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EXERCISES IN REMOTE COLLABORATION - HUIS CLOS / NO EXIT - (OR, "HOW CYBERFORMANCE REVEALS INTIMACY")

Annie Abrahams

In 2009 I started the artistic research project *Huis Clos / No Exit*. In this project I use a specially developed interface to unite several people remotely in a shared performance space that becomes subsequently both a laboratory and a playground. The performance experiences using this interface, suggest that today's intimacy is no longer revealed through private images but through behavior captured in real time interactions.

Angry Women, Annie Abrahams, screencapture of a performance test. bram.org/angry/women

Nowadays, people use webcams to film themselves and to express their ideas and feelings to the unknown other that will look at their videoblog. People rarely use their web- or phonecam to talk to someone else. The use of Skype is either very business like or restricted to family members. In Internet applications as Chatroulette people rarely exchange more than a glance. What they look for is their alter ego or an opportunity.

In her book *Alone Together* Sherry Turkle [1] describes how we hide more and more behind technology, how intimate communications start being something to avoid rather than to look for, how smartphones help us to flee our fear of the other, how we learn to control our relations via interfaces and how we are adapting our behavior to this new situation. Facebook teaches us how to simulate intimacy, how to make relations easy, clean, and without danger. At the same time, these relations also become superficial and makes us ask: Who are we when we don't perform? Why can't we show our vulnerable, messy sides? Why can't I be boring and cherish solitude anymore? In a society where authenticity and privacy become endangered it is important to find ways to access our vulnerabilities and doubts, to make them public, to cherish our messy side, to make place for the beast in the beauty, to go back to reality, to claim the human.

In 1998 I worked with at least eight other French artists, who I never met, on a collaborative website called lieudit.org. The site and the collective died in 2000, but I still have very nice memories of, for instance, our IRC rendez-vous during the launches of the virtual exhibitions we organized. Collaborating on a shared website was very stimulating, but in the end we couldn't find a common goal to make us better negotiate our differences and so we split up. It was very frustrating to learn that behind our machines we couldn't overcome these political, philosophical and emotional differences, that problems were exaggerated and stayed insurmountable.

This was the first time I noticed that collaboration using machines wasn't easier, maybe not more difficult either, but different from ordinary face to face communication. Later experiences with online collaborative creation interfaces, for instance Furtherfield's Visitors Studio, confirmed this.
So, in the early 2000s when people started talking, dreaming and glorifying the advantages of Internet collaborations, I was very doubtful and somewhat vexed; and so decided to start thinking about how to use the recently developed streaming interface of panoplie.org for working on these problems. (1)

In telematic performances intimacy is not where you think it is. *The Big Kiss* performed with Mark River (of MTAA) in New York in 2007 [2] might have looked as an intimate performance, but in fact it was closer to a 'drawing à deux' session than to a real kiss, even if it did awake intimate feelings, as drawing a kiss on paper might also have done.
In the telematic performance *One the puppet of the other,* with Nicolas Frespech (Paris 2007), [3] we felt most intimate, most close together when we didn't exchange, when we were waiting, when nothing happened.

In 2009 I started *Huis Clos / No Exit*: a networked performance series investigating collaboration at a distance and relational dynamics in a dispersed group. [4] With an interface developed by Clément Charmet (panoplie.org) and Estelle Senay (Théâtre Paris-Villette / x-réseaux) I could unite the images and sounds of the webcams of up to six participating performers in a mosaic. The physically separated performers could share borders and interaction surfaces in a common virtual space and become co-responsible for the mosaic image projected in front of the public during performances. At all times they had this same mosaic image on their screen.

A first experiment took place in November 2008 in the International Laboratory of Interactive Digital Media on Stage, organized by NU2's in L'Animal a l'Esquena, in Celrà, Spain. In one of the tests, I asked three performers to execute a protocol that stated that, before leaving the performance interface they were to compliment the others after having insulted them. It was strange and beautiful to see how they couldn't stop complimenting and saying nice things to another. Later I became more and more aware of how the performance interface, besides allowing observation of behaviour in collaboration and auto-organization, can also reveal private, intimate behavior to the public. The cyberperformers are so occupied by their interactions, that they don't have time to negotiate their image as they mostly do on the Internet.

I talked about machine-mediated revelation of intimacy in an interview with Maria Chatzichristodoulou published in *Digimag* in Oct 2010. [5]

I always look for situations that make any attempt at escaping from exposure impossible. In general I do not rehearse my pieces. If this is necessary – for instance, due to technical reasons – I write new protocols for the final performance. I try to find ways to penetrate the other performer – just for a second I want them to expose themselves to me (and to our observers) in an action, or a response, that

is out of their control. I want them to unveil something they usually hide or only disclose in situations of complete trust, of complete intimacy. I want to know how they function, not by them telling me, but by me almost forcing them to reveal an instance of their 'hidden code' in public. I want us to go beyond self-representation and the control that this requires. Am I really forcing them to do this?... No I am not. What happens is that the situation in itself – that is, the telematic performance interface, the protocols, the flaws in the streaming connections – rewrites the conditions of communication in a way that makes this revelation possible, if not inevitable.

Because I think we need to counterbalance the tendencies to make our Internet-mediated relations cleaner, faster and more and more secure I started paraphrasing Rancière, "The real needs to be trapped in order to be available for thought." [6] (2)

Notes:

(1) From 2006 - 2009 I organized the Breaking Solitude and later the Double Bind web performance series with panoplie.org. While they started out as performances around the idea of the Internet as a public space of solitude they became more and more involved with experimenting "different ways of being together." What can we share, what do we share, how are we interacting and what is this technology doing to us? http://2008.panoplie.org/2008.panoplie.org/#//DoubleBind

(2) Because the Huis Clos / No Exit interface makes people film their own image, a collaborative cyberformance using it can also be staged as a live production of an autonomous video, available for reflection. http://bram.org/huisclos/toutvabien/indexang.html

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THE DIGITAL CONTAMINATION OF DRAMATIC THEATRE: SUBJECT TECHNOLOGY IN EXCEPTION

Gorkem Acaroglu

Drawing on Derrida's analysis of the metaphysics of presence, this paper examines the centrality of presence in theatre commentary, arguing that such a privileging demonizes projected media as a form of contamination. Through a close look at a hybrid work that integrates live performers with avatars from Second Life, I seek a way to move forward between conditions of possibility and impossibility.

Dramatic theatre claims that it is a unique site of literal co-presence while asking audiences to forget their own presence and give precedence to a closed fictional world 'made present' by the auratic actor. In contemporary performance, two practices have emerged that shift these traditions: digital performance, where technology challenges the position of the actor as central; and live art or participatory performance that places the audience at the centre of the performance encounter. Although contemporary practitioners often rally against the prejudices of dramatic theatre, an understanding of its core assumptions can benefit emergent forms and prevent them from replicating those aspects deemed problematic in traditional practice. An awareness of literal, fictional and auratic presence as mediation can enable a richer theatrical encounter. I draw on Derrida's analysis of the metaphysics of presence to establish the centrality of presence in a significant amount of commentary on theatre, arguing that such a privileging of presence demonizes projected media as a form of contamination that impedes dramatic theatre's ability to represent 'truth.' While much has been theorized about presence in theatre, my position is that of a practitioner grappling with the problems that a privileging of presence brings to my work, of which I will examine a specific example.

From Greek antiquity onwards, discourses on the essential nature of the theatrical invoke some variation of what Peter Brook labels "a mystery called the present moment." [1] For example, playwright, actor and author David Cole claims, "theatre closes a great rift in our lives by enabling us to experience imaginative truth as physical presence." [2] Actor and Director Jean Louis Barrault believed that, "the final aim of mime is not the visual, but presence itself." [3] Practitioners like Eugenio Barba are concerned to define 'theatre's essence' which he claims, "consists… in radiating through the rigor of scenic technique an individual and collective *form of being*." [4]

'Being' can apparently be experienced through the actor's presence as expressed by actor and theorist Jean Pierre Ryngaert, "It is not always to be found in the individual's physical features, but in a radiant energy whose effects are felt even before the actor has acted or spoken, in the vigor of his being-there." [5] American director and teacher, Joseph Chaikin made similar claims, "It's that quality that makes you feel as though you're standing right next to the actor, no matter where you're sitting in the theatre… It's a kind of deep libidinal surrender which the performer reserves for his anonymous audience." [6]

Theatre is the place where co-presence of actor and audience apparently enables connection with the present moment. American designer Robert Edmond Jones believes that: "This is drama; this is theatre –

to be aware of the Now." [7] Descriptions of theatre often refer to it as a unique site of presence, like Norwegian poet, writer and playwright Jon Fosse describes:

[…] these intense, clear moments, although they are hardly explainable, are moments of understanding, moments when the people who are present, the actors, the audience, together experience something which makes them understand something they never before have understood, at least not as they now understand it. [8]

I have quoted extensively here to demonstrate the privileging of presence in much twentieth century theatrical discourse.

Through these quotes, we see what Eugenio Barba describes as a search to "transcend the performance as a physical and ephemeral manifestation, and attain a metaphysical dimension…" [9] Antonin Artaud and Jerzy Grotowski both attempted to transcend performance by eradicating the text while Constantin Stanislavski and Bertold Brecht outlined ways for the actor to speak so that all traces of the text were not felt to be present. Stanislavski's mission was designed to bring presence to the absence of the written word. It requires immense skill to achieve a sense of this, and we praise actors that give us the illusion of doing so. In his essay, *Just Be Yourself*, Philip Auslander critiques Stanislavski, Grotowski and Brecht, stating "all assume that the actor's self precedes and grounds her performance and that it is the presence of this self in performance that provides the audience with access to human truths." [10] It is this auratic actor that has been central to dramatic theatre, an idea which remained unchallenged until Derrida's deconstruction of Western philosophy's privileging of presence.

Derrida's analysis of 'the metaphysics of presence' has become an important feature of recent performance studies and helps us to understand why projected media in performance has threatened dramatic theatre. The desire to attain 'pure presence' through theatre, to eliminate all representation and 'access human truths,' if one follows Derrida's logic, is not possible or desirable since pure presence is outside time and therefore equals death. Derrida argues that every known thing is relational and the result of 'differance,' defined by what it is <u>not</u> rather than by an essential nature. The present moment itself cannot be grasped, there is never a now that can be restrained and held. The present always contains a mark of the past, at the same time as it allows itself to be invalidated by the mark of its relationship to the future. Difference is indeterminable and therefore meaning arises from something that is not present. The present moment can similarly not be apprehended. Derrida terms this non-presence 'differance.' He argues that full presence cannot be reached because no instant can exist outside of time; the present has disappeared before it has made an appearance. Signs are present in the absence of the things they signify. The sign represents the present in its absence.

The concept of 'differance' is important here as it helps us understand why traditional theatre has excluded the use of projected media. Many of the practitioners I have mentioned demonstrate a strong desire for various forms of theatrical presence. This desire is not limited to proponents of dramatic theatre and can be found in contemporary and postmodern theatrical discourse. Live art, for example, is a form of contemporary performance that, it could be argued, craves presence. I am interested to examine the assumption that any theatre or performance can 'make present the present moment.' More often than not, the desire for presence dismisses the use of technology because it imagines that technology contaminates the live actor: the conduit through which it is assumed full presence can be reached. Technology's use in theatre <u>can</u> bring into question claims of presence. It can disturb the assumption that presence is attainable, by making evident the fictional illusion; in juxtaposition with the actor it undermines the notion that theatre is a site of literal presence; and it can intrude on the actor's

charisma or aura. Most threatening about technology in theatre, is that it questions theatre's claims to 'a mystery called the present moment.'

A number of prominent commentators, such as Philip Auslander and Elinor Fuchs, have put forward that deconstructing theatre's illusion of presence is essential in order to demystify theatrical representation. I would argue that beyond deconstruction and demystification, theatre practitioners aware of the historical reach for presence can enable a more conscious play of both the audiences' and the actors' notions of presence. Auslander and Fuchs have been important in using Derrida's analysis to understand prejudices and assumptions in traditional theatre, but to a large extent we have gone beyond the need to make evident theatre's privileging of presence through the work. Cormac Power provides a comprehensive critique of theatrical presence. He defines theatrical presence in three distinct modes; the "fictional mode" of making present the fictional world of the play; the "auratic mode" of actors having presence as charisma; and the "literal mode" of actors being-present literally with an audience (co-presence). These modes are very useful to help us understand theatrical presence with a number of different aspects, and perhaps when we understand how these compete with one another then we will have the capacity "to explore and 'play' with notions of presence." [11] Power's main thesis is critical to this study: if theatre highlights that it is "part of a mediatic system" rather than claiming to be a privileged site of "unmediated 'nowness,'" (through literal, auratic or fictional presence), then theatre can realise its potential to show how the "(im)mediate" is itself "mediated." [12]

With emerging digital technologies, the notion of literal co-presence has had to be redefined. Until recently, most definitions of liveness referred to Auslander's binary opposition of 'live' and 'mediatized,' live only being understood since mediatization became a possibility. With the emergence of digital technologies, Auslander has had to redefine this notion of live. Speaking at the recent Transmediale 11 conference in Berlin, Auslander describes his new definition:

Liveness is no longer defined as presence of physical persons in front of each other or physical and temporal relationships. The audience's experience is now the locus of liveness. Digital liveness emerges as a specific relation between self and other. Our conscious act at grasping virtual acts as live in response to the claims they make upon us. [13]

The positioning of the audience as the test for liveness has created some controversy. In 2002, Auslander published a provocative paper about chatterbots, which prompted a number of responses. The crux of Auslander's argument was that, "The chatterbot forces the discussion of liveness to be reframed as a discussion of the ontology of the performer rather than of the performance." [14] He made this claim because the internet chatterbot performs live according to one of the Oxford English Dictionary's definitions of live, "Of a performance, heard or watched at the time of its occurrence, as distinguished from one recorded on film, tape, etc." [15] The Internet chatterbots are performers themselves, Auslander says, because they create their performance at the same time as we witness them. This proposition suggests that a live performance is no longer determined by the performer as live person, and therefore removes performance as a specifically human activity. Liveness, Auslander claims, is now determined by the audience 'being there,' rather than the performer. This notion that liveness is not dependant on the performer, but on the audience/viewer is important when we investigate further the relationship between projected media and its uses in theatre. Would we consider a work to be live if all the actors were avatars operated in real time, but not literally present, for example?

In a theatre that privileges the actors' literal and auratic presence, where the spoken words of a text are used to make present a fictional world, projected media has often been viewed as contamination. Having posed that presence is threatened by technology in theatre, I now want to look at a specific example of my own work that further problematizes this privileging.

Exception is a performance that uses the multi-user online virtual world, Second Life, as both metaphor and tool for performance. As a metaphor, Second Life functions as literal 'second life' for asylum seekers lucky enough to be offered a permanent home there; as a site for performance, one actor on stage interacts with avatars projected and operated (mostly) live from Second Life. The show is currently in its third stage of development in Melbourne, Australia. During the first stage, we proposed three possible interactions between actor and avatars; (1) Avatars (including an avatar of the actor), operated live by on-stage actors who manipulate the avatar movements visibly at workstations, voicing them from on-stage; (2) Actor interacting with pre recorded avatars including pre-recorded voice; (3) The capacity for live and remote audiences to interact as avatars in Second Life, projected into the theatrical space.

The desire to bring Second Life into theatrical space is a desire to 'make present' what is not present: a virtual world. Avatars are 'given life' by their scale of projection, method of voicing and dimensionality. Theatre however, has arguably always attempted to 'make present' that which has not been before it. Making Second Life avatars present in a three dimensional space is therefore not structurally different to any of theatre's other endeavors. My bias for theatre over virtual worlds demonstrates a privileging of presence on my part.

The actor onstage in *Exception* is immersed in an entirely animated projection world. All settings and characters are created from the crude two-dimensional animation that is the Second Life aesthetic. The argument that projections overwhelm live bodies is challenged when the actor is immersed inside the projections in this way. It is a common perception that projections overwhelm the live actor because of the dominance of the screened image. While this view may be true in specific performances, it is not a given that projections overwhelm live bodies. In the case of *Exception*, the immersion of one actor amidst an entirely animated world framed his liveness. It was impossible not to see him first. Rather than overwhelm the body, projection integrated with the actor and blurred the distinction between organic and mediated. In this way, the juxtaposition of actor and animation can make liveness more prevalent. The animations in *Exception* made no claim to being real. One actor immersed in an animation world enhanced the actor's auratic presence while at the same time challenging its power.

Another trope of dramatic theatre: an emphasis on empathy and identification, is challenged when most of the characters on stage are digital. Empathy has been well critiqued by Brecht in the last century who defined his epic theatre as the elimination of empathy and imitation. Brecht felt that film lends itself to "a type of drama not depending on empathy," and for the audience, he claimed that the use of projections in theatre "prevent[s] his complete empathy, interrupt[s] his being automatically carried away." [16] Brecht was significant in identifying traditional theatre's reliance on empathy and imitation and attempting to dislocate this but, as Auslander noted, Brecht's conception of the role of the actor was also based in the metaphysics of presence. Andre Bazin, amongst others, have refuted Brecht's claim that audiences do not empathize with the screen, however Brecht's claim that juxtaposition of projection on stage can prevent complete empathy, is relevant to this paper. Patrice Pavis defines identification as a "process of *illusion* whereby the spectator imagines himself to be the character represented and the actor gets right 'into the skin' of the character." [17] In *Exception*, through the juxtaposition of actor with projection, a level of estrangement occurred. The audience was brought closer to the actor's aliveness because the actor was surrounded by non-living entities: the animated avatars. Their otherness signaled

the actor's aliveness. The capacity for empathy was not affected, success of a closed fictional world to engage the audience's care factor remained the same whether projections were used or not. Dependent on the success of the closed fictional world, dramatic theatre's desire to create empathy in an audience can still be achieved. However, Brecht's objective to estrange the audience can also be enabled by using the projections to interrupt our identification with the living actor/character and reflect upon the fictional illusion made present. The argument that audience cannot empathize with projected characters ignores the capacity of projection to enhance empathy with the actor/character by framing the actor's liveness. 'Cyborg theatres' like *Exception* have the capacity to enhance empathy and identification, while at the same time enabling a kind of 'verfremdungs effekt.'

From its inception, *Exception* was conceived as a project that would enable interactivity from live or remote audience members via their avatars in the Second Life world. The idea being that the auratic present actor would engage in a three-way interaction with the two-dimensional avatar objects that could be operated by either audience or on-stage operator. This would enable real time interventions into the apparently closed fictional world that the piece otherwise constructs. Prior to showing the work-in-progress to an invited audience, we staged an in-world interactive exercise, which would feed this capacity for live intervention. One of our sets was a detention centre, created in Second Life. We placed our main character's avatar, Asim, in the virtual facility and publicized the fiction that Second Life had detained him. We had anarchists and communists from all over the world attempting to break Asim out (which they achieved quite easily). After sometime, with varied reactions, we enlisted a few of our more engaged rescuers to 'perform' in a live showing. During the section where our onstage actor and his avatar were locked in Second Life detention, the anarchists were to rescue our avatar, but of course our on-stage actor remained behind bars.

The participatory capabilities of *Exception* have not been explored to their full potential, but in an effort to engage the audience's awareness of their presence, we are moving the work to function as a game, giving the audience agency in the creation of the work. Already *Exception* plays with the actor's auratic presence by immersing him in an animation world and introducing avatars as 'live' animated characters. Now we propose to interrupt the fictional world by enabling further audience interaction.

In *Exception*, 2D animations are 'made present' through live interaction, operated and voiced in real time. This unsettles the notion of theatre as the privileged site of literal presence. The actor's auratic presence is challenged by juxtaposition with life sized animated characters; and by enabling audience's participation, the fictional world made-present is challenged. At the end of the day, *Exception* is no different from any piece of theatre that attempts to make present that which did not exist before it. However, *Exception* does this in such a way that the different modes of theatrical presence – literal, auratic and fictional – are identified as mediated and their competition with one another enables an enhanced awareness of liveness.

I have not resolved the problem of the privileging of presence in digital and participatory performance but through the development of *Exception*, my thinking has changed. By making this work, I have discovered that the ancient tradition of theatre can offer a rethinking of fundamental notions of presence to contemporary forms that engage with electronic arts. Far from attacking the metaphysics of presence, I seek a way to move forward between conditions of possibility and impossibility.

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15. *Ibid., 20.*
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ALGORITHMS AS STRUCTURAL METAPHORS: REFLECTIONS ON THE DIGITAL-CULTURAL FEEDBACK LOOP

Romy Achituv

Through a series of illustrated examples this article purports to show how the application of digital — algorithmic — paradigms to analog media may illuminate values and perceptions inherent in the digital models themselves.

Fig 1. R.E.M. Imitation of life music video freeze-frames
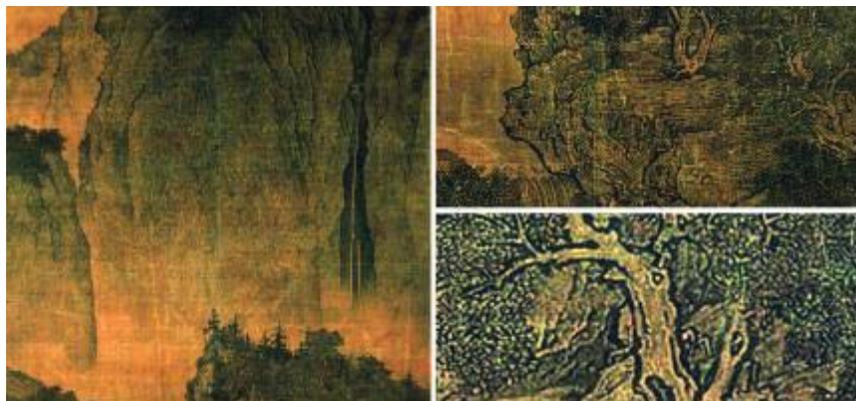
Fig 2. Fan Kuan, Travelers amid Mountains and Streams, National Palace Museum, Taipei

Fig 3. History stickers (Mandarin, English, Bengal), and emotional categories stickers (English, Nepalese, Mandarin)

The following excerpt from the full-length article focuses on three examples: an R.E.M. music video and two art projects co-authored by the writer. An extended discussion of metaphor, cognitive paradigms and perception, which establishes a theoretical background to the given examples, has been omitted for lack of space, as have most of the footnotes and images. The text has been edited for continuity.

*

In 2001, the American rock band R.E.M. produced an intriguingly "economical" music video for their song Imitation of Life [1]: a four-minute clip of an elaborate and densely populated pool party, pieced together from a single, stationary, twenty-second long shot. A virtual camera wanders through the scene, zooming in and out to focus on different vignettes while the source clip loops continuously back and forth. [2]

The short duration of the single shot and its looped unfurling and recoiling divorce it from its linear cinematic substrate and transform it into a pictorial, a-temporal, medium perhaps more akin to a kinetic picture, i.e. a picture with moving parts. Were we to view the source clip alone running back and forth unedited, we would be unlikely to experience it as passively as we would do, a cinematic narrative. Rather, we would actively explore its pictorial-scape, tracing our own paths through the crowded scene, choosing the vignettes we wished to focus on and the duration of our engagement with them. We might begin with a close-up of a woman bidding a fond farewell to her older partner only to turn and run into the arms of another, zoom out and refocus our eyes on a man set ablaze by a barbecue fire, then shift our spatial orientation, perspective, and attention to a group seated around a table presided over by a woman whose monologue is cut off only as another empties a glass of water in her face, and so on.

The cinematic experience of the R.E.M. video is rendered, not through the narrative of the twenty-second shot, but rather through the (meta-) narrative imposed by the sequential stringing together of selected vignettes. The edited video offers one possible narrative path, simulating the wandering eye of a viewer exploring the a-temporal scene.

The iterative spatial and temporal reframing of segments of the video clip might be described as a per-petual resampling of the video "database," analogous to the process of random access whereby com-puters retrieve arbitrary data directly, without the need to sequence through prior locations. If the ran-dom access metaphor seems apt, it is because we recognize in it a freedom that we associate not only with the nature of human perception, but also with cognition itself. The eye's capacity to wander the visual landscape of R.E.M.'s pool party is intimately connected with our sense of agency and freedom of choice.

The dynamic and multifarious nature of perception has long been embodied in traditional East Asian painting. Unhampered by the convention of single-point perspective, Asian paintings often depict scenes that combine multiple perspectives within one composition. The viewer's eye is made to wander in, out, and across the picture plane, alternating between grasping the composition as a whole and focusing in on details. Transitioning through scenes presented from multiple vantage points, the viewer constructs a multi-dimensional mental image of the depicted world. A peasant trailing a caravan of donkeys viewed from afar and above, for example, may appear at the foot of mountains which themselves are painted at eye level, and which may, in turn, be seen in the foreground of great cliffs viewed up close and from below. Mimicking human perception itself, the multiple scenes, each assigned an idiosyncratic perspec-tive, appear to exist in a single harmonious space.

Similarly, as it wanders through the looped visual time capsule of the R.E.M. video, the virtual camera offers reframed vignettes for our mind's eye to assemble into a coherent whole. The video thus offers a representational model that evokes, at one and the same time, the manifold perspectives that harmo-niously coalesce in the traditional Oriental painting, the mechanism of random access data retrieval, and the perpetually shifting focal points and fields of vision that characterize the free dynamics of human perception.

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French phenomenologist Maurice Merleau-Ponty died in 1961, almost thirty years before the dawn of Photoshop. "When the data of the world is subjected to coherent deformation," earlier that same year he wrote, "meaning is always present." [3]

Merleau-Ponty's characterization of experience as malleable data to be acted upon rings surprisingly contemporary, as it conjures up a world that can be accessed by means of algorithmic computation. Merleau-Ponty's view corresponds to western ideals of artistic expression that have, since the early Re-naissance, exalted the creative vision of the individual artist. Indeed, Modernism strongly endorses the notion that what constitutes the particular creative vision of an artist or artistic movement is expressed through their idiosyncratic, yet coherent, representations of reality. In other words, it is the coherent de- and re-formation of reality that we commonly refer to as the expressive quality of a given work iden-tifying in it the artist's conceptions, emotions, and ways of seeing, or in short, its meaning.

Present day technology forces us to reexamine Merleau-Ponty's analysis of the provenance of "mean-ing." We need only consider the multitude of preset filters packaged with standard media editing tools, such as Photoshop and After Effects, to realize that these programs provide their users with a host of automated procedures for fabricating "coherent deformations." However, does the rote application of a graphic filter necessarily produce meaningful expression in the altered image?

It might be argued that the meaning inherent in the application of a standard filter is the effect of the distortion itself. Thus, the meaning of a Gaussian Blur filter, for example, would be the blurriness of the affected image. However, we are only able to attribute meaning to the Blur filter due to a shared convention about what "blurriness" denotes. It is not the automated distortion; that imbues the image with meaning, but rather our perception of it.

Whether our perceptions are cognitive models grounded in convention (such as when we interpret the meaning of standard image filters), or formed in response to an artist's singular idiosyncratic vision, they acquire meaning by virtue of their relationship to their object of contemplation--that is, by virtue of intentionality without, intentionality meaning would remain indeterminate.

According to the Sapir-Whorf hypothesis, the cognitive structures fashioning the meanings we assign to a given image or utterance in everyday discourse are generally indiscernible as they constitute a seamless part of our perception. We become cognizant of these structures when ruptures occur in our cognitive "fields of view." These ruptures may be caused by internal sources, such as a sense of dissonance that rises to the level of awareness, or by external sources, such as an alternative paradigm that challenges our perceptions.

Art practice is a distinct arena where such challenges take place by design. "Dissonances" are introduced into artworks through "intentional coherent deformations" that are meant to draw attention to the structures of expression as much as to the content. In the words of Lev Manovich: "In art, the connection between content and [form] is motivated," [4] and "just as modern thinkers, from Wharf to Derrida, insisted on the [opacity] of code idea, modern artists assumed that content and form cannot be separated." [5] Consequently, the critical focus of modernism has been no less about the forms of expression than about the subject matter itself, often collapsing one into the other.

If the formal characteristics of an artwork shape its content, it can be said to render visible its structural code. While some elements of the code may be idiosyncratic, reflecting the singular vision of the creator, others are necessarily normative, relying on established convention. In either case, the code is made visible through the intentional analysis of its semantic value. Modern art is, therefore, a unique investigative space for exploring the structural determinants that underlie our conventions of representation and the semantic readings they dictate.

Viewed from this perspective, R.E.M.'s Imitation of Life video can be said to assign meaning to the navigational structure of the piece, i.e., to its non-linear "coherent deformation" of time and space–a reading which reveals characteristics of the code that otherwise might have remained opaque. Below are two examples of art projects that introduce digitally-inspired structural paradigms into physical interfaces, thereby capitalizing on the metaphoric potential of intentional coherent deformation.

The Garden Library

 http://www.thegardenlibrary.org [6]

The Garden Library is an open-air structure situated in the heart of a public park in the center of Tel Aviv. Established in 2009 to serve the community of refugees and migrant workers who congregate in the park on weekends, the library has no walls or door and is comprised solely of two bookcases supported by the walls of a public shelter. It contains approximately 3,500 books in 16 languages.

ARTEAM, the artists' collective that initiated and produced the library sought to break away from traditional categories of classification and to realize a sorting and indexing system that would playfully manifest the values of an open society. Accordingly, the books are not catalogued according to genre or author name, but dynamically, according to reader input.

On the inside back, cover of each book is a sticker that asks, "How would you describe the book?" and offers seven emotional responses the book may evoke: amusing, boring, bizarre, depressing, exciting, inspiring, sentimental.

When returning a book, the reader is asked to choose the fitting emotional descriptor, and the color-coded judgment is added to the history of responses on the spine of the book. The book is then placed on the shelves according to its latest emotional classification. In other words, the placement of the book is not decided by popular vote, but by the last reader, using a dynamic system that everyone can impact and in which every participant's input counts. The cataloguing system constantly restructures the layout of the book collection, creating at any given point in time a transient "wandering map" that reflects the readers' opinions and preferences.

ARTEAM thus sought to apply the non-linear algorithmic logic of digital technologies to the physical holdings of the library, transforming the book collection itself into a database that is continuously restructured on the basis of user input. The cross-disciplinary application of the algorithmic procedure to the library's physical collection directs attention to the structure of the cataloguing system itself. The system transforms the library into a small, parallel world where the books wander between the shelves as their readers wander the world, carrying with them their emotional history.

Hall of Memory – Ghetto Fighters' House, Israel

http://m--a--p.net/yizkor/Yizkor.htm [7]

The Ghetto Fighters' House Museum commemorates Jewish resistance during World War II. Founded in 1949 by a community of Holocaust survivors and former members of the Jewish underground and partisan units, it was the world's first Holocaust museum.

In 2007, the museum inaugurated a new Hall of Memory, designed to allow visitors direct access to archival material. Glass walls form the rear panel of the archive drawers, and visitors are invited to choose the drawers they wish to illuminate by touching blue light indicators on the glass panes. Touch-activated interfaces located behind the glass panes provide access to information about each item.

The designers sought to make available to the public the memories contained within the artifacts, enabling free access to the physical legacy of the country, its people, and its history. As in many traditional archives, these "semantic building blocks" of the historical narrative had previously been guarded as national treasures, open only to researchers and curators.

The multiple paths, which visitors can trace through the archives, echo the multi-thread non-linear structure of parallel computing. Indeed, the digital model was not only the initial inspiration for the design of the archive experience but is also integral to its symbolic reading. By transferring responsibility from the institution to the individual, the open archive democratizes the historical narrative. Each visitor

becomes as it were a curator, entrusted with the task of determining their own path through the physical "database" of historical memorabilia.

The archive occupies two adjoining sides of the hall, with a large-scale generative installation on a third wall. The installation cycles through over 4500 names of Jewish communities that existed before the war. The names are formed from letters that float up from a rubble-like base, pausing momentarily to assemble into a name, and then immediately breaking apart again.

The fragmentary and individual sampling of the database of names formally echoes the visitors' experience of navigating the museum archive. At the same time, the installation symbolically complements the archive by reflecting the notion that the viewer is responsible for sustaining historical memory. As each name falls apart, its memory lingers on only in the mind of the beholder.

Conclusion

George Lakoff and Mark Johnson's Cognitive Theory of Metaphor has had a seminal impact on the perception of metaphor in contemporary semantics. Once looked upon simply as a linguistic or literary device, metaphor is now regarded as a conceptual mechanism. Lakoff conceptualizes metaphor as a cross-domain mapping, [8] namely, "a cognitive mechanism whereby one experiential domain is partially 'mapped', i.e., projected, onto a different experiential domain so that the second domain is partially understood in terms of the first one." [9,10] Any yet, while the projected domain is intended to elucidate the target domain, metaphor is self-reflexive: it cannot help but draw attention to those characteristics of the original domain we "intuitively" perceive to be relevant.

In this sense, the R.E.M. video, which metaphorically applies the logic of a random access database, employs a representational paradigm that structures our interpretation of the video while simultaneously providing a context for a semantic reading of random access itself. Similarly, the cataloguing system of the Garden Library and the open archive of the Ghetto Fighters' Museum are symbolic systems that imbue the projects with meaning while acting as interpretive models, which they borrow, from the digital algorithmic structures.

Such cross-disciplinary mapping from the digital to the physical sheds an intriguing light on aspects of the feedback loop between culture and the technologies it engenders. When they appear in a work of art, these metaphorical structures illuminate the cognitive constructs and values that digital technologies are introducing into our lives, perhaps representing a means by which the non-transparency of the digital code may become a little less opaque.

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CORPOREAL_EXPRESSIONS: TRACING BOTH BIOMEDICAL AND EMOTIONAL LINKS FROM AN ARTISTIC PERSPECTIVE

PATRICIA ADAMS

What issues are involved in 21st century representations of corporeality from an artistic perspective? What parameters and methodologies are required when contemporary biotechnology and neuroscience are rapidly changing the ways we see ourselves and actively remodeling the human body? These questions drive my research and have formed the basis of my art/science practice and my investigations into both the biotechnical and virtual domains
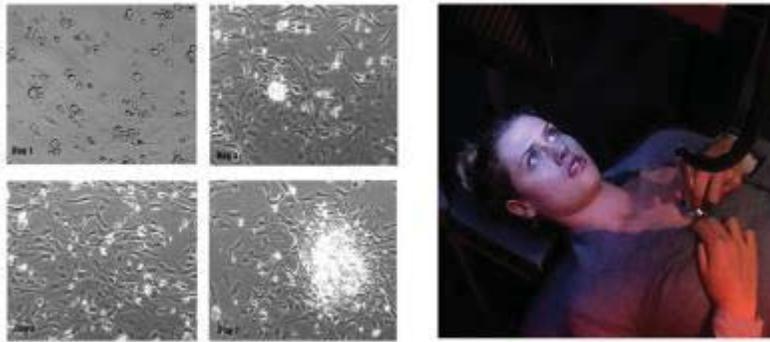
Fig 1 machina carnis, 2005,composite digital image showing adult stem cells changing into cardiac cells & an installation participant using the modified stoscope. © Trish Adams

Fig 2 Changing Fates matrilineal, 2009, digital video still. © Trish Adams

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Fig 3 mellifera, 2009, in-world shot of Neurone Schism, a.k.a. Trish Adams, Essential Beeswing & Nonnatus Korhonen, a.k.a. Andrew Burrell. © Trish Adams

INTRODUCTION

This survey of my art/science research practice traces my experimental methodologies and considers my hybrid, interdisciplinary explorations into the nature of corporeality. It illustrates how my artistic reinterpretations of scientific experimental data led to the creation of artworks that implicate the viewer as a participant who can evaluate the socio-cultural issues raised by contemporary biotech research. Recontextualising scientific data in interactive artworks and placing installation viewers in a participatory role offers an alternative experience to that of direct laboratory engagement.

Whilst escalating levels of scientific disciplinary constraints impacted upon my art/science research processes, my observations and data interpretations deliberately maintained an acknowledged artistic focus. My artworks: "machina carnis", "Changing Fates_matrilineal" and "mellifera" are introduced here to illustrate how I reinterpreted what is commonly termed 'hard' scientific research from the perspective of a visual artist. I introduced a sensual reading of the scientific experience, which resonated with the reintroduction of the Baroque aesthetic, so long rejected in favor of literate understanding and reason:

"(i)t is precisely the baroque's subversion of the dominant visual order of scientific reason that makes it so attractive in our postmodern age…in its disparagement of lucid clarity and essential form, baroque vision celebrated instead the confusing interplay of form and chaos, surface and depth, transparency and obscurity." [1]

My personal interpretations and responses have been paramount when developing hybrid spaces, and open-ended methodologies and during my innovative art/science research four fundamental questions arose:

1. What will occur if a visual artist engages with biomedical engineering as a first-person researcher?
2. Can two customarily divergent disciplines create hybrid spaces where artists can interrogate science?

3. How might an artist represent 'corporeality' at the beginning of the twenty first century?
4. What constitutes 'humanness' when both contemporary biotechnology and digital systems are rapidly changing the ways we see ourselves and actively remodeling the human body?

MACHINA CARNIS

The "machina carnis" project involved working in collaboration with a biomedical scientist, Dr. Victor Nurcombe. I was arguably the first artist to experiment on her own adult stem cells and change them into beating cardiac cells in the laboratory. [2] In these experiments, I contravened accepted scientific protocols by assuming the role of a 'human guinea pig' and carrying out my research in the first person on my own cells. The University ethics committee considered this a problematic methodology. They were concerned that, from a hygiene perspective, there could be a danger of transmitting life-threatening diseases when unscreened human material is put into equipment and cultured in the laboratory. Also, following the repercussions of the landmark He La case, [3] they had to take into account complex moral and ethical issues in the areas of social values and ownership. A first-person methodology was crucial to my research focus in spite of these problems. My commitment to a first person approach was based on the belief that it would increase empathy between the viewer/participants and the artworks and enable me to be more deeply immersed in the project. In the words of my scientific collaborator, Dr. Nurcombe:

 "…(y)ou have entered into the heart of a research project as a core participant. You were at once subject and object, (experimenting on) your very "ground-state" – your own material." [4]

Eventually the University ethics committee granted clearance to the "machina carnis" adult stem cell experiments, and we could begin. The ensuing "machina carnis" artwork encouraged individual emotional responses from gallery goers that in some ways mirrored the intensity of my own reactions during the scientific experimental processes. The installation was interactive and placed the viewer in the position of a participant who brought the work to life through their individual engagement whilst evaluating the contemporary biomedical and socio-cultural issues it raised.

Creating art/science collaborations that interrogate scientific research and open channels of inquiry in the public domain lead to my second question: what meaningful criteria facilitate the establishment of art/science collaborations in the first place? Cross – disciplinarity is complicated by the fact that art and science have become increasingly polarized by the specialist techniques now inherent in cutting edge science. This division began after the age of natural philosophy when the disciplines of art and science diverged in the early modern era. [5] This separation means that, for an artist who intends to collaborate with a scientist, doubts about the possibilities of a significant engagement between a scientific specialist and a visual artist are bound to arise. However various collaborative models are developing. For example, Professor of Digital Media Art, Joel Slayton suggests that constructive links occur when artistic collaborations expand upon aspects of research in unexpected ways: "…although art and science share many characteristics, a special role for the arts exists in the evolution and deployment of technology – the implication being that by operating outside the conventions of traditional practice, unique and significant research enterprises can and will unfold." [6] In cases such as my own, spaces for an artist arise when the exploratory collaborative methodologies are adaptable and malleable enough to be opened up and create a different type of research dynamic. Once again I cite Dr. Nurcombe:

"…(our collaboration) could only really be considered as "research" as I understand it, at a much more esoteric level; I would have thought we set out to do something quite "other", something more open-ended. Research with other scientists is usually extremely focused and conducted within tight parameters; it's not about possibilities so much as progressively excluding as many possibilities as possible. Our work was conducted much more in the spirit of "what if?" [7]

In other words, our art/science research methodology produced a hybrid entity which did not aim to mimic hard scientific research; rather it harked back to the cross disciplinary fluidity typified by the natural philosophers and, in doing so, allowed for the merging of different perspectives and the creation of organic outcomes.

The third question raised in this paper refers to twenty-first century representations of corporeality. In the "machina carnis" project, I explored scientific data from the perspective of a visual artist and acknowledged its corporeal origins. From the start of the laboratory experiments, I declared my partiality, and I clearly stated that I was making no attempt to emulate customary scientific claims to objective data readings. When I held my own cells in a Petri dish I did not document their behavior outside my body in a clinical way, I responded personally to the impact of this experience. Likewise, I regarded the time-lapse videomicrograph cellular image data, from my experiments, as more than a form of scientific documentary photography. With its intimate human origins and corporeal associations, this cellular image data was emotionally evocative and tactile. Professor Geoffrey Batchen refers to the semiotician, Charles Pierce's definition of "contiguity." Pierce states that contiguity was the indefinable dimension that was a focus of enquiry for the philosopher and theorist, Roland Barthes:

"Photography has never provided us with the truthful appearance of things, but it has guaranteed, through the magic of contiguity, the possibility of an emotional empathy across an otherwise insurmountable abyss..." [8]

I propose that closeness and emotional empathy was generated between my cellular image data and installation viewers. This cellular image data still carried a symbolic residue of my bodily presence, which in turn created an affinity with the viewers since it bore a metonymic relationship to their own cells.

CHANGING FATES

'Changing fates' is the term used by scientists to describe the ground-breaking process of chemically redirecting the growth of adult stem cells into a different type of cell. The artwork: "Changing Fates_matrilineal" expanded upon this research. It explored aspects of corporeality at the interstices between personal experiences and the symbolic traces embedded in the remediated cellular digital videomicrograph image data. The work included my adult stem cell digital videomicrograph image data and introduced the discourse surrounding mitochondrial DNA (mtDNA) and the female role played in genetic inheritance. My interest in mtDNA began when I read geneticist Brian Sykes' description of new, more accurate sequencing techniques that have enabled him to take DNA directly from bone rather than inferring its structure from amino-acids in collagen. These increasingly advanced sequencing processes have led to the formulation of Sykes' controversial theories that trace heredity via mtDNA. [9] Everyone gets their mitochondria from only 1 parent: their mother. For Sykes, MtDNA thus becomes a matrilineal indexical marker which, if the line of related women is unbroken, can survive through the female side from generation to generation. This mtDNA theory stimulated my curiosity about the underlying configuration of my biological relationship to my grandmother

Fig. 2 shows a photograph of my grandmother as a young woman. This is juxtaposed with a contemporary scientific digital videomicrograph still image of cellular data from my "machina carnis" laboratory experiments. I suggest that both these images carry residues of physical presence and form different types of portraits. However, this proposition is complicated by the fact that my adult stem cells have been changed in the laboratory into a different type of cell – the cardiac cells pictured – rendering their relationship to me physically ambiguous. Contemporary biotechnology has introduced layers of speculation and uncertainty into other corporeal connections.

CORPOREALITY

The final question presented in this paper considers our changing understanding of 'humanness' at a time when biotechnology is remodeling the human body and digital technologies offer us avatar selves in virtual domains. I was interested in the way a virtual environment might impact on my sense of self and my understanding of corporeality. With artist/researcher, Dr. Andrew Burrell I created the "mellifera" project that explored corporeality and identity in virtual worlds. "Mellifera" was a mixed reality project which included both real-time and virtual sites and a variety of participatory tropes in gallery spaces and on line. It drew poetic inspiration from direct research and observations of honey bee behaviors with Professor Mandyam Srinivasan's Visual and Sensory Neuroscience Group, Queensland Brain Institute, The University of Queensland (UQ). The "terra.mellifera" virtual environment was constructed in Second Life® (SL) and was home to self generating life forms and an imaginary species of virtual bee, known as 'mellifera.' This was my first experience of SL, and I found that whilst my avatar was, as far as I know, a digital representation of myself inworld; I invested her with the emotional and physical characteristics of my real world corporeal self. Consequently, when anthropologist and SL researcher, Tom Boellstorf suggests "virtual embodiment is predicated on a discontinuity, the gap between virtual and actual," [10] I take this as implying that an opening out of our scientific and philosophical frameworks is required to incorporate expanded constructs of 'humanness', the nature of living organisms and the impact of recent digital technologies on these reconfigured categories.

OTHER BEINGS

The extensive body of research on posthuman entities and actors that are not human paves the way for expanded notions of 'self' and 'other'. Consciousness Professor, Donna Haraway pursues her ongoing entanglements of species and states:

"(f)or many years I have written from the belly of powerful figures such as cyborgs, monkeys and apes, oncomice, and, more recently, dogs. In every case, the figures are at the same time creatures of imagined possibility and creatures of fierce and ordinary reality." [11]

Media theorist, Jussi Parikka discusses the history of etymological studies and highlights the contemporary relevance of pioneering ethological research. Parikka outlines the possibilities that insects and other nonhuman animals offer for rethinking media and for challenging our views of the natural and the artificial. [12] This research resonates with the corporeal complexities evoked by developments in biotechnology and opens the door to an ongoing expansion of what Haraway terms the "Principal Others to Man." [13] My recent residencies with the Visual and Sensory Neuroscience Group echo this research into inter-species links. At UQ, I experienced being in close proximity with honey bees in the largest indoor bee facility in Australia. I was initially surprised that, for most experiments in the bee facility, we did not wear protective clothing. In this space, honey bees and humans went about their business,

sometimes in contact each other and sometimes not. This unusual interspecies juxtaposition gave rise to my video: HOST (http://vimeo.com/channels/115324#12708853) for which bees were trained to come and eat from the palm of my hand. During my residency, I developed not only knowledge of the skills manifested by these amazing insects, but also an unexpected proximity to these 'non human others.'

SUMMARY

The art/science projects described here have all created layered networks of physical, emotional and sensory encounters. The research has involved cutting edge scientific technologies and the artworks have discretely featured the affective qualities of media technology. My innovative methodologies have traced both biomedical and emotional links from the perspective of a visual artist. Inserting a personal response into the reinterpretation and recontexualisation of the scientific data has enabled me to embrace contemporary theories about non-human 'others' and explore self and corporeality. Burgeoning virtual worlds and the newly discovered pluripotent characteristics of many adult stem cells have opened the door for potentially wide ranging changes to our physical structure. What once appeared immutably 'human' may no longer be so. In the artworks described here reflections on memory, emotion, materiality and ephemerality have been creatively interwoven with recontextualised and reinterpreted biomedical research. This has given rise to works that stimulate further debate as we strive to quantify our 'humanness' at the beginning of the twenty-first century.

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SHIVERING BOUNDARIES

PATRICIA ADAMS

My research explores the nature of corporeality in the biomedical sciences and queries the status of our "humanness" in the early the 21st century. I will discuss the intersections between art, biomedical science and honey bee research at the Queensland Brain Institute.

HOST, 2008, digital video still. © Trish Adams

INTRODUCTION

During laboratory experiments on my adult stem cells I felt that looking at my cells through the microscope was like looking into another world where I was able to make first-hand observations in a domain of non-human 'others'. The characteristics of the cells, observed at a microscopic level, highlighted issues relating to corporeality, sentience and cellular 'consciousness.' With the aim of finding out more in this field, I became an artist in residence with Professor Mandyam Srinivasan at the Queensland Brain Institute (QBI.) [1] I observed experiments being carried out on the 'cognitive' capacities of the European honeybee's small brain. In this paper I will discuss how the artworks: *machina carnis* and *HOST*, that developed out of my art/science collaborations, illustrate my research into the nature of 'humanness' and examine the 'shivering boundaries' between mind – body – self at first hand. [2] I will describe how the methodologies I employed created alternative 'habitats' by transferring cells from my body to other sites and then by entering into a different domain to carry out research amongst honeybees.

ORIGINS

When I discovered an abandoned kymograph, I traced the historical origins of this archaic machine for measuring physical and nervous impulses. [3] It inspired me to create art/science projects that referenced galvanics and nineteenth century experiments into electrical stimulation of tissue. I parodied early scientific attempts to quantify the human body that used the 'new technologies' of the day by such pioneers as Carlos Matteucci. [4] During this period, I read an article from a 1999 issue of the journal: *Science*, which declared that pluripotent adult stem cell research was the scientific 'breakthrough' of the year. [5] This article described how recent biomedical research into adult stem cells indicated that

some adult stem cells had the ability to become different kinds of cells. This ground breaking research resonated with my own explorations since it suggested potentials to fundamentally change the very structure of our bodies at a cellular level. In order to investigate this exciting theory I began my *machina carnis* project by collaborating with an adult stem cell research scientist: Dr. Victor Nurcombe.

MACHINA CARNIS

The *machina carnis* scientific process began when a doctor took a sample of my blood from which we could separate and culture the stem cells under laboratory conditions. After three days in culture, the drug 5'AZT was added to induce the adult stem cells to become distinctive, muscle-forming cells. At the same time a mixture of cardiac differentiating factors, with a proprietary molecule, were also added in order to change the undifferentiated stem cells into cardiac cells. In response to Dr. Nurcombe's unique chemical mix, the cells reproduced, matured and began to develop characteristics of heart cells. After the laboratory experiments were completed I reviewed the scientific image data and decontextualized it in the form of an interactive installation. My aim was to create a sensual reading of the scientific experience and draw each participant into an individual relationship with the *machina carnis* artwork. The installation employed open-ended methodologies, which encapsulated manipulable systems where the boundaries between the body and its environment were in a constant state of interplay and flux. Creating this type of permeable membrane between the artwork content and the individual participants reflected my own engagement with the scientific processes. My first-person research in the role of a human guinea pig had contravened accepted scientific protocols and exploded the customary tropes of scientific objectivity. By personalizing my engagement with both the experimental techniques and data, I aroused emotional links and raised questions about contemporary stem cell research and the status of our 'humanness' at the beginning of the twenty-first century.

CONSCIOUSNESS

I was motivated to find out more about cellular consciousness. I wanted to learn how the stem cells I had observed under the microscope might 'know' how to behave and interact with each other, so I moved from my collaborative project in the biomedical sciences to participate in research on the European honey bee. I became a visiting artist with Professor Srinivasan and the Visual and Sensory Neuroscience group at QBI. By studying the behavior and nervous systems of small insects, such as bees, Professor Srinivasan and his group are able to shed light on the cellular processes and functioning of larger brains such as our own. At QBI, I participated in experiments in the largest indoor bee facility in Australia. I had not realized that, in this unique space, we would walk amongst the bees without any protective clothing. From my perspective, after being conditioned to avoid contact with bees, this experience was a revelation. At first I was intimidated, and I felt vulnerable, but after a while I became entranced by the opportunity to engage in close proximity with these 'other beings;' to enter into aspects of their world.

NON-HUMAN OTHERS

In his recent book media theorist, Jussi Parikka gives examples of late nineteenth century ethnographers and twentieth century media theorists and ethologists who have described the spatial conditions of variation found in all sentient animals and entities. [6] I felt that, during my first hand research at the bee house, I was experiencing much of what Parikka discusses. In the bee house, the honeybees and human

beings went about their business side by side in their parallel operational spheres. Honeybees and humans were functioning independently but juxtaposed within the same habitat. I found this experience of intersecting domains a very powerful one. It became the underlying premise for my video: *HOST* where the honeybees were trained to fly down, land and eat honey from the palm of my hand. When the bees landed on my hand to eat, they entered into an unusual symbiosis with a human being – a poignant example of interspecies contiguity. In the video, my hand appears immense and, whilst the possibility of being stung renders me vulnerable, the bees also seem vulnerable as they stumble over this alien, fleshy terrain in search of food.

SUMMARY

During my research, considerations of inter-relational pathways and connections have encouraged me to move beyond customary categorizations and environments. I use the term: 'shivering boundaries' to describe the developing relational systems that evolved as I explored permeable membranes in both cellular and inter-species domains. The *machina carnis* and *HOST* projects demonstrate slippage between contemporary biomedical cellular research and current enquiries into non-human 'others' such as honeybees. In the light of my research, expressions and representations of corporeality embrace open-ended and interwoven territories that accommodate malleable, hybrid identities.

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URBAN ECOLOGIES: "IN THE CITY OF THE APIS QUEEN"

PATRICIA ADAMS & ANDREW BURRELL

This locative media project combines digital technologies, scientific research, artistic innovation and real-time interactivity. We discuss the urban migration of the European honeybee and networked activities in city environments. It develops a futuristic socio-cultural narrative and combines such diverse disciplines as visual arts, new media practice, literature, computer science and the biological sciences.

Through an expanded description of the media project, *mellifera* [1][2] the artists will explain their interdisciplinary concerns, research methodologies and the ways in which their approach lends itself to flexible, hybrid practices. They will outline potential strategies for moving on from *mellifera* to develop a locative media project: "In the City of the Apis Queen," which will fall within the framework of contemporary urban ecologies.

The *mellifera* project consisted of an on-line interactive environment in Second Life (SL), which was linked to a complimentary series of real-time exhibitions in gallery and museum spaces. Central to this innovative, ecologically sensitive artwork was the artist's direct engagement with various aspects of bee behavior at Queensland Brain Institute, The University of Queensland (UQ); [3] where researchers investigate cognition, navigation and communications in the honey bee. The artist's poetic and scientific interactions with the bees inspired *mellifera*'s experimental series of human/computer interfaces. These provided modes of sensory delivery for both virtual and real-world participant interactivity. A primary rationale behind this project was the artist's desire to find interactive tropes and strategies that would provide artwork participants with an interface, which enabled them to seamlessly interact with the virtual environment. Adams and Burrell were conscious of the limitations presented by software systems such as SL, in particular the constraints inherent in its closed structure. Furthermore, they viewed it as one of the many tools at their disposal for creating a contemporary artwork that pushed boundaries. At that time it successfully enabled them to explore the issues raised in *mellifera* but it is no longer suited to their creative needs for subsequent projects such as "In the City of the Apis Queen."

Adams and Burrell chose to collaborate on *mellifera* as a result of their shared interest in the self and its construction in physical and virtual environments. Consequently, through both metaphor and subjective

focus, their collaborative projects have shed light upon a wide range of themes relating to identity, narrative and corporeality. These works have both breached and bridged the spatial, physical and systemic aspects associated with virtual platforms and embodiment. *Terra.mellifera*, the *mellifera* SL virtual environment, consisted of a generated, balanced ecosystem that accommodated remote participation via avatars and responded to the interactive engagements of physically present participants. Following in the footsteps of the grand tourist and explorer – whose reports evoked new virtual worlds within the minds of their listeners – an exciting aspect of Adams and Burrell's collaborative practice, for both themselves and their audience, has been the creation and exploration of parallel universes that evolve – generating realms within which to discover new frontiers. Through narrative and real time interactive technologies Adams and Burrell have created a hybrid physical/virtual space via technical & ecological interconnectivities, making analogies between the behaviors of humans and communities of honeybees that emphasize observations of interspecies links. [4]

The underlying code of the *terra.mellifera* environment investigated the complexity that can be obtained through the combination of less complex elements. Ultimately, the whole process was about the system, from which emerge the individual creatures and life forms. Rather than setting about creating an environment with fixed goals and outcomes, the artists proceed to create a spectrum of behaviors and processes that became inextricably linked with one another and which imparted their own identities and parameters upon each other from the ground up. A question that the artists consistently asked themselves throughout their creative collaboration was, what makes any new addition to the system an integral and logical part of the system, continually adding complexity to the whole? The artists did not want to recreate a bee in the virtual world. They were investigating creating a creature with aspects of 'beeness' that was very much a native of its virtual ecology.

Interest has been developing since the nineteenth century in insect communities, behaviors and social structures. [5] This has led to a recent focus on the relationship between etymology and networked media technologies, which has informed Adams and Burrell's recent research. For the project – "In the City of the Apis Queen" – the artists will compare the relationships between urban ecologies and the behaviors of a community of European honeybees. The project combines such diverse disciplines as visual arts, new media practice, literature, computer and biological sciences to develop a futuristic socio-cultural narrative within a citywide networked space. The artists aim to generate a networked project consciousness that grows out of the recorded 'energies' of participant engagement and evolves to resemble a 'hive-mind-whole' artwork system. In the "Apis Queen" project other key areas of honeybee behavior, such as the building of a productive community, the need for aggressive responses and the role of the queen bee will inform the programming and construction of the artwork networked system. The whole work seeks to transcend conventional spatial boundaries; materially immersing participants in a very physical way .

Through the use of custom-made wearable devices that self organize into a local network and communicate with each other in real time, and a digitally programmed system of web portals aimed at mobile browsers, the artists will immerse participants in what is an essentially an open-ended system. These systems will both create, and highlight existing urban ecologies as networks. As part of this system, through a quasi-gaming structure, "Apis Queen" participants are provided with hand crafted network devices and invited to collaborate with one another. They become immersed within a network that forms as a result of this process; which then becomes part of the overall pre-existing network to create narrative data, which is native to it. This process leads to the local becoming global and the private, public. These networks will be temporary and exist only while participants are active. However, the data

that is created will be allowed to continue its evolution within a perpetual virtual environment accessible through a web portal. Reminiscent of the *mellifera* ethos, one might ask whether the artists are trying to uncover a networked mind or life form arising within this expanded ecology? Ultimately the "Apis Queen" project creates a space for the investigation of future narratives at the nexus of science fiction and everyday urban reality. This unique intervention into networked environments represents new explorations into uncharted territories of urban and data ecologies. The artists' role as tourist and explorer of these new frontiers is an ongoing one, and as the interface between the physical and the virtual continually shifts, they will encounter many unknowns.

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NEW MEDIA ART INSTALLATIONS AS COGNITIVE SPACES: AN APPROACH FROM THE PERSPECTIVE OF DISTRIBUTED COGNITION

Josefina Lopez Aguayo

Do all artefacts hold the same cognitive load?

Are art installations, using new technologies, cognitive to the same extent as other spaces or technological artefacts?

New media art installations are not aimed at usability. They turn into artefacts that generate spaces where what has been produced is a result of the worldview of the artist
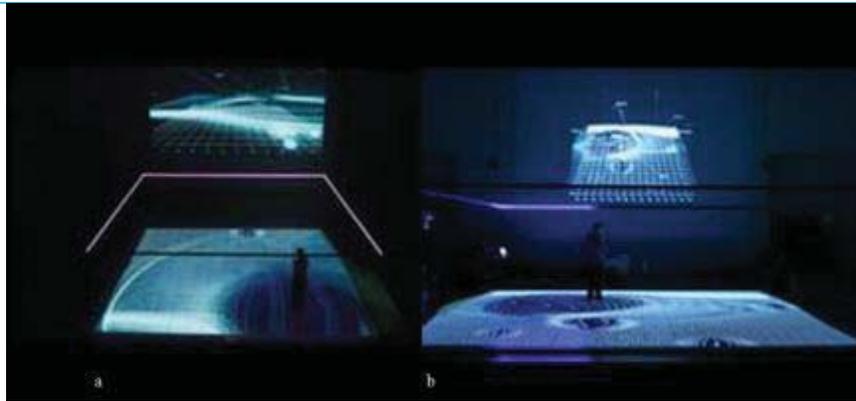
Fig 1. Gravicells - gravity and resistance. (2004) by Seiko Mikami & Sota Ichikawa realtime-interactive installation GPS system 6m x6m floor composed with sensors, transparent screens, projectors, speakers, computers © Seiko Mikami + Sota Ichikawa
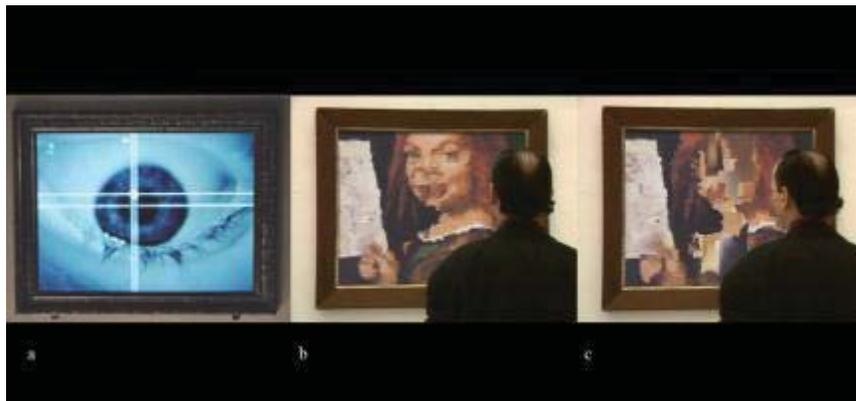
De-Viewer (1992), Linz, Austria, by ART+COM. Rear projection display with infrared eye-tracking system, 100x60 cm. © ART+COM; Photos ART+COM

The theory of distributed cognition, developed formally by Hutchins and his colleagues, is a view of cognitive science which shares the idea that cognition is not situated in the thinking agent. By contrast, knowledge is regarded as a construction that emerges through contact with the artefacts to which people are related. According to this theory the person is an active not a passive agent, and it is also argued that spaces are spaces of distributed memory. On this basis one can infer a cognitive relationship between people and technology, where the latter refers to what human beings have produced as an extension of themselves. Consequently, cognitive artefacts can be understood as "physical objects made by humans for the purpose of aiding, enhancing, or improving cognition." [1]

The present analysis seeks to distinguish between technological cognitive artefacts and cognitive technological art artefacts. We discuss whether all cognitive artefacts have the same properties in relation to the creation of cognition.

1. TOWARDS NEW MEDIA ART INSTALLATIONSAS A COGNITIVE WORLDVIEW

Over a decade ago Jan Greenberg and Gary Dickelman (2000) [2] argued that it was important to ask where and how knowledge is produced, rather than assuming that it is simply located in the head of the thinking agent. Since then the knowledge paradigm has shifted from a focus on the agent to a theory of distributed cognition, developed by authors such as Hutchins from the University of California, San Diego.

Hutchins' [3] theory, which he terms 'distributed cognition', aims to explain the acquisition of knowledge by using a concept of extended cognition, one that goes beyond the corporal framework of an isolated agent, locating it instead in the environment that involves the agent. This environment, according to Hutchins, is organized by elements such as technological artefacts.

Because the theory of distributed cognition represents knowledge as being located between agents and the world, such knowledge is no longer in a certain place. Rather, it is distributed in a mediating space between agents and artefacts, producing interactions which are able to produce transformations in the agent's state of knowledge. Hence, it can be argued that cognition takes place in the system, not in the head of the agent or in a precise spatial location.

In line with these ideas authors such as Marshall McLuhan [4] suggest that cultural instruments are "extensions of man," which alludes to their power to extend human capacity. Similarly, David Kirsh [5] theorizes about "the intelligent use of space," in which objects and the environment are cognitively structured in order to improve the agent's capacity, conferring functions of cognitive and physical simplification to space. From this perspective, cognition does not depend on an isolated act of the agent, but rather is produced through interaction with the social and cultural environment. This is especially relevant in contexts that involve technological tools which imply cognitive capacity and can modify the agent's environment.

However, not all environments or technological artefacts seem to have been designed to be used in the way that people tend to use them. [6] For example, imagine a house that was purchased for its particular orientation and large windows. This might lead us to think that the orientation and the windows serve to provide more hours of daylight or shade, which in turn are associated with financial savings and

personal comfort. However, the occupier could just as well use his home and its orientation to determine the time of the day by considering its relationship to the movement of the sun. In this sense, the functional aspect focused on this local use is more powerful, and illustrates how the functional value of artefacts is mobile and has different levels. [7]

At all events there are artistic spaces and artefacts whose cognitive nature diverges from this functional perspective. Rather than being determined by practical usability they are developed as socio-cultural spaces of knowledge whose ultimate 'function' lies in the possibility of extending somehow the mind of the interacting agent. Thus, the purpose of mental processes in this case is not the local use of the space or artefact but rather to expand the agent's experience.

Installations of this kind enable mental processes to be implicated in multiple ways when it comes to the development of knowledge. To put it another way, an installation using new technologies can lead to a cognitive state which has not been intended by its programmers, just as we have seen in the case of functional artefacts or spaces. Therefore, while they may show certain variability their application is not limited to a localized usability as a cognitive tool. For instance, a new media art installation might have been created for its aesthetic or entertainment value, but could become a place of associations and conceptual fusions which provides the inter-actor with experiences that are difficult to achieve.

Let us consider two examples in order to illustrate what is being proposed.

TWO EXAMPLES

A.   GRAVICELLS - GRAVITY AND RESISTANCE

The first example concerns the Japanese research project *Gravicells - gravity and resistance*, by the artists Seiko Mikami and Sota Ichikawa (Yamaguchi Centre for Arts and Media (YCAM), 2004).

This is an installation in which the agents interact in a GPS space through body movements in real time. The installation consists of projected images and geometric information in the same space, one in which the inter-actors can experiment with their bodies. Their movements through the installation produce changes in the space [Figure 1: Gravity and other external forces are simulated in order to generate new ways of understanding gravity, starting from the experience of sensorimotor processes, aesthetics and the interaction of the body with the simulated environment.]

The installation becomes essentially cognitive on different levels, principally due to its capacity to generate a conceptual fusion which would be difficult to experience in the inter-actor's life. It comprises two 'inputs,' two spaces, with which a third space is created, integrating the first two spaces, thereby leading to a conceptual integration that enables the emergence of a new 'mental space.' [8]

1. The first 'input' is determined by an artistically developed technological space, which simulates time-space.
2. The second 'input' is generated by the static or moving images of the universe, which we are all familiar with.

This enables us:

1. To consciously experience, through sensorimotor processes and first hand, the simulation of a barely accessible aspect of space: zero gravity.
2. To become aware of the physical laws that establish the representation of space, based on a curved — not a flat — time-space continuum.

As stated above, this experience is produced by a conceptual fusion of two spaces or 'inputs' from which a third space arises. This allows the inter-actors to feel their movement as if they were each a celestial body, perceiving the geometric deformation as a consequence of their own displacements and body mass in the created space.

The author of this installation states the following:

 "This work presents the dynamic processes of interaction between gravity and resistance. It was created after reflecting upon the overwhelming difference between everyday life space and the mass of the earth. It seeks to recompose gravity by reconsidering the dialogue between the body and space."

However, the experience of this project cannot be reduced to this alone, to the instrumentalization or usability of the generated cognitive space. On the contrary, knowledge is integrated in the cognitive processes (mental and sensorimotor) of the agent. This is a consequence of the worldview of the programming artist or the research group, and not of any type of localized functionality.

B.   DE-VIEWER

The second example is De-Viewer (1992), a project developed under commission by the company ART+COM. This shows a projection of a painting by Giovanni Francesco Caroto, the image of which is altered by the presence of the inter-actor and his/her viewing of the display [Figure 2, images a, b, c. (a) Installation of the system on the projected display; (b) Initial alteration of the process according to the visual action of the inter-actor; (c) Advanced alteration of the image due to the visual action of the inter-actor.]

The underlying technology is based on a system of eye-movement recognition. A computer is used to analyse the view of the inter-actor, calculating the coordinates of the viewpoint on the display. These coordinates are then sent to the graphics system, which alters the image as the viewpoint moves over the image. There can be no identical movement and, as a consequence, no identical alteration of the image. Once the inter-actor stops looking at the image, the alteration disappears and the image returns to its original state.

The artwork is presented in an open space where the agent/artefact relationship creates a hermeneutic environment. The experience of the artwork leads us to question the concept of reality without the presence of the perceiving agent and the very act of knowing. These aspects become evident when we perceive the effect of the visual action upon the perceived 'object'. The view, seen as the action of the inter-actor, questions the notion of reality as something existing without the presence of the inter-actor. Furthermore, what is emphasized is knowledge based on inter-relationship within an organized system. This holistic emergence of knowledge comprises the relationship between the agent and his/her environment.

What this space does, therefore, is enable the agent to activate cognitive mechanisms with which to experience an abstract theory about reality, which was perhaps not the original idea behind this artwork.

According to its creators this art project was designed:

"… as a reaction to the general attitude to computers as tools rather than a medium, still prevalent at the end of the 1980s. (…) This installation was designed to promote one of the most crucial qualities of computers as a medium, their interactivity or mutual dialogue."

By contrast, the experience of the work brings to the fore the following aspects:

1. The possibility to experience consciously the effect of our presence as a constructive element of reality, in this case through eye movement.
2. The awareness of the interdependence between the object of perception and the perceiver. Space emerges through the experience of enactive cognition [9] in relation to the phenomenon. The agent and the object/artefact are inseparable parts of the same given reality. Hermeneutic and semantic knowledge arises between the 'other' and the agent.
3. The modulation of consciousness in the course of evidencing the worldview — and artistic and cultural point of view — of the programming artist or research group. This aspect is related to the theory of constructing reality through the exhibition of artistic practice.

Thus, we are not dealing here with a functional artefact of mobile instrumental usability, but rather the worldview of the programming artist or research group as an extension of their mind. This is a worldview based on distributed cognition, one in which cognitive mechanisms — such as memory, metaphorical associations or conceptual fusions, sensory, cerebral or sensorimotor processes – produce a holistic mixture that enables the generation of extended and integrated cognitive spaces that endure in the mental structure of the agent.

2. TWO POSSIBLE CATEGORIZATIONS OF COGNITIVE SPACES OR ARTEFACTS

In light of what has been argued above it would seem important to clarify the concept of cognitive spaces or artefacts as used by Hutchins. [10] Our proposed way of doing this involves two categorizations. The first, or strong category, relates to the increased and permanent integration of new knowledge (of ideas) within the agent's mental structures. This implies a different modulation of consciousness due to a worldview of cognitive artefacts or space that is neither functionalist nor instrumental.

The second or weak category is related to the priority given to the functional aspect of the artefact or space, which is situated and instrumental. Hence, this category is determined by the abilities which can be generated through the interaction with these artefacts or spaces and, as a consequence, in relation to their local usability and functionality.

In the earlier example of the home, knowledge could be defined as localized, as specific in regard to its usability. Therefore, once the possibility of interaction with the agent has disappeared, the tool that is able to optimize functionality also vanishes. This is not the case, however, of the two examples of art installations. This is because even after they have disappeared or the agent finds him or herself beyond their reach, the knowledge that was generated by the sensorimotor or mental action persists in time by

being embedded in memories as an abstract idea. The consciousness that is generated by the world-view, expressed through the cognitive space or artefact, endures within the mental organization of the interacting agent's knowledge.

Obviously, the worldview that regulates the new media art installations in relation to the inter-actor can show different levels of permeability depending on the theoretical load, the experience and the state of the inter-actor's attention. This is a state that enables an increment, with different level of inscriptions, of the cognitive experience of the enactive phenomenon. [11] However, in all these cases the incorporation of the phenomenon into the agent's consciousness tends to last over time.

CONCLUSION

In conclusion, we propose the need to differentiate between cognitive artefacts or spaces by focusing on two aspects: the modification of cognitive structures and the immediate functional usability of the object. This is related to two possible categorizations, which are termed strong and weak. The criterion of organization for the strong category would be the persistent incorporation of knowledge into cognitive structures, which results from a global worldview in the production of the cognitive artefact or space. This worldview derives from the particular view of the programming artist or research group responsible for developing the cognitive artefact or space.

The weak category is defined in relation to local and instrumental cognitive processes. In this case, functional social, cultural, economic and other local abilities can be acquired provided that the given cognitive artefact or space remains active. This implies a process that takes place in the context of immediate cognition and, therefore, neither modifies cognitive structures nor leads to their integration.

The categorization of cognitive artefacts or spaces as either weak or strong thus depends on the form of cognition with which they are associated, i.e. one that is locally contextualized and immediate (weak) or, in the case of the strong category, one derived from a global worldview which becomes integrated within the agent's cognitive structures and, therefore, is able to endure beyond its locally contextualized use.

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CYBERNETIC SERENDIPITY REVISITED: INTERACTION, PLAY & FUN FROM THE UNIVERSE OF ELECTRONIC ART TO METAVERSE

ALMILA AKDAĞ & BEN SCHOUTEN

Since its first introduction, the concept of cybernetics spread widely through many branches of academy and percolated into the everyday life soon after. Even now, it continues to affect our social and cultural life greatly. Here, we will trace the impact of cybernetics on electronic art, and how this impact resonates with 21st centuries' social online networks and metaverses in the idea of participation, co-creation, and constant flux.

Introduction
In 1968, the time was finally ripe for an exhibition where robots chased the audience and changed the lightning according to environmental sounds like clapping hands, where one had the chance to encounter computers writing poems, and machines drawing interesting geometric figures that played magical tricks with your visual system. Today, after 60 years, it has acquired the status of a myth among the cognoscenti of computer arts. In this paper, we will trace the links between the metaverse and electronic art to those first years, and to the impact of cybernetics.

From cybernetics to the fundamentals of electronic art
The term 'cybernetics' was first used by Norbert Wiener in the title of his famous book "Cybernetics or Control and Communication in the Animal and the Machine". Cybernetics grew partly out of Shannon's information theory, and its etymology goes back to the ancient Greek word kybernetes, meaning steersman or governor. The title of Wiener's book includes an appropriate definition of the concept, which is effectively a theory of control, i.e. of the principles that govern the behavior of adaptive systems (e.g. animals and machines) in dynamic environments.
Two concepts were particularly important to cybernetics. The first one is teleology, by which Wiener denoted the 'purpose' that guided the behavior of an adaptive system. This concept relates to planning and autonomy, issues that are still important aspects of robotics. The second important concept was self-replication, which is a natural property of living systems. In short, cybernetics sought the principles behind mechanisms of replication and reproduction that were equally applicable to artificial and conceptual systems. Katherine Hayles charts the transformations of the concept as it diffuses into the cultural space, by examining the equally influential information theory in broadest sense, and taking into consideration a bidirectional flow between the cultural/social circumstances of the times and the scientific agenda. [1] Here we would like to focus on the initial activities that transferred ideas from cybernetics into arts.
Abraham Moles and Max Bense were the first to apply information theory to arts at a theoretical level, when they tried to capture the essentials of aesthetics with the use of cybernetic thinking. [2] [3] However, on the level of applications, we should name the British artist Roy Ascott as the pioneer. Already in 1961, Ascott was teaching at Ealing School of Art a curriculum that fused cybernetic thinking with art education. In 1964, he displayed pieces based on these ideas in an exhibition entitled Diagram Boxes and Analogue Structures. Later on, he published the philosophical aspects of his work in the journal Cyber-

netica in a two-part article, "Behaviorist Art and the Cybernetic Vision." [4] In this paper, Ascott describes a cybernetically driven art theory called Cybernetic Art Matrix, CAM for short. CAM's prerequisite is an environment that calls for user participation in creating an art object. This environment is set up in a way to force the audience, or in Ascott's terminology, the participant, to give feedback, through which the participant engages in a decision making activity concerning the art object. The end result is the joint creation of the object by the artist and the participant. Ideally, this object would be an open project, in constant flow and never ceasing to take on new aspects. With every new participant, the creation process would re-start or expand, and this circulation would continue until some physical limit (e.g. end of the exhibition) brings the process to a halt.

Apter notes that Ascott's idea of 'art as a process' had a great appeal for artists, as it formulated art as a dynamic system that comes into existence only through the feedback loop between the artist and the audience. [5] As Ascott details in his papers, this line of thinking is in continuity with the modern art's "behaviorist" tendencies. In contrast to the traditional understanding of an art object with a well-defined body, ways of construction (such as painting and sculpture), and a specific space for dissemination (i.e. museums, galleries, fairs), cybernetic art opened the doors to a new way of making, experiencing, sharing and displaying art. Franke sums up the aesthetics of this new type of art object as: "The conditions of optimum aesthetic communication can be obtained from a determination of the reactivity of viewers of works of art. Art then is a part of a process of regulation (in a cybernetic sense) in which an artist seeks to achieve the maximum of receptivity." [6] The actual impact of cybernetics on arts clearly manifested itself in the form new meanings attached to arts and in the understanding of what makes an art object, as well as in the ways of how art production has changed. The concepts of feedback, interaction, information sharing and 'art as a process' led first to Telematic Art, then to Telepresence Art, both of which eventually falling under the heading of New Media Art, as Electronic Art is called today. [7]

From interaction to open-ended play
In their "Book for the Electronic Arts," Mulder and Post subdivide the modern art practice in stable and unstable art. [8] With stable art they denote the culture of "high art", driven by the materiality and of secularity of art objects. Unstable Art, in contrast, is more volatile, as it is participatory, performative and in constant flux, and is based on (shared) experience. Stable art is serious, unstable art is playful. In modern games and playful interaction the principles of unstable art are more alive then ever.

In the last decade digital games introduced new concepts in the context of playing: a virtual game space containing interaction space allows gamers to communicate, decide and create. These actions are all in line with the ideas expressed in the previous section, namely that the idea of being a part of the process inherently follows the principles of cybernetics, and opens up a performative space. In this sense, some artworks resemble games, and vice versa. A famous example of this is the computer artwork Daisies, by Theodore Watson. In this interactive installation, daisies are projected on a floor, creating an immersive game experience, in which the user is central. You walk over the daisies and the daisies die under your feet, only to quickly grow back a few seconds later.

In the 90's, based on these concepts, designers and artists created interactive environments, mainly supported by video images and interactive sound. In this context, Marinka Copier's definition of play becomes crucial. She describes games as a system of communication and continuous negotiation of (role) players with socio-cultural network of human and inhuman actors. [9] Copier formulates a comprehensive description of (role) play that does not focus on actors like rules, goals, objects, or environments, but instead investigates the relations between all actors. Role-players actively negotiate with the game mechanics, socio-cultural mechanics, as well as individual-personal ones. From these negotiations a play experience emerges. The play experience and the activities related to these experiences are in a constant state of flux. It is in this continuous change that the characteristic of play can be found, and is

often defined as open-ended play.

Instead of designing for goal-directed behavior, as is assumed by, for example, Norman's action cycle the definition of open-ended play assumes that players do not structure their activity beforehand, but that activity grows as the interaction in the context of use occurs. People are opportunistic as they inter-act with the world. These ideas are inspired by theories about situated action [10] [11] [12] and above all on emergent behavior in decentralized systems, [13] which relates to the aspect of cybernetics as regulatory systems. According to Resnick, nature provides us with various examples where local behav-ior leads to global patterns. For example, individual birds in a flock use only simple local rules related to nearby birds, which lead to organized flock patterns. Programs in his parallel programming environment StarLogo have shown that by giving objects or agents local rules overall patterns can occur in simulated environments (or micro-worlds). But most importantly, local rules are shaped by players' participations and actions, and the patterns of the overall game emerges through these interactions, or in other words, through the wisdom of the crowd.

Play & Fun in Metaverse & Social Networks

Games in social networks like Facebook become more and more popular as they can be played every-where and anytime. They enable expression through role-play, interactive attributes, measures and other (nonverbal) communications. In modern identity construction, (instant) meaningfulness is of in-creased significance. [14] This (instant) meaningfulness can, for example, be established in playing the same games in social networks (MafiaWars (Zynga 2008), PetSociety (Playfish 2009), or RestaurantCity (Electronic Arts 2009)) other activities like chat, msn (Microsoft 1999), Skype (Heinla, Kasesalu, en Tallinn 2003) etc., or belonging to the same interest groups. In Social Games like Farmville (Zynga 2009), identities are reshaped through collaborations around certain thematic activities. Within these online games a friend's value corresponds to his or her instant meaningfulness in the game. To be a friend in FarmVille, means to be of value. A friend transforms in a sort of commodity since friends are assets to play the game. This directly ties-in with the social rules on social networks, in which someone's popular-ity, and 'value' is qualified by his/her number of friends.

Here for us the most important thing is that the boundaries between 'play time' and other activities cease to exist: accessing the social sphere of the virtual games can be done via handheld devices, mobile phones and computers while working, eating, and even playing other games. The second factor we would like to emphasize is the erasure of the roles/identities: a dear friend becomes a commodity dur-ing the play experience, but with a switch for example from the play window of FarmVille back to Face-book home window, the everyday 'identity/role' of the friend is restored.

In modern play-design games and playful interaction are situated in real life as part of everyday activity; a playful approach in which games can be called upon when necessary as part of existing applications in learning, social networks, etc. [15] This requires a social intelligence in game design and will lead to games that are embedded in systems of social meaning, fluid and negotiated between us and other peo-ple around us. In this way game design focuses on interactive products as creators, facilitators and medi-ators of experiences as well as the creation of opportunities.

Damer makes a distinction about the 'game-play virtual worlds' and 'social virtual worlds', emphasizing that the latter differs from the former primarily because it is based on the freedom given to the players for building both the virtual world, as well as the social atmosphere and the game space in it. [16] In contrast the game-play worlds come with predefined rules, and scenarios. We can state that social vir-tual worlds resemble the idea of open-ended play.

An interesting thing to note here is about the artistic dimension of these worlds, and the question of creativity & artistic expressions experienced by its users. The general impression is that most of the artistic practices in these spaces are still confined to the existing forms of art creation and dissemination (Lester et. al. 2009). It is expected that with time, when virtual reality loses its novelty of offering a new

experience, the potential it generates will be explored thoroughly, and new forms of arts will be born out of these explorations. There are already many fruitful virtual exhibitions hinting for this next step. However, we believe that these virtual worlds and social networks will have a much bigger impact on the understanding of art. A simple google search for the most popular virtual worlds like World of War Craft and Second Life shows that their popularity extends to the social network sites as well. Here, for us, the most interesting social sites are the ones devoted to art (deviantArt, Flickr), and media (Youtube, MySpace). For instance, in deviantArt, there are ample groups around these cult-spaces, and many users not only uploads screenshot of their experiences, or their avatars, but also share tutorials and textures to help other members in educating how to create in virtual worlds. In other words, some players, first experiment themselves how to create 'art', and then share their knowledge with other members for them to join the experience.

Conclusion

The ubiquity of virtual social platforms, and the effects of overabundance of media lead some critics to question the role of the artists in current society. For some, spaces like metaverse offers, and forces the artist to go beyond the traditional artistic goals like catching/questioning the reality, and to become a scientist/technician redefining/creating the reality. For others, art as such does not even have a role to play anymore. In this paper, we tried to contradict these extreme postulations about art in metaverse by pointing out the potential of social spheres of networks and metaverse have on the dissemination and (hence) the definition of art.

Mulder and Post trace the transition of electronic art from machine to media, from there to interface, and lastly to networks. [8] We would like to conclude our paper by asking the question: What is next? We hope that the next step in the evaluation of electronic art will be the realization that expertise has lost its importance. Only then, art will be detached from its high pedestal and materiality by becoming the toy of the layman. Everyone who uploads a picture, designs an avatar, creates a space in Second Life, comments at someone else's pictures in Flickr or deviantArt will be entitled an 'artist' if they care to take on this title.

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MUTATE OR DIE: A WILLIAM S. BURROUGHS BIO-TECHNOLOGICAL BESTIARY

TONY ALLARD

This afternoon I will discuss my current collaborative bioart project, "Mutate or Die," and along the way I will touch on some key aesthetic, ethical, and philosophical issues that are inherent in the creation of bioart works. My collaborative partner, Adam Zaretsky, and I have gained support for our project from Grand Arts, an experimental presentation space and artistic production facility in Kansas City, Missouri.

Mutate or Die: a William S. Burroughs Bio-technological Bestiary

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This afternoon I will discuss my current collaborative bioart project, *Mutate or Die*, [1] and along the way I will touch on some key aesthetic, ethical, and philosophical issues that are inherent in the creation of bioart works. My collaborative partner, Adam Zaretsky, and I have gained support for the project from Grand Arts, an experimental presentation space and artistic production facility in Kansas City, Missouri. We launched the project in July of 2010, and its development will span three years, culminating in an installation and performances at Grand Arts in September of 2013.

Introduction

"Rational thought is a failed experiment and should be phased out."
-- William S. Burroughs

In 1996, attempted to get the writer William S. Burroughs' DNA sequenced at the University of Missouri in Kansas City. For various and interesting reasons, Burroughs' DNA never made it into the sequencer, and I put my attempt back in my subconscious for a very long time. Now, some fourteen years later, in retrospect, I have started to realize that in my attempt to get Burroughs' DNA sequenced in 1996, I was unwittingly tapping into a Burroughs' multi-temporal, nonlinear reality. That reality is summed up in this quote from the Brion Gysin/W.S. Burroughs third mind, "When you cut into the present, the future leaks out." [2] Fourteen years later, the future is leaking out in the form of my current collaboration with bioartist Adam Zaretsky.

At the core of our project will be a gene gun blast performance, which will involve shooting a random segment of raw DNA extracted from the 'beat scat' of William S. Burroughs into another organism's genetic code. This biolistic cutup will produce the potential for a transgenic mutation to occur in the future. After the gene gun blast, we are anticipating that the resulting mutations will give us a code, a sign, a transgenic hieroglyph left upon us. In this wet, oatmeal like substance, there may be a new text that will tell us how to make a highly bent immortality blueprint, there may be an edifying nightmare of 'homo sap's' [3] future, there may be a tasty recipe for Gonad Jam, or there may be proof that indeed, language is a 'virus from outer space.'

Over a span of three years, Adam and I will be going into the lab and getting scientifically funky with mu-tagenic protocols, and exploring the role that mutation will no doubt play in the future survival of the human genome and species diversity on this planet. We will also be challenging some of the mystified bio-technological protocols of directed evolution and privatized knowledge bases being generated by the life sciences, and the biotech industry in particular. Specifically, we are challenging the biotech industry's corporate approach to genetic research and development, and its enormous investment in the illusion of objective, rational control over the organic and inorganic world. We are challenging the biotech industry's patenting of life forms, which basically amounts to stealing the human genome and others from what the writer Lewis Hyde has identified as 'the commons.' [4] Historically and contemporarily, the commons have been and are the collectively owned natural and cultural resources that we all can legitimately lay claim to using. We are, in fact, modeling our project after the commons, Do It Yourself (DIY), and open source movements.

We are taking the commons, DIY, and open source approach to making bioart and doing science for the purpose of demystify biotechnology, and getting the public proactively involved in a debate about the role that random mutation plays in generating diversity within a species. Mutate or Die also confronts the almost total media blackout of any critical discussion about what could be described as the biotech industry's thinly veiled programs of eugenics. This new and highly profitable cottage industry that has sprung up in the exact sciences is clearly in the business of eliminating biologic impurities and mutations in its short-sighted effort to sell genomic purity to an uninformed, and bio-technologically illiterate public. The industry's genomic cleansing products are sold under the various brand names of human betterment, enhancement, miracle cures, and progress.

For obvious financial reasons, and I will venture to say political reasons, the biotech industry is quietly keeping biotechnology cloistered in high tech research facilities and out of the hands out of the general public. Adam and I, on the other hand, will be creating a DIY lab that is accessible, interactive, and open to the public within the installation at Grand Arts. We will stand shoulder to shoulder with the public, working in a not-for-profit lab of our own design, and creatively use biotechnology and poetic protocols together. The transgenic protocols we are developing for the lab are intended to set in motion processes of uncontrolled, random mutations which will have the potential to re-introduce novel mutagenic influences into the still relatively free genomic playing field on this planet. Unlike the biotech industry and a lot of trans humanists who are primarily focused on eliminating entropic, mutagenic processes, we are interested in introducing more mutagenic processes, which are at the core of species diversity and survival.

Mutate or Die, a bioart project in progress

"When you cut into the present, the future leaks out."
      -- Brion Gysin/W.S. Burroughs, *The Third Mind*

In 1996, when I attempted to get William S. Burroughs' DNA sequenced, I was also experimenting with some of the literary and cinematic cutup techniques that Burroughs and the painter and poet, Brion Gysin developed in the 1960s. Burroughs would go on to use the cutup technique to engage randomness and chance in the writing of his aggressively nonlinear trilogy of novels, which include: The Soft Machine (1961), The Ticket that Exploded (1962), and Nova Express (1964). With this trilogy, Burroughs shattered the centuries-old linear narrative form, and put in its place a text-based form of traveling back

and forth in time, which is similar to flashing forward and backward in time in cinema. The cutup technique also provided Burroughs, and by extension the reader, with a means to get at the content of a text that is not accessible through linear and rational thought processes. With our current bioart project, Adam and I are re-engaging Burroughs' cutup technique and nonlinear processes at the genetic level in living organisms. Through the medium of a gene gun, we will set in motion a genetic cutup by randomly combining Burroughs' genetic code with those of other organisms. These biolistic cutup techniques and the results we are anticipating have affinities with the literary conceits of mutagenic forces and mutants that run throughout many of Burroughs' novels.

With this project, Adam and I are literally taking up the challenge from Burroughs to 'mutate or die'. Burroughs thought that if 'homo saps' are to survive in the toxic political and biological environments of the earth while we are preparing ourselves to leave the planet, then we need to unsentimentally mutate into biological forms that are adapted to these harsh environments. Burroughs puts this mutational survival strategy in perspective when he stated "It would involve a biologic mutation quite as drastic as was involved in the shift from water to land." [5]

This radical biologic mutation will be a truly tall order for humans to fill because we are becoming quite comfortable with and bio-technologically capable of taking the human genome out of the mutagenic, diversity-generating mechanism of our species hereditary and evolutionary trajectory. The biotech industry is only too eager to kick its bioinformatics machines into high gear and stop the mutagenic forces of evolution, and put the human genome in a kind of eugenic holding pattern indefinitely while their short term goals and market shares 'vampirically' increase.

We humans, who are now bio-technologically and rationally poised to reconfigure our genetic code and what it means to be human, would do well to give Burroughs' literary conceits of mutation and mutants due consideration and room to roam in the real world. We humans, who are now beyond the flirtatious stage of putting the prefix, trans(genic), in front of human, would do well to study Burroughs' dismantling of the exact sciences' taxonomy of the natural world in order to make room for mutants that stand outside the natural order, or as he tagged them, 'natural outlaws.' [6]

The Art of Risk: Bioethics Tour, San Francisco, October 2010, San Diego, July 2011

Before we began the actual wet work of extracting the DNA from the preserved sample of 'beat scat' in June of this year, we went to San Francisco in October of 2010 on the first leg of what we dubbed our bioethics tour. After the wet work had been undertaken in Kansas City, we returned to the West Coast and did the second leg of the tour in the biotech capital of the world, San Diego.

After we came back from the San Francisco leg of the tour, R.U. Sirius, the then editor of the online trans-humanist magazine, H+ (and one of our interview subjects), published our questions and the primer on the project in H+, in February of 2011 (http://hplusmagazine.com/2011/02/06/mutate-or-die-a-w-s-burroughs-biotechnological-bestiary/). As a result of the H+ publication, our efforts to bring the discussion to the public went viral within days after the article went online. The H+ publication began almost immediately to be linked and aggregated on such sites as Dangerousminds, Boing Boing, Flavorwire, and Lifeslittlemysteries. Much like Burroughs' conception of how language works as a virus, the hyperlinks, comments, memes, and bad puns that appeared on sites early on in the week began to replicate and mutate, and in some cases were transformed into misinformation about the project. Nevertheless, there are some telling comments about the power of peoples' imagination and mutaphobic fears that emerged after they put aside traditional taxonomies and began to entertain the idea of a transgenic

mutant living among us. In fact, one mutaphobic fear that got a lot of airtime was the possibility of a mutant Burroughs clone being set loose from our lab and reeking biological and psychological havoc on planet earth. It is exactly these kinds of responses posted by the public online that we will be including in the installation and on the project website (http://mutateordie.net). Allowing the public to weigh in on the ethical and philosophical aspects of the project is a significant part of our efforts to open up a dialogic space that is critical to the survival of our contemporary biological and cultural commons.

Bioethics Tour Questions

What follows are questions we asked interview subjects on the San Francisco and San Diego legs of our Bioethics tour. To date we have interviewed, among others, Hank Greeley, a Stanford law professor, and consultant to the U.S. government on bioethical issues, filmmakers Lynn Hershman and Craig Baldwin, Ricardo Dominqez, a University of California, San Diego Professor and co-founder of The Electronic Disturbance Theater (EDT). We also interviewed a senior researcher on the Human Microbiome Project (HMP) at the J. Craig Venter Institute in San Diego.

Question 1: Queer Anatomy: Beyond Enlargement

There seems to be a lot of publicity around transgenic transhumanism these days. Promoting human use of biotechnology to redesign ourselves is not the worst idea. Unfortunately, most human genetic modification advocates forget to think creatively about the full range of forms and beings into which we could force evolve ourselves. They tend towards a naïve optimism based on futurist potentials, emphasizing: longer lifespan, more beauty and bigger brains. Where can fringe anatomical and metabolic goals take us, beyond enhancement, general enlargement and 'goody two shoes' betterment? While redesigning ourselves what other directions might we investigate? What resulting forms of genome bending would exemplify the politics and aesthetics of W. S. Burroughs fiction and theory? (See related concepts from his writings: i.e. cut-up, junkie life, control and language as a virus, Dr Benway.) What queer advice can we give to artists and engineers who would intentionally alter future peoples' minds, senses, body differences and living décor?

Question 2: Mutation

This project involves random segments of DNA being incorporated into the genomes of sperm, blood cells and microflora. Most random mutation causes instability and harm to organisms. Only very occasionally does a mutant worm grow elbows as humans did. Fitness may just be a lucky oddity; most of the poetry of random DNA upsets the stability of life's repetitive anatomy. We believe that directed evolution is just as fallible in the long run, we want to ask you what the difference is between letting the production of life differences be spontaneous collage versus an aesthetic based on maximizing short term market shares, 'enhancing' traits based on human goals and using organisms as production factories for pharmaceuticals, industrial products and food? When it comes to transgenic art, is it preferable to gamble in the dark with another's heredity or try to tailor someone and their kindred?

The title of our project, Mutate or Die, comes from William Burroughs' frank admonition of homo saps to mutate or die. In essence, this project will literally take up Burroughs' challenge to mutate or die, and will function in a similar fashion that basic research does in that it will, through direct manipulation of genetic material, proactively speculate on the role that mutation can play in the survival and future of

the human genome. What are your thoughts on the actual, wet work of mutation-based bioart, versus strictly representational, mimetic art? What science fiction premonitions do you think can be applied through creative biotechnology to alter the future of, not just humans, but also all organic beings?

Question 3: Sex

Inserting genes into a hereditary cascade is a great responsibility but it is also a powerful sex act. In biology, sex is defined as the passing of genetic information into the lineage of progeny; meaning and transgenic protocol is sex. This question is about the desires and satisfactions of the experimenter during the techno sexual process of getting the genes into the being to be fucked. Many tinker with the gonads of yeast, worms, rats and in the case of humans, gene therapy. There is a question as to what kind of erotic, pornographic and even deadly economies drive this work? What is the flavor of the compulsive urge to control reproduction? What is the quality of the scientist's satisfaction when shooting a signature or a graffiti tag into an unsuspecting life's form? How is the humping joy of defect sex ameliorated or amped up through technology?

This is not an easy question as the economies of techno-sex and sadism as an energy are not simply negative in the world. We cannot pretend that technology is without certain connectivity, or that life is not driven by libido. What kind of sex is interspecies gene gunning? How is the perverted act of shooting nuclei with genetic choices made to seem formally neutered of hotness? Can one imagine the moment of pulling the trigger of a loaded gene gun as a pornographic, erotic and dangerous yet orgasmic pulse as a sex-positive relation? What types of connections can be made between our biolistic aesthetic of shooting genetic information into a target that will result in a cellular based mutation, and Burroughs' ballistic aesthetic of shooting a target tacked to a piece of plywood in order to generate a psycho-symbolic mutation? What can be said about the frank fact of the destruction that results from shooting any type of gun, regardless of what/who the gun is aimed at?

Question 4: Scatological Biopolitics

The Human Microbiome Project (HMP) is based on studying the life that lives within us. This is our second genome, our internal ancestors and possibly the source of our third mind. What kind of beings might result after insertion of scrambled shit gene in their family tree? What kinds of identity splay can we expect from becoming bacterial? What is the social and political definition of excrementality, when scientists play with shit, is it kinkier or are the kinks ironed out somehow? In which ways will this project change the cultural reception of scatological action? By way of literally getting into W.S. Burroughs' shit, can we transcend its waste status and legitimately ascribe use value to it? Can we actually time travel back to Bill's gut/intestines at that time (1995 when the sample was acquired by Burroughs' plumber) and biolistically liberate any information that may add to mutant-divergence for the future survival of trans homo saps.

Question 5: Art of Risk

What is your personal risk/benefit assessment on the artistic use of a gene gun to make living animal/human/non-human/cultures of mutagenic difference? Feel free to comment as a bioethicist, ecologist and art critic. There are some laws of course, but we are asking your opinion. Is art allowed to play with as much risk as science? In the name of art or science, where do you draw the line? What should

not be allowed to be done to the ecosphere, to dignified living beings and/or informed, human volunteers?

Interviewee Responses to our questions (Video online)

http://mutateordie.net/content/bioethics-tour-short-version

'Natural Outlaws' creating a William S. Burroughs Biotechnological Bestiary

Bioart often uses cutting edge and DIY biotechnology as an art-making medium, and it specializes in presenting living organisms as art. This past June, we worked in a multi-million dollar research lab at the Kansas University Medical Center, and extracted DNA from a preserved sample of Burroughs' shit, and put it in a deep freeze for future use. Our next step this winter will be to get trained in a genetics research lab on how to use a gene gun. However, in the spirit of the DIY movement, we are looking into the possibility of making our own gene guns and nano gold dust for the gene gun blast performances in the installation.

The following is a very condensed version of one of the poetic protocols we are developing for the DIY lab we will be creating at Grand Arts in Kansas City in September of 2013.

Take a glob of William S. Burroughs' preserved shit
Isolate the DNA with a kit ($300 from Quiagen Technical)
Make, many, many copies of the DNA
Soak the DNA in nano gold dust
Load the DNA and gold dust into a gene gun (a modified air pistol)
Fire the DNA and gold dust into a mix of fresh sperm, blood and shit
Call the genetically modified mix of blood, shit, and sperm a living bioart, a new media paint, a living cutup literary device and/or a mutant sculpture.

Putting on the Gloves, Opening 'the commons'

We are modeling the installation and performances after the commons, DIY, and open source movements, and are planning two primary types of interactivity: the DIY lab in the installation at Grand Arts and its virtual counterpart online at http://mutateordie.net. In our DIY lab, the public will be able to get their hands on some biotechnology and make bioart with Adam and I. The public will also be able to write and draw in the installation and online, giving their thoughts and imaginings as to what kind of mutations and mutants might emerge in the future from our biolistic cutups. Most importantly, the public will be able to leave their mark and weigh in on the ethical and philosophical implications of adding novel forms of mutation and transgenic mutants into the mix on planet earth.

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CREATIVE ECOLOGIES IN ACTION: TECHNOLOGY & THE WORKSHOP-AS-ARTWORK

Jamie Allen, Rachel Clarke, Areti Galani & Kamila Wajda

A shift is occurring, particularly evident in art-and-technology contexts, in which the artist-led workshop is transformed into an important and distinguishable artistic form. Resulting from, and contributing to, the new accesses and relationships people have to information, creative culture, materials and one another, the "workshop-as-artwork" is proposed, outlined and exampled.

Fig 1. Participants doing a public performance at the Chiptune Marching Band event at the NK House, Berlin, in August 2009. Attribution Jamie Allen

Fig 2. A Sundroids participant at Harehope Quarry UK, presenting his solar powered kinetic work to the participant group in June, 2010. Attribution Rachel Clarke.

ON TECHNO-SOCIAL ART FORMS

Technology situates and constructs what it is to be a creative human being. Our technologies are never "just tools," nor are their effects and resonances limited to the individual practices of artists-as-producers-of-work. Contemporary cultural activity with technologies is not "production," in the classical sense. Understood as both an ecology and entanglement of people, ideas, tools, materials, systems and processes, art-and-technology grows to encompass a complex and expanding set of forms. For example, recent suggestions are of the "artwork as social interstice" would be impossible except through resonances with an ultimately techno-social tool: The Internet. [1] True to its history, art-and-technology and related practices continue to be sites of endeavours that seek to question and escalate the assumptions of art, artist, audience and form. [2]

Resulting from, and contributing to, the new access and relationships people have to information, creative culture, materials and one another, we propose the "workshop-as-artwork": The technology-based artist-led-workshop as the site of an emerging artistic form. This idea seems particularly evident in art-and-technology contexts, where an assumed importance of the transfer of practical information and technical skill often merges with interests and expertise in performance, installation, theatre and on- and off-line communications and media. Positing the workshop-as-artwork as a creative ecology in action provides a way of locating these works along with other strands of ecological thinking and acknowledges that artistic *form* as we have come to know is in many ways unlocalisable.

Such a proposition also calls forth instructive criticisms. The increased frequency with which artists are called upon to deliver workshops can cloud artistic or personal objectives, especially when done in the service of intermittently insincere institutional and political "community engagement" agendas. The workshop-as-artwork may also seem ancillary to more production-oriented, neo-romantic, individualistic notions of how an artist should be spending his or her time. That said, "doing a workshop" now forms such a large part of the average art-and-technology practitioner's activities that discussing its repositioning as a form, developed in its domain of practice, seems productive. We also seek a vehicle for developing better conditions of the co-created meaning that can take place at such encounters. Further, from the artist-interventionist point of view, positing the workshop-as-artwork serves to update notions of legacy, consequence and significance for the art-and-technology practitioner within his or her community.

Drawing on a set of select technology-based art-practice workshops with various communities, we posit the workshop-as-artwork as this collaborative, ecological artistic form and describe some of its attributes and potentials.

SIGNPOSTS TOWARDS A CREATIVE ECOLOGY

The ideas herein are indebted to topics through artistic, techno-social, and pedagogical theory. Our creative practices and thinking have been influenced by the works and writings of Allan Kaprow and his formulation of the "Happening," a social artwork which is at moments performative, relational, environmental and situational. He and others sought to create a form that would encapsulate and elaborate public performance towards an integration of "art" and "life," and further towards the complete dissolution of "art" as a separate category. [3] It is of note that a number of art-and-technology practices (net-art and other interventionist new media work) echo sentiments purporting fuse high and low brow, the aesthetic and the political, gallery and "street" culture - bringing life into art and vice versa. [4]

Joseph Beuys' ideas of Social Sculpture, the possibility of a social organism as a work of art, also outlines aspects of our project. A desired integration of purpose carried over into Beuys' great valuing of peda-gogy. Much of Beuys' persona and activity during his career was developed through dialogic lectures, workshops and conversations. As Beuys himself said: "To be a teacher is my greatest work of art." [5] Beuys wanted to blur the line between civic action and artistic techniques, completely and radically transforming the "idea of sculpture... or of art in general." [6] Considering this ontology of the art-object and form, Umberto Eco's Open Work, in which art "determines the limits within which a work can accen-tuate its ambiguity... while keeping its existence as a work," is a helpful construction. [7] Parallels in ma-terialist thinking have adopted terms like "assemblages," and more recently "hyperobjects," [8] to name a similarly and difficultly described "kind of relation obtaining between the parts of a volatile but some-how functioning whole." [9] Eco lays out a shift which occured in the 20th Century from origination with concrete, authorial propositions, towards "universes" or "fields" of "possibilities," [10] that could serve to define what is intended by *creative ecology*, as a "properly ecological form of... art." [11]

The idea and importance of "conviviality" as a criteria for technologies and their use, as first outlined by Illich underpins this discussion. Illich explains conviviality as a force opposing industrialisation, as he be-lieved the latter to have grossly distorted our sense of possibility for change in modern society. He imag-ined, "a society of simple tools that allow men to achieve purposes with energy fully under their own control." This would be achieved via the development of open and participatory technologies and tools, and a "deschooling" of society - an integration of pedagogy and everyday experience. [12] The work-shop-as-artwork is sympathetic to these strains of thought. Constructionist approaches to epistemology and pedagogy which emphasise both learning by making and a close engagement with tangible objects form part of our practical approach to these ideas. Any learning that purports creative empowerment should not be concerned so much with the transmission of ideas, but oriented toward the construction and reconstruction of knowledge through experience. [13]

THE WORKSHOP-AS-ARTWORK

Over the past four years, the authors have designed, executed and documented a series of workshop-as-artwork events in art-and-technology festivals, conferences and as part of school-organised activities for young people. These have all emphasized concepts related to renewable energy technologies, as a means of encouraging improvised, public electronic-art making. A sensitivity to the use of electronics as enablers for creative expression in social and public spaces was key to all the events. What follows is a description of a selection of workshops, (Transmisol, Chiptune Marching Band and Sundroids) that ex-press the theoretical goals of the workshop-as-artwork in various ways and to varying degrees.

TRANSMISOL

Transmisol is a 3-day workshop-as-artwork that first took place in Mexico City in the summer of 2008. The event was developed as a collaboration between artist Geraldine Juarez and Jamie Allen, and is in-spired by the work of Transmission Artists, such as Tetsuo Kogawa (author of the "Micro Radio Mani-festo"). [14] Participants at the event were a group of young people aged 18-20 who were attending the Transitio Festival, a week-long new media and electronic arts festival. The Transmisol group was invited to make a set of solar-powered MP3-player and radio transmitter devices, to be installed in public space as a distributed Transmission Art exhibition. Each attendee was encouraged to scavenge the streets of Mexico City during the evenings to find elements for physical housings to hide and contain the solar

panel and radio transmitter units they hacked and assembled; found items included an orange child's play-stove, and other household items.

Participants' responses to the question of "content" for their micro-radio experiments in many cases involved a selection of revolutionary and anarchist texts read into the provided portable MP3 recorder/players. Discussion with participants clarified their motivations to be, in part, a particular response to corrupt administrational and media-industry practices and related problems with wealth distribution in Mexico. Participants understood that they were creating a solar messaging system which (under the Mexican sun) could potentially broadcast in public, in perpetuity (or at least as long as the electronics and hardware remained functional). Transmission Art, through the workshop-as-artwork, became a subtly political gesture - a modest opening up of an otherwise hierarchical media network.

CHIPTUNE MARCHING BAND (CTMB)

CTMB is a series of workshop-performances, inviting attendees to learn, build and perform together while engaging with local energy generation and public outdoor sound performance. CTMB workshops have been hosted by Maker Faire UK, Pixelache Helsinki, Bent Festival NY, NK House Berlin and Creativity & Cognition (all in 2009), among others, all with 7-20 participants at a time. CTMB is designed as a 3-hour event, during which participants build a small sensor-driven sound making circuit (oscillator), powered by an alternative energy source (hand-crank generator). Contrasting comparable workshops, [15] and the Transmisol workshop, a kit of parts including the majority of what is required to participate is provided at each event. Cardboard tubes, colourful tapes, paint, etc., are also provided for the construction and personalisation of the instruments. With instruments in hand, the "band," parades in the streets of the host city as a public performance and spectacle. At the end of the march, participants take their instrument home, along with a self-addressed stamped postcard and web URL, to be used to report back to the Band as to what has become of their instrument in the weeks following the event itself (Fig 1.).

A second workshop-as-artwork, CTMB materials consisted of simple electronic components and cardboard tubing. This material framework was provided along with extensive online community information, a guidebook, a developed graphic identity and uniform design, as well as a gallery website featuring profile photos of everyone who's ever participated in a CTMB (chiptunemarchingband.com). These informational structures were intended to create a highly coherent aesthetic entity, a resonant structure of invitation, web-presence, event and performance. At the end of the CTMB events, everyone involved becomes part of the Band, both through membership and through performance. This is supported by a belief that an intrinsic intertwining of artwork and social structure happens best where people are "consciously engaged in constructing a public entity, whether it's a sand castle on the beach or a theory of the universe." [16]

SUNDROIDS

Sundroids is a one-day workshop-as-artwork using solar robotics to create autonomous kinetic sculptural works for and within the rural environment. These have taken place at Harehope Quarry, a sustainability co-operative and outdoor creative educational facility in rural Northeast England, and invited secondary schools take part in day long sessions. The sessions explore site-specific and kinetic art through the use of found materials on-site and simple solar powered motor circuits.

Art-practice inspiration came through the work of artists like Jean Tinguely and Arthur Ganson. At each event, participants work together collecting and discussing natural resources while exploring motion concepts and movement, through physical activities and re-animating found objects and materials. Participants are encouraged to scavenge found and natural materials from the site to develop their solar/kinetic work. Once students finish their structures, they present their work to the rest of the group (Fig 2.).

The third workshop-as-artwork developed, Sundroids emphasises an improvisatory and contingent approach to materials, movement and the openness of the encounter itself. The framework for each individuals' process is much less prescribed (in terms of materials) than with CTMB, allowing for more variation amongst individuals, while still presenting a cogent enough concept for the group to feel they were working within and towards an agglomerate artistic form.

CREATIVE ECOLOGIES IN ACTION

Nardi and O'Day use an ecological metaphor to highlight aspects of informational relations, hoping to imbue them with a sense of urgency, evolution, diversity and scale. A set of useful characterisations of ecological structures emerge for the workshop-as-artwork: [17]

- *Keystone species:* Explicitly, the "skilled people whose presence is necessary to support the effective use of technology," "the natural teacher" and "mediators." (p.53) Within the workshop-as-artwork artist-practitioners and educational practitioners assisted participant, primarily helping the technology work effectively. As we have noted, this was not just facilitated through skill *transfer* but also through embodied action and playfulness with materials to encourage exploration in a relaxed and friendly way.
- *Locality*: More than just in the geographical sense, the workshop-as-artwork arises through local context. For an information ecology, *locality* is a description of the "habitation of technology." The workshop-as-artwork is an exploration of a contingent habitation of this kind, and attempts to help people make sense of creativity with technologies on their own terms.
- *System*: Creative ecologies of art-and-technology, much like their biological and informational counterparts, are marked by "strong interrelationships and dependencies among its different parts." (p. 51) Genealogies of art-and-technology practice that cite systems theories (e.g.: cybernetics) as influential are worth noting here. [2]
- *Diversity*: Creative ecologies exist for and through a diverse set of individuals and communities engaged with them. In biological ecologies, diversity manifests itself through a variety of "niches", where the strength of an individual is supported locally by the environment around it, and the diversity of the environment in turn supports this capacity in the individual. In the design and action of the workshop-as-artwork, it is hoped that diverse styles, perspectives and interests are allowed to flourish, as a dynamic and agile support structure is present.
- *Coevolution*: Along with the interplay of individual actors and their local environment - there are the dynamics of their diverse temporal development strategies, rates and scales. "The social and technical aspects of an environment co-evolve." (p. 52) In the workshop-as-artwork opportunities for coevolution exist where and when participants are able to progress and participate, dealing with new technical and social conditions at their own pace, in an environment where performance is downplayed in favour of a valuing of process.

QUESTIONS & CONCLUSION

How might the art-and-technology workshop, conceived as an ecology of technologies, learning potentials, and creative possibilities be even further restructured as a more radical improvisation, Happening, or performance? Claire Bishop develops the idea of a collaborative/relational work which is not judged solely on its moral ("bringing people together") or instrumental ("teaching people to solder") merit. Instead she suggests that "practices need to be thought of in terms other than their ameliorative consequences; they should also question the very terms of these ameliorative assumptions." [18] As objects becomes assemblages, practices ecologies, and information ubiquitous, words like "laboratory" and "workshop" comfortably replace words like "gallery" and "exhibit." [19] In such a landscape, the workshop-as-artwork posits a framework for just the kind of questioning that Bishop suggests.

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F(X) - AN AUDIOVISUAL PERFORMANCE ENVIRONMENT

Alo Allik

f(x) is an audiovisual performance environment to enable exploration of 3-dimensional continuous cellular automata. The automata provide the basis for sound synthesis and computer graphics parameter mapping. During the performance the behavior of the automata world is affected in real time in an attempt to reveal the complex and organic behavioral patterns in three dimensions and modifying the mapping space in response to them.
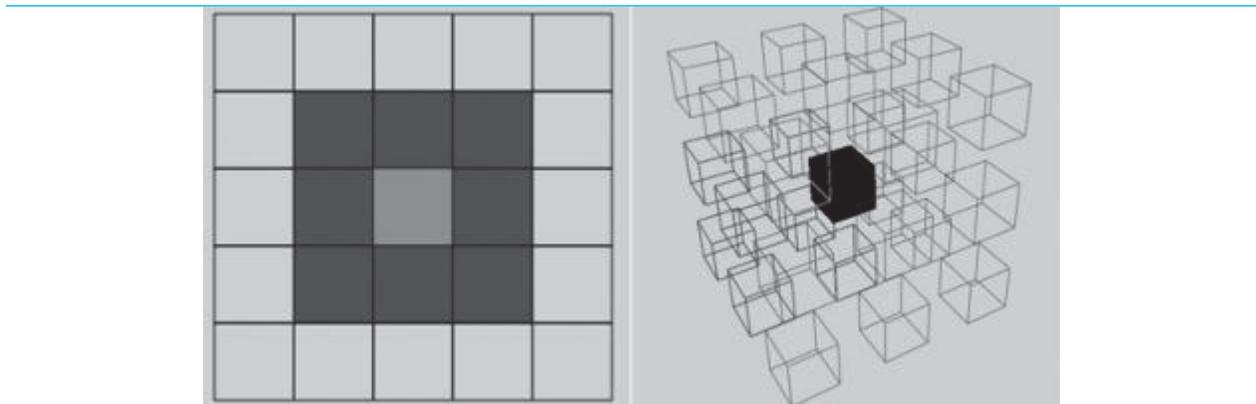
Fig 1. Moore neighborhood in 2D, with the neighborhood surrounding the center cell shaded darker, and the equivalent in 3D with the center cell represented as a black cube and the neighboring 26 cells as wireframe cubes.
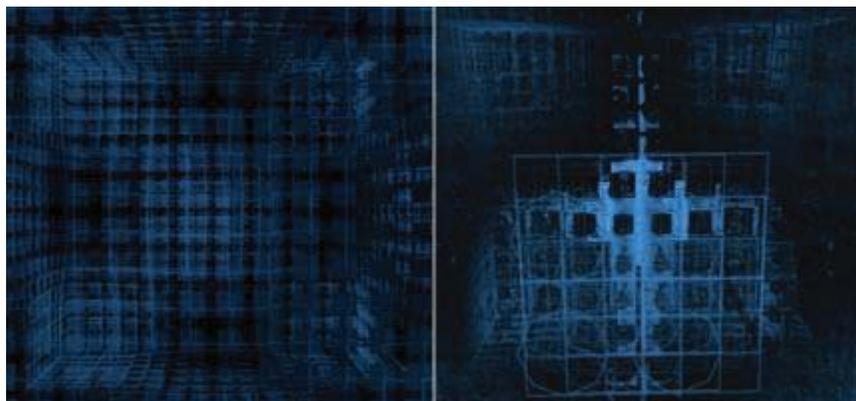
Fig 2. Snapshots from 'zone 01' of f(x)

Introduction.

Digital technology has provided an incredible variety of opportunities for artistic exploration and has fostered a new perspective on human culture and society. It has forced scientific methods and concepts into the working process and aesthetic framework of an artist due to its very nature. The beginnings of the digital computer are inseparably connected to research into the biology of self-replication and the possibility of artificial life. The early work of most remarkably Alan Turing and John von Neumann was essential to the way the modern world operates and the fundamental concepts based on the spectacle of biological evolution and natural selection have been integrated into every piece of digital technology with which we have surrounded ourselves. f(x) is a performance environment created to reveal some of the aspects and principles of digital technology. It is based on a concept that has only been made possible with the advent of computers - cellular automata – and was born out of research into artificial self-reproduction. It is designed as a live audiovisual experiment in which the performer interacts with a world of 3-dimensional spatial functions defined – analogously with the principles of cellular automata – in terms of each other. The performance is seeking to reveal complex patterns of behavior, generated by relatively simple instructions and rules that would uncover some of the elusive characteristics of digital media surrounding us now in almost every situation.

Cellular automata constitute an area of research belonging to the interdisciplinary field of complex systems science. They have been used as computer models mainly in computability theory, mathematics, theoretical biology and physics, but also have found many applications in generative art and computer music. The beginnings of the research in complexity can be considered as coinciding with the advent of the field of biology in the beginning of 19th century. In the middle of the twentieth century two independent lines of research were started that have greatly shaped our understanding of complexity. In molecular biology, it became evident from the research that led to the discovery of the chemical structure of DNA, that every living system is highly organized and this organization is coupled to a complex molecular apparatus, which functions as a stored information code for regeneration. There are two complementary modes of existence embedded in each complex living system: the internal physical-chemical workings of a cell and the informational mode where information is selected, stored, and interpreted by the physical actions. In early computer science research an investigation was launched into the nature of complexity in general in a computational or mathematical sense. John von Neumann initiated the study of self-replicating automata in 1940ies. He recognized the dual functioning of information that self-replication requires. The two modes are present in any cellular automata system as well: the dynamics of an automata system and the rules that evolve it.

Cellular automata.

Cellular automata are deterministic dynamical systems, which are discrete in space and time, operate on a uniform lattice and are characterized by simple local interactions. An automata world consists of a number of cells on a grid and evolves a number of discrete time steps according to a set of rules based on the states of neighboring cells. The behavior of every cellular automata system depends on four basic features: (1) the size along each dimension of the grid, (2) the number of distinct states, (3) neighborhood over which cells affect each other, and (4) the initial state of each cell at the outset. The most elementary family of cellular automata rules is defined as a one-dimensional row of cells in which each cell can only be either 0 or 1. The automata world evolves by iterating through each of the individual cells at each time step to determine the next state according to the established rule. The resultant patterns of

behavior can be characterized as 'emergent', meaning the local simple interactions can produce unpredictable and complex behavior on the global scale of the automata world. The main attraction of such a system is the demonstration of the dynamics of how complex structures can emerge from simple interactions without premeditated design or intention in analogy to the most basic processes in nature.

Automata in f(x).

The automata principles utilized in the f(x) environment are slightly modified from the standard discrete valued approach. It is also possible to contemplate systems where the values are not discrete, but continuous within a specified range. In such systems, the value of each cell can be defined by calculating the average state of the defined neighborhood. In this scenario, it becomes necessary to either multiply the average of the neighborhood of each cell by a fraction greater than 1 – e.g. 3/2 - or add a value typically between 0 and 1 and then only use the fractional part of the result for the system to exhibit complex behavior similar to the elementary automata discussed previously. Otherwise the averaging process will quickly settle the lattice into a uniform state all across. The multiplier or the added value becomes the determining factor in the behavior of the automata on the global level, with smaller values producing an overall smoother transition effect.

The behavior of the continuous-valued world can be further affected by assigning weights to each of the cell's neighbors, making variable the amount of influence each cell has in the neighborhood. In this case, weighted mean value is calculated for each cell when updating the states. Weighted automata rules increase in significance as the automata world is extended into higher dimensions as the geometrical properties of the system become more pronounced. In the f(x) environment, the automata idea is expanded into a three-dimensional world of regions, in which there are significantly more complex geometrical phenomena that emerge in the shape of patterns created. One can imagine a cube-shaped world of three-dimensional space sectioned into smaller cube-shaped regions, each of which has an associated state value and is defined in terms of surrounding space. The shape of the surrounding space depends on the neighborhood definition and is further molded by the weights assigned to each neighboring region. These spatial fluctuations can be viewed as continuous functions permeating a region of imaginary space while being defined in terms of each other. This imaginary three-dimensional world constitutes the foundation of the performance environment.

The environment enables a real-time exploration of the evolving spatial patterns by modifying a number of parameters, including the global addition value and the shape of the neighborhood by selecting different patterns of neighborhood weights and enables the user to manage predefined computer graphics algorithms and audio synthesis definitions in response to the automata behavior. The current automata world consists of 4096 regions or cells – 16 along each of the three dimensions. This choice is rather arbitrary having more to do with limitations on real time computing power than any logical or aesthetic considerations and can be easily altered. Currently, only two cell neighborhood configurations are used as the weighting provides further options for different neighborhood configurations. The three-dimensional equivalent of what is known in cellular automata literature as 'Moore neighborhood' considers 26 nearest neighbors, including those diagonal from the center cell on the lattice. Figure 1 illustrates the Moore neighborhood in 2D, with the neighborhood surrounding the center cell shaded darker, and the equivalent in 3D with the center cell represented as a black cube and the neighboring 26 cells as wireframe cubes.

System overview.

The system has been implemented in two separate parts. The automata world and graphics functions are part of a separate custom-written application, while the control center, audio synthesis and activation routines, and user interfaces for external control have all been implemented in the SuperCollider programming environment. The communication between the applications is managed through the Open Sound Control (OSC) protocol. Cell state values are used to generate audiovisual content during the performance. Due to the large size of the world and the high standard message rate (24 cycles per second), only a selection of individual cell values is polled by the SuperCollider application for audio synthesis mappings. This selection can also be specified and modified during the performance and it usually coincides with the selective visual representation of the cells. In addition, a global mean cell state and standard deviation for the entire world as well as mean state values for 8 sub-regions are calculated and sent out through the OSC client. The sub-regions are created by splitting the cube-shaped world in half along each of the 3 axes, thus creating 8 smaller cubes of 8^3 or 512 cells each.

Another dynamic feature of the automata world is linear interpolation of cell state values, which allows "time-stretching" the automata behavior by delaying the update function by a desired number of cycles. This feature allows slowing down the propagation of fast patterns when the addition value is set relatively high. Drawing functions are implemented as encapsulated patches, each with a specific characteristic. These patches can be easily added and modified during development and constitute a basic unit of the graphics application. Each patch has a number of parameters for transparency, color mapping and other values that can be controlled remotely. Besides the individual patch controls, global transparency, screen background color, zoom along each of the 3 axes, speed and direction of rotation, and relative rotation angle around each of the 3 axes can be controlled in real time. The added functions are expected to contain mapping logic from state values to audio synthesis parameters and can also be used to control certain parameters of the graphics application, creating parameter feedback loops during the performance. Audio synthesis definitions and time-structuring routines can be added dynamically during the performance either from predefined functions or specified in a live-coding just-in-time programming manner.

Audiovisual composition.

The audiovisual composition relies on two elemental concepts: audiovisual macro compositional entities called zones and the separation of audio and visual content within these entities both physically and conceptually. The concept of a zone emerged in the process of developing this project as a means to have a meaningful segmentation of considerably different audiovisual material and allows introducing new approaches to audiovisual mapping without restructuring the existing organization. Each of these zones can be activated in any sequence during a performance and, for better or worse, have provided a

general form for the entire composition. Each zone is characterized by unique and specific mapping procedures resulting in a distinct audiovisual entity.

The disparate networked structure of the environment keeps the conceptual and operational schism between the auditory and the visual. However, it is intended that neither is subservient to the other medium and both have an independent and equally important role in the composition. The two worlds are explored for their inherent characteristics and there is always a hint of a connection, at times seemingly synchronized and at others not easily identified. The 3D world is represented in computer graphics by mapping selected cell state values to low-level vertex drawing functions. Most commonly the cell state or inverse of the state is mapped to the drawn object's grayscale color, transparency and size. The variation of these three parameters already yields a significant palette of mapping options, considering that what really makes an impact in terms of the visual content are the intricate patterns that emerge even from the simplest of representations.

Audio synthesis parameter mapping is driven by the messages received from the automata world and handled through 3 different types of OSC responder functions as described in the previous section. A commonly utilized technique is to activate a number of parallel synthesis processes, identifying a certain number of modifiable parameters and mapping the incoming cell state values to appropriate mapping ranges for each parameter. Each synthesis process can have its custom mapping range for every selected parameter or synthesis processes can be grouped and the same mapping ranges used for equivalent parameters. The mapping ranges and curves themselves can also be modified during the performance, which provides even more powerful expressive tools for the performer. An example of the described mapping technique from the 'zone 1' section of the environment defines first a prototype synthesis definition for time stretching existing audio buffers with 8 modifiable parameters: overall amplitude, start read position in the buffer, end read position in the buffer, amplitude of the signal sent to auxiliary effects bus, pitch-shifting ratio, sound field rotation angles around the x-, y-, and z-axes (in terms of Ambisonics spatialization).

When the 8 synthesis processes are activated in parallel, each with 8 modifiable parameters, a cell states value responder function is added to the responder function evaluation queue containing instructions to map the incoming cell values to the specified ranges. Each time the SuperCollider language application receives a message marked as 'cell states', the function is instructed to clump the 64 incoming values into groups of 8, and then map each of 8 cell state values in a group according to the 8 parameter ranges and update the running synthesis processes with the obtained parameter values. Similar technique is used throughout the different zones, however, this is not the only method of mapping employed in the environment. Synthesis processes of shorter duration are also triggered according to received messages, for instance, and there are ranges of cell state values specified within which a certain process is active and is automatically switched off if a specific cell state goes out of that range. There are an endless number of alternative mapping strategies and as the environment is developed further, hopefully new approaches will keep surfacing.

Conclusion.

f(x) is an experimental environment, continually under development, exploring possible strategies for audiovisual laptop performance, in which the generative computer art paradigm is brought into the con-

text of live performance. Every performance on the system has so far produced distinctly differing outcomes, even though the introduction of the concept of 'zones' has channelled the performances into previously explored territories and encouraged the performer to favor certain system behaviors over others. In general, the environment fosters the idea of the composer/performer as an explorer or a discoverer, rather than a spontaneous creator. The design of the system tries to balance the amount of control and gestural character of the human performer against the distinctly non-human behavior of the automata world, simultaneously exploring the conceptual differences between the auditory and visual composition.

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PAYING ONE'S RESPECT TO A MOUNTAIN

ASTRID ALMKHLAAFY

Over the last three years I've climbed and mapped sacred mountains in Asia, as well as man-made monuments that refer directly to the cosmological. As an artist I fuse archaeology, legend, history and the site specific pilgrimage together – exploring on foot – while documenting with video, photography and GPS and react to the location through performance and later participatory installations.

Up&Down Installation, Night & Day Gallery, Nov. 09, Singapore, mountain and the Todorovics

"You must ascend a mountain to learn your relation to matter, and so to your own body, for it is at home there, though you are not."
– Henry David Thoreau

INTRODUCTION
Over the last three years I've climbed and mapped sacred mountains in Asia, as well as man-made monuments that refer directly to the cosmological Mt. Meru and Mt. Sumeru of Buddhist and Hindu tradition. As an artist I fuse archaeology, legend, history and the site specific pilgrimage together – exploring on foot – while documenting with video, photography and GPS and react to the location through performance.

The mountain pilgrimage has become my lens into deciphering aspects of my new home. To share I create participatory art that attempts to poetically embody and translate my own experience to new audiences. In this artist talk, I will introduce my mountain treks in China, Indonesia and Cambodia and also discuss the challenges and successes I encountered in translating these site specific projects and performances into installation pieces.

TALK

This work draws on the tradition of Somatics, where direct experience and the body are key ingredients in exploring the inner world through physical engagement with location. It is also inspired by Yi Fu Tuan and his thoughts in Space and Place, where "the human person, who is animal, fantasist, and computer combined, experiences and understands the world". As an artist much of my understanding of place is through walking. Artists including Francis Alys and his Paseos, Guy Debord's Derives, Janet Cardiff's audio and video walks and Walkbook, and Hamish Fulton's walk art have also drawn on the walk as a source for their making.

The mountain has been my lens, specifically magical and mystical epicenters in Asia. Walking has been my way of engaging in these spaces. To understand my new home of Singapore, I climb through mountains of religion. There is something transformative about ascending, climbing, straining towards a peak, especially a peak with a temple perched on top, ideally along a path with hundreds of other climbers, that pushes my awareness out of my own experience into a synergetic flow of humanity. I've been drawn to these places that push my endurance and awareness. It is on mountain pilgrimages that my subjective experience begins to feel integrated into a larger awareness. This is hybrid practice-based research that attempts to combine approaches from interactive art, somatic bodywork concepts and experiential Aesthetics that includes site specific performance and translations in later installations.

"The ordinary man looking at a mountain is like an illiterate person confronted with a Greek manuscript."
– Aleister Crowley.

The mountain as a pilgrim destination is not specific to any one region; it is an archetypal metaphor that transcends location and time. Think of Olympus, Ararat, Zion, Sinai, the temple at Delphi, the Tower of Babylon, Ziggurats, Pyramids, Manchu Piccu, Temples on Mounts, Mounds, Tells and so many other upward looking locations where we are inspired to consider if not engage in intense communication. We have real mountains where real gods reside, and man-made mountains where we see the achievements of civilizations. This holds true for the Americas, Africa, Australia and of course Asia. It is the mountains in Asia where my search began. It's the small temples perched on hilltops, the monuments of Borobudur and Angkor Wat, and the gaze of the regions religions up to Mount Meru, Mount Sumeru, and Mount Kailas as well as the 5 peaks of Taoist China that make up the body of Pangu, the first living being and the creator of all in Chinese mythology

"Mountains are cosmological symbols of the divine human meeting, as well as the point of creation of community as well as cosmos. Depending upon the era, culture, and text, the cosmological emphasis on the mountain might be one or more of the following: the assembly place of the gods, the connection between heaven and earth, the center/navel of the earth (and thus the locus of creation), the locus of revelation."
– Donaldson, Terence L., Jesus on the Mountain. A
Study in Matthean Theology.

In the last four years I have climbed with video, cameras and gps, Mt. Taishan and Hushan in China, as well as the nearly erupting Merapi in Java, and manmade structures that represent Mt Meru and Mt Sumeru of the Buddhist and Hindu cosmologies, at Angkor Wat and Borobodur. Most recently I joined in the annual ceremony in Bali to Mt Batur and Mt. Agung, At each site, I reacted to the location by performing site specific performance walks, circumambulating structures, interacting with the flow of pilgrims or performing within the pilgrimage space. All of the walks have been documented with GPS and photography and often video.

Nearly all have been translated into print pieces that have been published and exhibited internationally. But I am drawn to the challenge of communicating on a more experiential and participatory level.

I exhibited my work of Taishan and Hushan in a three floor installation in Singapore. Drawing inspiration from participatory art and the book, What We Want is Free, I tried to create an experience for my audience that physically drew them into the concept of a pilgrimage, both the subjectivity of the experience and also with a taste of my own experience. I was fortunate to collaborate with video artist Kal Almkhlaafy as well as sound artist Darren Moore , both from LaSalle College of the arts in Singapore, in creating a more immersive environment. My success was less through media art, more through traditional exhibition. I had words everywhere and messages about mountains, pilgrimages and quests. The installation used three flight of stairs leading up to the gallery, making the journey up a mirror of climbing a mini mountain. Participants walked up the flights, holding handfuls of red sand which spilled through their fingers and painted the stairs red, again mirroring my own experience at Taishan, where I walked in red and 'painted' the mountain red by my walk. At the top floor, the participants added their sand to a mountain of natural sand that was already there. This mound was then painted red by those coming into the space. The most successful element was a wall of quotations that were velcroed in a grid. This was where people could take away meaning that resonated. The GPS tracts were displayed as soldered Plexiglas wall hangings, making the ephemeral nature of the walks made of a lasting material.

"Baudelaire writes: In certain almost supernatural inner states, the depth of life is entirely revealed in the spectacle, however ordinary, that we have before our eyes, and which becomes the symbol of it." Here we have a passage that designates the phenomenological direction I myself pursue. The exterior spectacle helps intimate grandeur unfold."
– Gaston Bachelard

CONCLUSION

When we seek a mountain, or enlightenment, and the Chinese equate the two, we seek our own center. The pilgrim goes physically on a quest to a location that represents the center of a universe, the universe as a whole, but also the center of the pilgrim. By moving outward we also move inward. By seeking we see ourselves from a new perspective, and in many of the instances that have been explored, that perspective is one of centering the pilgrim at the heart of the mandala. The axis mundi within.

And then how is this communicated? It must be documented well enough for clarity shared open enough for subjective interpretation

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SWARMING ROBOTS AND POSSIBLE MEDICAL APPLICATIONS

Mohammad Majid al-Rifaie, Ahmed Aber & Remigijus Raisys

In this paper a Swarm Intelligence algorithm (SDS) is introduced and the performance of a set of autonomous robots is observed. The robots agree on a task and despite the existence of 'organic' noise accomplish the mission through communication. The potential of using SDS in identifying metastasis from bone scans is also explored and a discussion on using swarming robots using SDS resource allocation/communication mechanisms is presented.
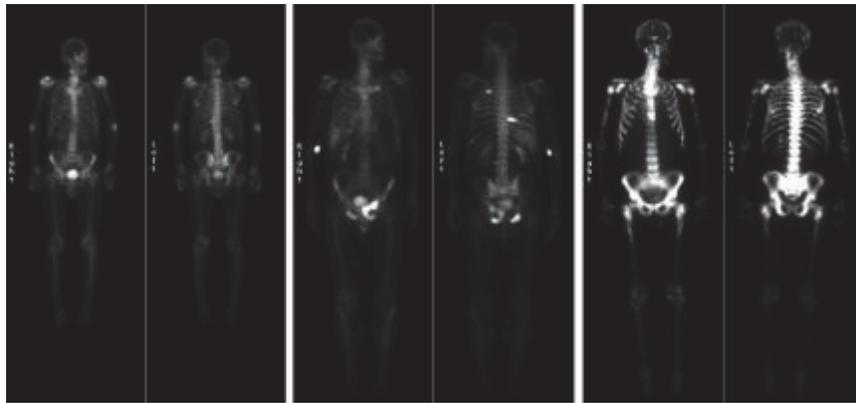
Fig 1. Bone images: typically 2-6 hours after intravenous asdministration of technetium-99m-labeled diphosphonates. Brighter areas indicate a higher radiotracer uptake. Left: Healthy; middle: partially affected; right: metastatic disease spread.
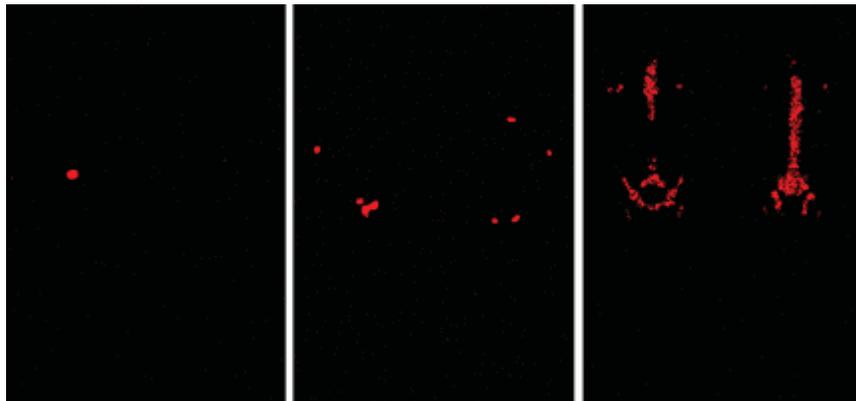
Fig 2. SDS-analysed bone images: The results returned by SDS agents after reaching 80% of activity. Left: Healthy; middle: partially affected; right: metastatic disease spread.
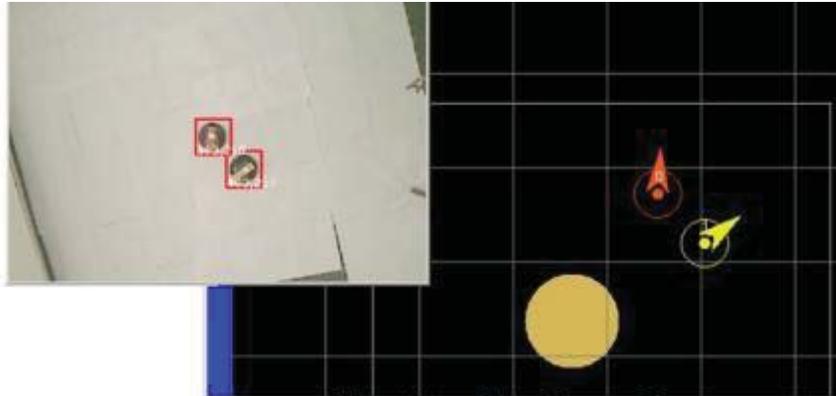
Fig 3. Snapshot of two swarming robots on the ground and in the simulator.

Introduction

Communication – social interaction or information exchange – observed in social insects is important in all swarm intelligence algorithms, including Stochastic Diffusion Search (SDS), [1] which mimics the recruitment behavior of one species of ants – *Leptothorax acervorum*. Although, as stated by James F. Kennedy and his collaborators, [2] in real social interactions, it is not just syntactical information exchanged between the individuals, but also semantic rules and beliefs about how to process this information, in swarm intelligence algorithms only the syntactical exchange of information is considered.

There are different forms of recruitment in social insects: it may take the form of local or global, one-to-one or one-to-many, and stochastic or deterministic mode. The nature of information exchange also varies in different environments and with different types of social insects. Sometimes, the information exchange is more complex where, for example, it might carry data about the direction, suitability of the target and the distance; sometimes the information sharing is simply a stimulation forcing a certain triggered action. What all these recruitment and information exchange strategies have in common is distributing useful information in their community.

In this paper, the behavior of the robots is explained according to the Mining Game metaphor, [3] which provides a simple high-level description of the behavior of agents in SDS.

The Mining Game

This metaphor provides a simple high-level description of the behavior of agents in SDS, where a mountain range is divided into hills and each hill is divided into regions.

A group of miners learn that there is gold to be found on the hills of a mountain range but have no information regarding its distribution. To maximize their collective wealth, the maximum number of miners should dig at the hill that has the richest seams of gold (this information is not available a-priori). In order to solve this problem, the miners decide to employ a simple Stochastic Diffusion Search.

- At the start of the mining process each miner is randomly allocated a hill to mine (his hill hypothesis, *h*).
- Every day each miner is allocated a randomly selected region on the hill to mine.

- At the end of each day, the probability that a miner is happy is proportional to the amount of gold he has found. Every evening, the miners congregate and each miner who is not happy selects another miner at random for communication. If the chosen miner is happy, he shares the location of his hill and thus both now maintain it as their hypothesis, *h*; if not, the unhappy miner selects a new hill hypothesis to mine at random.
- As this process is isomorphic to SDS, miners will naturally self-organize to congregate over hill(s) of the mountain with a high concentration of gold.

In the context of SDS, agents take the role of miners: active agents being 'happy miners,' inactive agents being 'unhappy miners' and the agent's hypothesis being the miner's 'hill-hypothesis.'

Algorithm 1 -- The Mining Game

Initialization phase

Allocate each miner (agent) to a random hill (hypothesis) to pick a region randomly

Until (all miners congregate over the highest concentration of gold)

    Test phase
        Each miner evaluates the amount of gold
        they have mined (hypotheses evaluation)

        Miners are classified into happy (active)
        and unhappy (inactive) groups

    Diffusion phase
        Unhappy miners consider a new hill by
        either by communicating with another miner
        or, if the selected miner is also
        unhappy, there will be no information
        flow between the miners; instead the
        selecting miner must consider another
        hill (new hypothesis) at random
End

Swarming Robots

One work by the authors, [4] is based on a project that involves the use of a swarm of autonomous robots to evaluate their interactions in the physical world (see the figureshowing the robots and the simulator). The main channel of communication (one-to-one/one-to-many) is wireless. The goal of this project is to study and demonstrate the behavior of swarm robots using a decentralized control mechanism, where intelligence emerges through the interaction and communication among the robots, rather than just by the endeavor of one individual robot.

Each robot is fitted with a controller board (Arduino POP 168 micro-controller), with servo motors and other sensors connected to it. The wireless communication is facilitated by XBee modules. Each robot

has a label with a unique color, giving them a distinctive feature. For the system to recognize the robots, the OpenCV library is used to detect the color of each robot as well as the direction they are moving.

Following the Mining Game metaphor, each robot represents a miner and the location of the gold is defined on the search space with a uniquely identifiable label. The robots, which set off to search for gold, proceed with the communication and information exchange in wireless mode. At the end of each trial, as expected, the robots congregate around the gold location. In this experiment, the search space is just divided into hills; the hills were not divided into regions because of the small search space used for the experiment.

SDS and Bone Scintigraphy

Bone scan, or bone scintigraphy, is one of the most frequently performed of all radionuclide procedures. Radionuclide bone imaging is quick, relatively inexpensive, widely available, exquisitely sensitive, and invaluable in the diagnostic evaluation of numerous pathologic conditions. Although protocols vary among institutions, imaging is typically performed two to six hours after intravenous administration of technetium-99m–labeled diphosphonates. The delay between injection and imaging allows clearance of the radiotracer from the soft tissues, resulting in a higher target-to-background ratio and improved visualization of bone. The degree of radiotracer uptake depends primarily on two factors: blood flow and, perhaps more importantly, the rate of new bone formation. [5]

NORMAL SCINTIGRAPHIC FINDINGS

There is symmetric distribution of activity throughout the skeletal system in healthy adults. Urinary bladder activity, faint renal activity, and minimal soft-tissue activity are also normally present (see the bone scan figure - left).

The accumulation of radiotracer in bone generally decreases with age. However, there are sites of persistently increased symmetric uptake, such as the acromial and coracoid processes of the scapulae, the medial ends of the clavicles, the junction of the body and manubrium of the sternum (angle of Louis), and the sacral alae. Increased radiotracer accumulation in the jaw may be due to dental disease or to malocclusion of dentures. Symmetric areas of increased calvarial activity occurs in hyperostosis frontalis. In the neck, activity in calcified thyroid cartilage and in the apophyseal joints of the cervical vertebrae in patients with asymptomatic degenerative changes can also be seen [6] (see the bone scan figure - left).

METASTATIC DISEASE

Metastasis is the process by which the cancer spreads from the original site where it starts as a primary tumor to other tissues in the body, such as prostate cancer metastasizing to the bone tissue.

Many, if not most, bone scans are performed in patients with a diagnosis of cancer, especially carcinoma of the breast, prostate gland, and lung. Radionuclide bone imaging plays an important part in tumor staging and management. This imaging technique is extremely sensitive for detecting skeletal abnormalities, and numerous studies have confirmed that it is considerably more sensitive than conventional radiography for this purpose. [7] About 75% of patients with malignancy and pain have abnormal bone scintigraphic findings. The usual pattern consists of increased radiotracer deposition in areas of new

bone tissue formation in response to the damaging effect of cancer on the bone. [8] The presence of multiple, randomly distributed areas of increased uptake of varying size, shape, and intensity are highly suggestive of bone metastases (see the SDS-analyzed bone scan figure - middle). Although multiple foci of increased activity may be encountered in other pathologic conditions, it is often possible to distinguish metastatic disease from other entities by analyzing the pattern of distribution of the abnormalities. Traumatic injury, in contrast to metastatic disease, generally manifests as discrete focal abnormalities of similar intensity. In older patients, osteoarthritis and degenerative changes may manifest as areas of intense activity on radionuclide bone images. These changes can be distinguished from metastatic disease by virtue of their characteristic location; for example, knees, hands, wrists. Involvement of both sides of the joint is common in arthritis but unusual in malignant conditions. [9]

When the metastatic process is diffuse, virtually all of the radiotracer is concentrated in the skeleton, with little or no activity in the soft tissues or urinary tract. The resulting pattern, which is characterized by excellent bone detail, is frequently referred to as a superscan (see the bone scan figure - right). [10]

Bone scintigraphy is a popular and important imaging modality and will likely remain so for the foreseeable future. Although bone scintigraphy is not specific, its exquisite sensitivity makes it a useful screening procedure for many pathologic conditions, especially for the detection of prostate, breast and lung cancer metastasis.

SWARM INTELLIGENCE AND BONE SCANS

In this paper, the SDS algorithm demonstrates a promising ability in identifying areas of metastasis. [11] Each scan in the bone scan figure is processed by 10,000 SDS agents, which are responsible for locating the affected area(s). When the activity rate of the agents reaches 80%, the application terminates. The highlighted areas in the SDS-analyzed bone scan figure show the affected regions. According to the description given in the previous section, the SDS-analyzed bone scan figure (middle and right) are the areas of metastasis.

This technology can be effectively employed to develop programs for teaching and training medical students and junior doctors. Additionally the reproducibility and the accuracy of the SDS algorithm can be utilized in developing a standardized system to interpret the bone scans preventing operator errors and discrepancies.

Possible Medical Application with Swarming Robots

Robotic technology is enhancing invasive medical procedures through improved precision, stability, and dexterity. First experiences of using micro-robots in the human body came from the development of technologies to improve endoscopic procedures of the gastrointestinal tract. Endoscopy provides valuable information about any major pathologies; such as bleeding, malignancy or precancerous conditions in the gastrointestinal system. Typically, the widely used endoscope is composed of the head (active part) that incorporates the camera, optics and illumination and the shaft that allows the advancement of the instrument. By pushing and pulling over the shaft of the device, the endoscope advances inside the lumen of the gastrointestinal tract; however, these actions stretch the colon and cause pain during the endoscopic examination. in addition, despite advances in endoscopic technology, early precancerous conditions are still missed with fatal consequences. [12]

Robotics research has provided a solution for one of the major limitations of the conventional endoscopy by splitting the system and making the active part of the endoscope (camera, light) self propelling inside the lumen while the control and energy equipments are left outside of the body, thus avoiding stretching the colon and limiting the abdominal pain. This is intended to minimize the pain that often limits complete examination of the colon.

For instance, in an advanced robotic system that is currently in use for in vivo endoscopic exploration of the gastrointestinal tract, an un-tethered camera pill is swallowed by the patient and then naturally moves through the lumen of the GI tract. This micro-robot contains an imaging device and light-source on one-side and transmits images at a high rate in a matter of seconds to a control device outside the patient's body. This generates a wealth of data over a period of a few hours. The images are sent from the capsule wirelessly to the control device. Images of the gastrointestinal lumen can then be analyzed either in real-time for immediate localization of the micro-robots or off-line for detailed diagnosis. [13]

As for the future medical experiments, micro-robots with similar properties will be utilized; these agents (robots or miners) will be identifying areas in the gastrointestinal lumen with any pre-cancerous pathology. In the initial experiments, the simplified case of having a pre-malignant condition, which is confined to an area in the gastrointestinal system, is explored. Micro-robots interacting based on the SDS algorithm provide a promising tool to identify pathological areas in the gastrointestinal system; with greater precision enabling a better a diagnosis and management plan for the patients. When optimization is involved, the integration of SDS with other swarm intelligence and evolutionary algorithms has shown promising results. [14] [15] The artistic aspects of this integration are discussed by the authors in the article *Coopertation of Nature and Physiologically Inspired Mechanisms in Virtualisation*. [16]

Conclusion

This paper introduced SDS, a swarm intelligence algorithm, through a social metaphor and presented some of its possible applications. The applicability of the SDS algorithm in identifying areas of metastasis are discussed and the potential of deploying SDS in developing programmes for teaching and training medical students and junior doctors is also considered. Possible areas for future research in using SDS with swarming robots are also explored.

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TEN YEARS AFTER

Franck Ancel

I therefore propose to create "Round Zero" an international platform at ISEA2011, "chess" or success. It depends only on you, Artists and Theorists, Institutions and Museums. I will not be in Istanbul due to shortage of funding for a plane ticket to be present in such meaningful occasion, but am and will always be available to share and exchange by email or other possible means.

"Ten Years After" was originally conceived as a combination of three proposals, a panel discussion, and a workshop over an article. It has resulted in a piece of text as it is now, because it was unable to receive the funding it would require after submitting various proposals to different French Institutes and bodies for international grants. (1) This is not the first time I have encountered such disappointing situation. For both the 2006 and 2008 ISEA conference, the French institutions were not very generous towards my participation in the ISEA.

Undeterred, I still tried my best this year, to propose a round table discussion, a workshop, together with this single text, exactly ten years after the events of September 11 in New York, here in Istanbul. Through words, I hope to imagine another way of inhabiting this planet; and through networks, I hope to look to the future as well as the past, and come up with a very concrete proposal.

At the last Web-Biennale in 2010, which was founded and directed by Genco Gülan since 2002 and held in partnership with the Museum of Contemporary Art in Istanbul, I was invited among other curators to participate in such alternative exhibition, and proposed a "**Zero Pavilion**".

My "Zero Pavilion" consists of ten links (2), all with a theme relating to the idea of 'zero' in the contemporary sense. These 10 links ranged from William Gibson's latest novel "Zero History", to "zero pollution", an idealistic environmental goal for private companies; from the experience in zero gravity in space, to the birth of the art group Zero, which is preparing a Guggenheim retrospective in 2013 in New York. There is an introductory text to explain of my intention, where everyone could contribute to the web pavilion through its open-frame nature.

Please be reminded that the theme of this Web-Biennale in 2010, was "anti-censor". For that I have specially presented the "Zero Pavilion" as a platform with 10 links to express my vision of a "Better Web Better Wor(l)d" designed with an open framework. This enable participatory updating from the public,

through which the pavilion could continue to renew itself. My proposal echoed the Shanghai World Fair 2010 , during I initiated a virtual project to synchronize with the event. (3) Confronted by the fact that the Frenchgovernment invested the 50 million euros on building the French pavilion without offering a single place for artists, I created a proposal with zero euro on June 16, 2010 at the Art Fair, Volta, during which "Celestial Hopscotch", a performance I made, was broadcasted live on the Internet, between Switzerland and Iran, from Basel. (4)

It has been more than 15 years since the democratization of the Internet. Such change has revolutionized the process of art making. "Net Art" has emerged since then around the world. It has been recognized and successfully absorbed into the discourse of Western Art, continuing the vein of life of a history, of which now is mostly confined to the walls of museums. And we know, Art can be without these walls and screens.

The current proposal "The Museum of Non-Visible Art" by James Franco from the United State will soon be presented in a cultural event in Europe. In many ways, it has revived a lot of principles inherited from the Fluxus, which has an ephemeral conceptual approach to art. So far these fluxus ideas have been manifested in the world of networks, but not yet in the museum, without wall or screen. The idea of the "Museum of Invisible Art' has redefined the concept of the museum and renders it an invisible ephemeral condition, extending its definition and reality to the state of concepts, thoughts and imaginations.

Another model for zeroness, which has also created a dialogue between the real and the virtual, is the digital database posted on the project of the Memorial Museum on September 11 in New York. Its mission is to provide a gathering place within a virtual gallery for artworks which are created in response to the 911 catastrophe by members from the community, ranging from seasoned professionals to inspired individuals from the public. It is the first time perhaps, for the public to express their reactions to 9/11 through multiple media: visual, tactile or auditory. (5)

In 2001, as a response to the New York 911 event, I had tried to put these different media and perspectives into my project, called "Aporie 11", which aimed to be collaborative and rhizomically free in structure. Not aiming to confine to one well-defined medium, it also did not seek for a catharsis. Apart from that, I have engaged with the event indirectly so that it questioned and challenged a lot of presumed irrefutable facts. It was an attempt, to move away from the traditional medium of art, the duality of the interior and exterior, the walls and screens, in order to point to a new direction for artistic research.

To respond to the dramatic event is what seemed to us almost essential. For it has updated a lot of questions and concepts about the world, such as the idea of eternity and its centre. **World-eternity-center** was the name of our ephemeral internet website, and together with a mail art project, which has

lasted six months. There was a monthly meeting on every 11 day of each month, so we have named it "Aporie 11".

To produce my research, theory and practice, I have allowed myself ten years of time, to focus on questions and answers not confined to only the physical walls of museums and / or the virtual screens of the Internet. The influence of the history of the avant-garde and neo-avant-garde has been decisive and critical to me until today. One of its founders, Marcel Duchamp had opened the door to other practices as a symbolic economy in art with the help of an invisible network of his contemporary and friends. Recent research by Miss Daniela Alina Plewes in this field through her university thesis is illuminating the relationship of the artistic exchange existing at that time. (6)

Marcel Duchamp has imagined a « failure system », not as an enterprise or business, to gain money at the Monaco Casino in 1925. For him to be permitted to play, so to live, Duchamp had spent a total bills of 500 francs (at an interest rate of 20%) as a starting capital. Each bill was signed by Marcel Duchamp and his female pseudonyme Rrose Selayv. His friend, the photographer Man Ray has also been sollicited to create the bill, with a reproduction of Duchamp as a devil. This work from Man Ray is a Dadaist joke. However, only Jacques Doucet and Marie Laurencin have been poetic enough to understand and invest in this action that relates art practices with economy.

To be specific, I tried to bet the last ten years of my life at the Casino of French Culture in a total failure. That is to say I have invested some money and time, to produce dozens of appointments and collaborations that seemed relevant between the reality and virtuality. Yet this creative freedom was met with futility in finding the space to work. However, sometimes I have satisfied some fetishistic collectors by selling them plexiglass boxes containing DVDs, remixing the arts from Yves Klein or Vladimir Mayakovsky.

In order to achieve my goal, I do not need any office, any infrastructure, but just a platform for collaboration, emails exchange and a banking account. Recently, the global news has urged me to conceptualise and realise two projects, with iPhone as an ideal medium of choice. One responds to the Fukushima catastrophe, named "Deserto Rosso" (7) while the other called "Space 140" (8) in resonance with the Tunisia uprising.

After more than ten years of activities, in fact, soon a quarter of a century, I still continue my research with humor, where now I have defined a new paradigm with the term the post-scenographic zerography. (9)

Looking at the operation of ANAT [Australian Network for Art and Technology], and from my experience, the whole world is at a crisis in almost every aspect, politically, economically, ecologically and culturally.

We are indeed at a critical point where actions need to be taken to envision a new economy based on a vision of the 21st century. This vision should not merely inherit from the past, but be radical and daring enough to create a break and rupture, for a more positive and creative future. And that is my good wish for the world.

Also, for the ten years of "Ground Zero", I would like to create a price "**Round Zero**", endowed with 10,000 euros. This allocation could be selected at random, like a virtual roulette. Though like a virtual roulette, it is with real money invested in it, and a concrete realization, without any constraint of curator or border in art.

The periphery of the art fair in Basel with its EuroAirport, the three countries, Switzerland, Germany, France, in the heart of Europe are ideal in providing the perfect place and context to showcase such a price. Of course, the creation of the artist will be chosen by drawing lots, and will take the form of an audible or visible action in the form of augmented reality. The production will be dependent on him, understood in these 10 000 euros.

In order to achieve that, I am looking for a company to develop an application on the iPhone / iPad or Android, and a cultural center and / or a gallery to produce and hold this event, which I consider a very serious artistic vision.

In regards to the proposal, the application we designed will accept an annual admission of 1000 subscribers. The price to download the application is set to a symbolic price of 10 euros. We identify the subscribers as voters with each having a chance to nominate one artist. From the 1000 subscribers to this club, together with donations accepted worldwide, we have 10 000 euros to create a scholarship for an artist drawn from the nomination list of registered voters. The EuroAirport (10) would be the ideal site in our context to create the first immaterial Art Fair, for the architectural site is composed of transparent glass walls that will inspire the provision of accounts and members open for this application/creation.

I therefore propose to create this international platform at ISEA 2011, "chess" or success. It depends only on you, Artists and Theorists, Institutions and Museums. I will not be in Istanbul due to a shortage of funding for an plane ticket to be present in such meaningful occasion, but am and will always be available to share and exchange by email or other possible means.

I am not boycotting the ISEA. But I defend for myself as an artist, and protest against the way the French Institutions allocate its fundings: please take note my empty chair as an invisible strike.

Now, if not too much, I only ask of you ten minutes, to meditate on my "Art of Silence"
here: **OOOOOOOOOO** per minutes.

Lastly, thank you: Space and Love!

Corrected translation by Miss Heidi Ting

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IS THERE A CONCEPTUAL GAP BETWEEN ART AND BUSINESS?

CHRISTIAN ULRIK ANDERSEN & SØREN POLD

Communities of taste ('what we like') historically relate to changes in the production process. How does art respond to this? Three case studies will demonstrate how Marcel Duchamp responded to mass production, how etoy responded to a dematerialized Internet economy, and how Christophe Bruno on a meta-level has addressed the result of the artist response itself: the appropriation by marketing.

The silence of Marcel Duchamp is overrated. (Joseph Beuys)

The experience economy, as proclaimed by Joseph Pine and James Gilmore, highlights how aesthetic experiences producing human capital (that is, cultural, social, and symbolic capital) may be converted into financial capital, adding to the exchange value of a brand on a market. [1] In this, they perceive the aesthetic experience as 'icing on the cake.' In contrast, we want to emphasize how contemporary digital art practices incorporate critique, and may be business innovations in themselves.

As described by Kant, the judgment of taste is based on a subjective experience proclaimed as a universal truth 'we' share ('this is beautiful'). [2] The transformation from subjective experiences to universal statements produces communities of shared experiences, or 'communities of taste.' Our argument is that communities of taste relate to changes in the production process. For instance, with the introduction of photographic techniques, our perception of images changed. [3] People developed a taste for images that could be copied; easy-to-print snapshots, movies, and so on. With this, art lost its traditional aura of uniqueness, but art also reflected these transformations. Artists develop markets for newly occurring communities of taste that come along with changes in production processes. Particularly, we find this during times of major change. The following three case studies will demonstrate how Marcel Duchamp responded to mass production, how etoy responded to a dematerialized Internet economy, and how, more recently, Christophe Bruno on a meta-level has addressed the result of the artist response itself. Marketing often appropriates artworks that address the new communities of taste, how does art respond to this?

Fountain: Selling shit

The best-known artist exploring the relationship between art and capital is Marcel Duchamp. His ready-made urinal, or *Fountain* (1917), jokingly reflects how changes in capitalism and production affect taste (aesthetics). Belgian art theorist Thierry de Duve has argued that *Fountain* was all about selling 'shit' ('arrhe') as art; commenting on the result of everyone being an artist. [4] Duchamp had done nothing more than buy a ready-made unit from a manufacturer (J. L. Mott), produced by workers whose productivity was bought on the labor market. He rotated it 90 degrees, signed it R. Mutt, and submitted it to an exhibition. It was then sold to an art collector (Walter C. Arensberg) using a blank check, enabling Mutt to pay his credits to Mott.

The check was never cashed, and Duchamp remained independent of the forces of capitalism. However, this independence should not be mistaken for a romantic view of the artist. The introduction of the check into the masquerade is important to our understanding of how Duchamp treated the changes in

the production system, as it indicates a possible transaction of 'shit' into an infinite amount of money. In showing how to make art/money from shit, he was an entrepreneur, a 'phynancier,' as de Duve calls him, inventing a new market that is neither art nor business in a traditional sense. Though Duchamp never pocketed the money, the value of *Fountain* (or rather its reproductions, authorized by Duchamp) on the art market today says something about the potential of the artist's business innovation and speculation in the market.

Toywar: Mobilizing a community of taste

Works such as *Fountain* indicate situations where artistic disruptions in a market create new markets. Much later, within the field of net-art, this was experienced again. Around the turn of the millennium, the artists' group, etoy, disrupted the power relations of financial shares. Through their website, www. etoy.com, etoy had for years played with a corporate identity on the Internet. Faced with lawsuits over their domain name registration by the toy retailer, eToys, etoy used the World Wide Web to mobilize their supporters in fighting eToys. Many activities took place, but most famous was the game *Toywar*. *Toywar* was very simple, and mostly a satire of corporate discourse. For example, it screened new players with questions such as: "Have you ever dreamed of being the opposite sex?" and "Did you ever wake up at night and realize you had real sick dreams?" [5] Some of etoy's actions, including an attack on their web servers during their Christmas sale, had direct consequences for eToys, but mostly, the success of etoy's actions rested on mobilizing people (almost 2000 enrolled) and the media attention it gained, affecting the broader public's taste and opinions. Ultimately, the most important score in the game was the stock value of eToys. This dropped drastically, resulting in eToy's collapse, and 'History's most expensive art performance.'

etoy had a remarkable ability to respond creatively to the sudden situation in which eToys put them, and demonstrated not only the strengths of an artistic business model, but also the dangers of ignoring it. Their activist war played on new markets with a taste for networked public participation, which inverted the power relation between the corporate and civic spheres. Though common in today's corporate communication, mobilizing people 'virally' through the Internet, using media tactically, was novel at the time. With the growing appearance of social web media in the last decade, this new market has proved itself a playground for marketing and new business ventures. Not only was *Toywar* critical of the power of global enterprises, it paradoxically also showed how to develop new markets on the Internet. How do artists respond when marketing appropriates art? [6]

ArtWar(e): Exploiting the hype-curves of taste

A decade later, net artist Christophe Bruno observed how his works, *Fascinum* (2001) and *Google Adwords Happening* (2002), had been appropriated by marketing. These works critically address the semantics of the web, and how Google takes over 'the market of the language,' but were echoed in Nicholas Sarkozy and Ségolene Royal's presidential campaigns in 2007. In concordance with how Google has capitalized semantics, for example, Google AdWords combines words with a monetary value, politicians are now using a 'panoptic ideology' and a 'remix of ideology' to assume control of 'a market of ideologies.'

In collaboration with the philosopher Samuel Tronçon, Bruno has applied mathematical logic, ludics and network theories to explain this transformation from art to market. In their project, *ArtWar(e)*, [7] they analyze how works of art (including *Toywar*), independent of their aesthetic value, enter a "scale free

network" where their popularity is dependent on laws of attraction, as opposed to randomness. The website essentially consists of a number of 'hype curves,' a term originally used to graphically illustrate the enthusiasm for new technologies over time – from over-enthusiasm, to disappointment, to economic implementation. "Hype cycles aim to separate the hype from the reality, and enable CEOs to decide whether or not a particular technology is ready for adoption," [8] it states on their website. The term is now used more broadly in marketing. In other words, *ArtWar(e)* reflects how businessmen are farming concepts and evolvements in the communities of taste.

The artist's response is to take control by making hype-curves for works of art, predictions of developments in taste communities. With some humor, Bruno even claims that *ArtWar(e)* is art, and hence implicitly suggests that the real response to the appropriation of net-art by marketing is to become a joking businessman. He employs the discourse of a CEO, and offers an opportunity to do "artistic risk management" and "computer aided curating." Bruno's art no longer involves working with the semantics of the web, which briefly characterized his earlier work, and was exploited by marketing. In order to avoid becoming an alienated laborer in an immaterial economy, the artist must become a businessman.

The three examples present the artists as businessmen. Duchamp reflected mass-production by creating an art market. etoy criticized the digital economy by assuming a fake corporate identity, and, caught in the act, they managed to employ a disruptive counterstrategy that, paradoxically, showed the world how to develop markets based on networks. As a meta-reflection on the appropriation of art by marketing, Christophe Bruno assumes the role of a stockbroker, calculating the stock value of taste. [9]

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THE KIND OF PROBLEM A SOFTWARE CITY IS

CHRISTIAN ULRIK ANDERSEN & Søren Pold

New urban interfaces introduce software to the city. To understand software cities we must compare the city with the software at a specific level. Building on the architect Christopher Alexander's idea of a 'pattern language' the article will present the activities that urban software fosters, and question how the underlying computational processes change the complex life forms of the city, and the response of urban planners.

The Kind of Problem a Software City Is

The final chapter in Jane Jacobs's *The Death and Life of Great American Cities*, from 1961, is entitled "The Kind of Problem a City Is." In it, she gives an account of the relations between urban development strategies and the progression of science. From being able to deal with problems of simplicity and disorganized complexity, science in the 20th century became capable of managing organized complexity. Statistical material and mathematics made it possible to manage a large number of variables as an organic whole. So-called 'urban renewal' projects were launched in both the United States and Europe to solve the urban problem of disorganized complexity. Slum areas that, according to statistics, had high rates of crime, infant mortality, and so on, were replaced with new and efficient infrastructures and a geographical separation of the use of the city into areas (residential, commercial, industrial, etc.). Several cities have been 'renewed' from the fifties onward by replacing urban areas of high complexity and diversity with new and functional areas of low complexity and diversity. Jacobs, however, claims that many urban planners do not know much about the actual interactions that take place in the city. [1] In contrast to this, they need "to think of cities as problems in organized complexity – organisms that are replete with unexamined, but obviously intricately interconnected, and surely understandable, relationships." [2] They must seek to think in processes that explain the general by the specific, rather than in statistical information that oppresses people and their relations.

In many cities today, the infrastructures no longer just consist of buildings, roads and paths but also of information flows embedded in software interfaces and networks (smartphones, tablets, wireless networks, surveillance systems, media displays, etc.). The software itself in many ways provides the means to effectively map out how the software city is used; for example, which smartphone applications are the most popular, what areas are under surveillance, or even the whereabouts and routines of an individual. Is it possible not to reduce our use of the software city to information overviews but instead focus on the specific use of the software city? Taking a lead from Jacobs, we need to ask ourselves what kinds of specific life forms occur in this environment and how we support their diversity and complexity. Architecture itself provides good techniques to do this.

A PATTERN LANGUAGE

In the 1970s, the architect Christopher Alexander, inspired by Jacobs, developed the notion of 'a pattern language.' A pattern is a way to summarize experiences, individual practices and practical solutions in a way that makes it possible for others to reuse them. Alexander's book comprises of 253 patterns, each with its own context, problems and solutions that sometimes help complete larger patterns or need

other patterns to be completed. As an example, Alexander uses the pattern 'accessible green' based on the observation that people need open green places to go to; but when they are more than three minutes away, the distance overwhelms the need. Consequently, green spaces must be built "within three minutes' walk […] of every house and workplace." [3] This pattern helps fulfill larger patterns such as 'identifiable neighborhood' and 'work community.' [4]

According to Alexander, "towns and buildings will not be able to come alive, unless they are made by all the people in society." [5] The general idea is that a successful environment depends upon an ability to combine physical and social relationships. The pattern language creates such combinations: it is a lively language, not exclusive to architects, that responds to the needs and desires of the people and thus connects architecture to people. Alexander's book is a pattern language for towns, buildings and constructions, but this pattern language is only one amongst many. Any society, or even individual, will have their own languages to combine the physical with the social. However, the problem is that these languages are often not very sophisticated; people are unable to speak and must therefore develop their own language. [6] By suggesting that architecture and urban planning at the time was built on a language that was not refined, he implicitly raised the same critique of modern urban planning and architecture as Jacobs: architecture that is merely functional, and does not build on social relationships, is brutal. A successful environment must be sensitive to the needs, desires, hopes and aspirations of the people living in the environment.

If Alexander provided the beginning of a pattern language for towns, buildings and constructions, how developed, refined and sophisticated is our pattern language for software cities? To what extent do we build an awareness of our social relations, and not least our needs and desires for these relations, into the process of making the software city?

Alexander's ideas have in many ways been more influential in the design of software systems than in architecture. This means that the pattern language for software development is quite sophisticated. Before we begin to critique the level of refinement in the pattern language of the software city, let us consider the experiences created in software development.

DESIGN PATTERNS IN SOFTWARE DEVELOPMENT (LESSONS TO LEARN)

Design patterns in software development express a relation between programming, design, and use. This is particularly evident in the Scandinavian participatory design tradition, which in the 1970s had already begun to focus on how to bring the different stakeholders of a workplace into the process of system development. Participatory design not only includes the design of human-computer interfaces but also the technical parts of system development. Ward Cunningham, a pioneer in this field, initiated the Portland Pattern Repository that in the mid-nineties was accompanied by the WikiWikiWeb: the world's first wiki. It consists of numerous patterns that, using the schemata of Alexander in general ways, describe problems and solutions in graphical user interface design and programming. [7]

'Ward's wiki' became popular because it allowed programmers to share and co-edit their experiences. By using this, they developed a sophisticated pattern language that combined the human use situation with the structure of the program; similar to Alexander's vision of a pattern language for towns, buildings and constructions. The combination of physical and social relationships has, however, also been corrupted along the way.

Firstly, the sharing of a language, which was the starting point for the Portland Pattern Repository, has partly disappeared. With the exception of open and free software projects, the code of software is copyrighted and not accessible to other programmers. Secondly, and partly related to this, interface design patterns seldom combine the physical and social relations in an 'open' way. In today's interface design it is compulsory to meet the user at eye-level in order to combine the physical and social relations in a 'useful' way. Software successfully responds to the needs and desires of its users to write text, edit images, collaborate, socialize, play, and so on; and developers regularly consult its users via interviews, questionnaires, supervising debate forums or even by letting them produce add-ons to their program, like apps in Facebook or macros in *World of Warcraft*. However, it is not desirable to discuss our social relations merely in terms of 'ease of use.' Social relations demand openness to the actual patterns of the users. The patterns of use should not only encompass user-friendliness but also other ways of using, including unintentional use and even oppositional or critical use. If not, pattern language does not respond to the needs and desires of social life.

Massive multiplayer online games illustrate this very clearly. Here, life is obviously not restricted to what is 'in the box': participants produce strategy guides, additional stories, make t-shirts, etc. However, game developers will often try to seize control of these activities. One example of this is the *WoWGlider*, a third-party program that automatically controls a player's character via scripts. The program, and similar 'glider bots' are popular because they allow players to acquire game skills without being present in the game. In 2006, a "high ranking officer of Vivendi" and a lawyer for both Vivendi and Blizzard (the game developers of *World of Warcraft*) approached the maker of *WoWGlider (*Michael Donnelly) at home, and accused him of violating their copyrights. [8] Later, they also filed a lawsuit and his company was eventually sentenced to pay Blizzard six million US dollars. This is just one amongst several examples of how the interests of players and game developers are in conflict. It has nothing to do with the usability of the game but is entirely a political issue: in order to protect their software and develop their business, developers prohibit certain types of behavior.

Today, software is no longer just for work but a platform for social life, and examples similar to *WoWGlider* are growing in numbers. The challenge for participatory software design today is to not only include people's use in the design of software but also openness towards creative and alternative use. In this, political issues concerning ethics and ideology become increasingly important, and conflicting interests and unbalanced relations of power and control often restrict the development of a lively pattern language. Successful examples are rare, but are, for instance, found in the FLOSS movement (Free/Libre Open Source Software) that explicitly combines the openness of technical structures to, for example, individual freedom and the refusal of intellectual copyright. [9]

The software city is to a large extent a non-work context where issues similar to the ones that are noticed in social software are relevant. In developing a pattern language for software cities, the first step is to critically evaluate the way we currently combine the physical with social relations (technical infrastructures with the complexity of life), in the software city. Experiences with both social software and FLOSS are valuable in this context.

PATTERNS IN THE SOFTWARE CITY

The standard image of a software city is somewhere where media saturation is obvious and clearly visible, like Shibuya in Tokyo or Times Square in New York. However, less spectacular implementations of software in cities also demand attention.

We have previously studied the digital layers of the mid-sized Swedish town Lund. In general terms, we found that software is embedded via 'log-in spaces' (as found in restricted networks of various sorts) and 'iSpaces' (as found in the individual use of personal and mobile laptop computers, tablets or smart-phones), paired with a 'hypertextual connectivity' that connects physical space with virtual networks (as found when, for exmaple, a location-based smartphone application links to a social web service). [10] Both log-in spaces and iSpaces suggest that the migration of software into urban space propagates two kinds of activities: surveillance and configuration.

As a general pattern, surveillance is not only visual but also structural. Surveillance does not only take place via cameras but also, and more often so, by following seamless transactions: for example, when logging on to a network, transferring money, or using personal identification numbers to keep records.

As a way of interacting with software, configuration means to change a system on a user level, including actions as diverse as image editing, setting software preferences or shooting monsters in a computer game. Configuration patterns are found when we use the software city to play games, socialize via services such as Facebook or Twitter, find weather reports, use a GPS for creating routes, etc.

Surveillance and configuration patterns reflect two particular and interrelated views on the public sphere: 1) When public wireless networks are restricted and its users tracked it is to avoid violations of copyrights, illegal conspiring, terrorism, and so on. Hence, surveillance fulfills a need to protect land and property. 2) When I, using my smartphone apps, can find information about the place I am, connect to my friends anywhere in the world or track my whereabouts and share them in public, the configuration pattern fulfills a need to support the exercise of the individual.

In this sense, inhabiting the software city is like inhabiting *The Sims*. The ability to perform as an individual in this environment is equal to the sum of acquired platforms (smartphones, credit cards, laptops, etc.) and applications (location-based guides or social networking software such as Facebook, Foursquare or Twitter) one possesses – similar to the acquirement of objects as a way to increase one's character level in a game. Every action is registered by the system, and you are given the right to configure the system, but you are never given the right of a citizen to negotiate the system itself. The problem of the software city is the same as in many computer games: life does not always fit into the box of the game. Actions such as evading surveillance, hacking networks and disrupting configurations are often considered illegal. Even common practices such as information sharing is considered a violation of copyrights. In this sense the physical infrastructures of the software city do not always correspond with the social practices and desires of the people. At the same time, we must also consider that life in the software city fits surprisingly well into a box. People do not mind 'living in *The Sims*.' Surveillance is widely accepted, and though CCTV is often part of public debate, registration of computers, tablets or smartphones on the Internet is widely accepted; which is similar to the tracking of money transfers when people use their credit cards or smartphone apps for Internet banking. Likewise, people generally do not critically evaluate their use of location-based or social services for their smartphones, as long as there is a benefit to them.

To discuss the software city in terms of 'ease of use' may prevent the development of a diverse software city. The software city must therefore encompass the idea of citizenship, where the combination of iSpaces or log-in spaces with our social relations can be debated openly and lead to new visions. This development of a shared pattern language for the software city also implies critique of urban planning.

PLANNING THE SOFTWARE CITY

Though our use of software in the city is rarely planned, the software cities themselves are planned, and are usually thought of as 'smart cities' and 'media cities.'

Smart cities cover a range of initiatives. The general idea is that a city's performance is dependent on its ability to support and include aware citizens in issues such as economy, governance and sustainability. This demands that, for example, the people can be smart: that they have the necessary infrastructures to communicate, a high level of education, a pleasant environment with secure health systems, no crime and a rich cultural life, and so forth. [11] This is supported by current developments in software, for example, cloud computing, where services are offered via a network and thus support the mobility of the citizens. However, city planners and governors can also use software for data monitoring, analytics and visualization to sustain the smart city. This may include a wide range of services that compute and visualize data for crime, education, traffic, energy consumption, etc. These are not only management tools but are also tools that involve the participation of the citizens, such as, for example, reporting the water quality via a smartphone application. [12] The general idea is to not only anticipate but also innovate through data analytics.

Smart city initiatives appear to combine a city's physical infrastructure with its social and intellectual capital. Learning from our critique of the use of patterns in software development, we must however also realize that in the smart city urban life is programmed into the software in ways that do not always correspond with the citizen's practices, needs and desires. To develop a sophisticated pattern language we should not only debate the 'usability' of cloud computing or how monitoring systems make a 'safer world' (patterns of surveillance and configuration), but also some of the issues that are at stake in social software. Smart cities, for instance, heavily affect our perception of private and public. In other words, we need to reflect on what a common good means; who owns the data; what it is used for; when it is public/private; how it is monitored; how it is visualized; what data visualizations are used for, etc.

Media cities involve using software as a spectacle that can evolve new neighborhoods. The urban renewal project MediaSpree in Berlin is an example of this, out of many across small and large cities. In the past decade, large property investments have been planned along the banks of the river Spree in the Eastern parts of Berlin. The aim is to create high profile architecture that integrates media, small and large-scale use with public access to the river. [13] For various reasons (including lack of capital) many of the MediaSpree initiatives have been interrupted and several places are temporarily occupied by cultural initiatives; including the Berlin techno scene and clubs such as Club Maria, Berghain, Bar 25 and Tresor. In MediaSpree, the integration of media in architecture via displays and façade media is aimed at creating a spectacle that attracts people. In contrast to this, the media integration of these clubs is almost invisible at street level, but nevertheless very evident. The club scene is part of a global network of electronic music enthusiasts, connected via blogs and other services for cultural co-production. Every weekend thousands of people fly to Berlin to take part in the scene. Even though the club scene is not a clearly visible architectural landmark, indeed it often strives to be invisible, it is a lively part of Berlin and an attraction that possibly even outshines many of MediaSpree's initiatives in terms of city life and branding. [14]

The smart city and the media city each in their own way demonstrate how the software city often is controlled top-down by corporate and urban planners. However, the development of a diverse software city

does not have to be spectacular or 'smart.' Although media architecture, cloud computing and data visualization should not be dismissed, there is a need to focus on the spaces in-between that do not have clear ownership, areas "devoid of meaning," as the Danish sculptor Willy Ørskov has defined the 'terrain-vague'; spaces that can be of potential significance. [15] These spaces may be physical locations, like the banks of the Spree, but they may also be spaces for new software-based practices. It is in these spaces that we see glimpses of the software city as something other than just log-in spaces or iSpaces. In other words, there is a need for a new pattern language for the software city that is based in emergent cultural practices appearing in the terrain-vague; a language written by people, rooted in their practices and a sustainable combination of social relations with the physical infrastructures of software.

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CIRCLES AND PROPS - MAKING UNKNOWN TECHNOLOGY

Kristina Andersen & Danielle Wilde

The OWL project is an evolving interrogation of how we might imagine technologies that do not yet exist. The paper describes the theoretical background and structure of a series of workshops aimed at allowing participants to create their own personal technological fantasies. We explain the background for each conceptual shift in the process and attempt to outline how and why they may work.

Fig 1. Owl circle workshop, Sydney 2010, photograpic media, © Kristina Andersen & Danielle Wilde

Fig 2. Owl circle workshop, The Mastification Amplifier, Sydney 2010, photograpic media, © Kristina Andersen & Danielle Wilde

How will you go about finding that thing the nature of which is totally unknown to you?

Meno, from Plato's dialogue (in Solnit, 2005) [1]

Any sufficiently advanced technology is indistinguishable from magic.

Arthur C. Clarke, *Profiles from the Future* [2]

The Unknown

It is almost impossible to imagine what lies ahead. What will the future bring? How could life be different? The OWL project is an evolving interrogation of how we might imagine technologies that do not yet exist. How can we support the emergence of radical future technologies that reflect and respond to our personal desires? Asking someone to imagine yet-to-be-imagined technologies puts a large strain on our ability to bring ideas into being. What do you really want, if you could have anything? It is an awful question to ask and when you do, you will mostly get simple, modest answers. In the quote above Meno asks how we will go about finding that thing "the nature of which is unknown to us." [1] The OWL Circles were created as an attempt to find a way to blot out the most immediate answers, so that we might access more instinctual, and perhaps less plausible responses.

The Circles are purposely designed as a way to sneak up on ourselves, to be caught unaware and unselfconscious for a moment so that we dare to begin. Our aim is to elicit nuanced, imaginative and implausible responses that challenge and stretch what we consider to be possible. We begin with the body and use ideas of enchantment, ambiguity and play, as vehicles through which to contemplate Meno's question, and thereby support the conception of "sufficiently advanced technology." [2] The Circle workshop experience takes the participant through a rapid series of formalised conceptual shifts, that each draw on large areas of work in theatre and performance theory, game-play and motivational psychology. This paper is an attempt to account for these shifts and the body of work that lies behind them.

The OWL Circle Workshops

The purpose of the OWL Circles is to allow participants to create their personal technological fantasy. They are hosted in a neutral, utilitarian space, containing a large shared worktable with various tools and lights, and another table, off to the side, containing various neatly organized recycled materials. Neutral colors predominate. The materials are chosen to afford a large range of structural possibilities and aesthetics. A small area is also set up for video interviews, with a video camera on a tripod in front of a black wall. Ideally, the circles are conducted with twelve participants and two workshop facilitators. The format has evolved until it was reduced to the following, strict sequence of conceptual shifts:

- Introduction: Welcome and brief introduction, including the reading out loud of the quotes from Arthur C. Clarke and Meno. [1] [2]
- The Desires: A list of common desires are read aloud and placed on the table in the form of index cards. [3] Participants are asked to choose one.
- Transfer to Body: Participants are asked to identify in which body part their chosen desire resides.
- The Material Switch: Participants choose materials they find appealing.
- Thinking with Your Hands: Without knowing what to do in advance, participants begin making.

- Being 'Done': When they recognize that they are 'done,' each participant is led to the video interview corner.
- Description: While being fitted with a microphone participants are instructed to tell us: their name, their desire, what their object is called and what it does. The answers are filmed in one take.
- Debrief: A short debrief is performed to complete the process

What is Happening?

In the following we explain the background for each conceptual shift in the workshop process and attempt to outline how and why they may work. The main component is a series of estrangement switches that shift the mindset of the group away from the predictable and towards a temporary moment of otherness.

THE INTRODUCTION:

The introduction functions as the drawing of a circle or the beginning of a game and as such it serves a number of functions. In a theatrical sense, it declares that a game is beginning. Caillois specifies a number of characteristics for games: they are engaged in by choice; they are separate from the routine of life, and occupy their own time and space; games are uncertain: the results cannot be predetermined, the players' initiative is therefore required; games are unproductive: they create no wealth and end as they begin; games are governed by strict rules that suspend ordinary laws and behaviors; and, finally, they involve make-believe that confirms in players the existence of imagined realities that may be set against 'real life.' [4] By framing the circle as a game, Caillois's characteristics automatically come into play. This liberates qualities of attention and engagement that are useful when trying to find "that thing the nature of which is unknown," [1] while Clarke's assertion that "any sufficiently advanced technology is indistinguishable from magic" [2] further emphasizes the game-like quality of what we are trying to do; at the same time as it focuses our quest into the realm of technology.

THE DESIRES:

The list of desires that we use is borrowed from Steven Reiss's research on motivational psychology. [3] Reiss's desires are usefully provocative: they reduce a complex emotional field down to someone else's shorthand definition of the world. They also introduce language before we know what we might be describing, and thereby provide an uncommon point of departure for an embodied discovery process. Choosing to approach a difficult subject in a complex or convoluted manner is a common strategy of fine art. The underlying assumption is that to 'free up' the creative and expressive body to respond to the unanswerable, we must first 'busy' the reasoning part of the brain so that it will not interfere. [5] The sparse, yet strict instructions that we provide act as a structure that engages the reasoning part of the brain; freeing participants to be spontaneous, to follow their intuition, aesthetic scents and creative whims. [6] It allows them to trust and follow their instincts. The list of desires acts as the first estrangement switch, and is followed very closely by the next conceptual shift: the transfer to the body. Importantly, the facilitators remain neutral throughout, accepting all choices as equally valid.

The list of desires is:

- Acceptance, the need for approval

- Curiosity, the need to learn
- Eating, the need for food
- Family, the need to raise children
- Honor, the need to be loyal to the traditional values of one's clan/ethnic group
- Idealism, the need for social justice
- Independence, the need for individuality
- Order, the need for organized, stable, predictable environments
- Physical activity, the need for exercise
- Power, the need for influence of will
- Romance, the need for sex
- Saving, the need to collect
- Social contact, the need for friends (peer relationships)
- Status, the need for social standing/importance
- Tranquility, the need to be safe
- Vengeance, the need to strike back/to win

THE TRANSFER TO BODY:

"Where in your body does your chosen desire reside?" This question acts as a second estrangement switch, transferring from, and connecting, desire to body. It is a nonsensical question that draws heavily on surrealist art strategies, liberating in their absurdity. [7] "If you were a color what colour would you be?" Children know this game and have answers for these types of inquiries. The switch between an abstract desire, defined very strictly by someone else and the feeling that this word does indeed reside within your body, allows the participants to begin to work. The question is no longer abstract: it has been made concrete and physical. This clear concept now becomes the participants' guide in the work.

THE MATERIAL SWITCH:

"Find the material that works for you." This instruction acts as the third estrangement switch and allows the physical making to begin as participants find physical form and texture for the body-feeling that has been identified. Again, the decisions made here are not reasonable, rather participants continue their line of absurdist questioning by asking, "if this feeling had a texture and a shape what would it be?" This process exposes unexpected and poetic possibilities that can be explored from the specific sensory potential of a material to body behaviors as they rise from desires, feelings, and anxieties. Dr. Montessori of course famously used blindfolds in reviewing materials, stating that the eye can interfere with what the hand knows. [8] We could add that language can interfere with what the hand knows. Once the participants have chosen materials, they can begin to build and support their burgeoning concept.

THINKING WITH YOUR HANDS:

Through the making process the work is one step further removed from reasoning and habitual thinking. The participants have up to this point made three very large leaps of faith: choosing a desire, connecting this desire to their body, and their as yet unnamed feeling to a material texture and expanse. These three switches have occurred in less than fifteen minutes, allowing no time to re-consider or back out

into careful reasoning. In a sense, participants are not completely committed at this point, simply because they do not know what it is that they are making. The work that follows is instinctual and effective. The conversation around the table is practical: "Can I have the scissors?" "How do I make this stick out to the side?" [9] Kelly claims that the divorce of the hands from the head puts a strain on the human psyche. [10] This suggests that bringing them back together again through embodied processes releases strain. Having viewed numerous circle participants engage in this process, we suggest that the state that it engenders is tranquil: focused, efficient, relaxed and also gently energetic. Thinking as an emergent bodily process allows us to access knowledge, expertise or connoisseurship that otherwise eludes articulation. [11] The OWL processes leans heavily on this idea.

BEING 'DONE':

Knowing when a device is 'done' is an instinctual knowing. The circle structure removes verbal reasoning from the imagining and creating process, and frees the participant to trust their ability to recognize what it is they are doing as it emerges, including when it is 'done.' This knowing 'when' is something we all have experienced, Henri Cartier Bresson called it "the decisive moment," the moment when the trigger on the camera is pushed. This moment relies on the photographer's ability to see and record an event literally taking form in the immediate future. [12] Cartier-Bresson's decisive moment was tied to a particular approach to photography, nonetheless it is useful to provide ways of thinking around the notion of making a device which is yet to be imagined, and knowing when that device is 'done.' In musical improvisation, the knowing where to go next becomes a series of small decisions made in a hyper aware state of flow in which the musician 'knows' both the minds and desires of his or her fellow musicians, and also holds the experience of the audience as an almost physical thing which can be examined, turned, changed, and at some point is 'done.' [13]

DESCRIPTION:

The interview is filmed in one take. Participants are required to think on their feet, to not let their inner dialogue drown out their ideas. We began with language, with the desires and now we return to language again. The process between is embodied, non-lingual or mute. As language floods in, it takes over, surprising the participants. Excluding language from the central part of our structure allows a very intuitive and productive process to emerge and only at the end is reasoning allowed back into the experience. In order to allow this process to appear "on camera" we ask the participant to speak in one-take with minimal intervention from the camera operator. This achieves two things: first it allows the process to remain personal and introverted, the camera operator is just that, an operator facilitating the participant to self-record their piece; and secondly, the switch between an intuitive and wordless making process to a reasoned presentation happens 'on camera,' with many participants only realizing what they have built as they name it. To make this final switch more distinct we ask strict, product-like questions. Instead of, "how did you feel?" we are asking, "what does it do?" The strictness of this line of enquiry allows the sometimes hazy decision making process that has come before to crystallize out. The 'product' is described and the participants are thereby brought back into the everyday world. The circle is broken and the game is over.

DEBRIEF:

As a postscript to the overall workshop experience, each participant is debriefed before leaving the workshop space. This allows us to close any conceptual holes, attend to any concerns the participant might have and is an important part of us taking responsibility for the emotions and questions that may arise in an intense experience. It is also where we can explain a little bit more about the background and reasons for the project.

The workshop takes two hours, including the recording of all twelve participants' work. In that time we have opened a bubble in time in which we were allowed to physically build what did not previously exist, and in turn meditate over our desires, and how they might be met or mitigated.

Nine circles have been conducted to date: three in Tokyo and six in Sydney. Five of the Sydney workshops were targeted towards specific social or community groups: artists with disabilities and their carers; design academics; young children; performing artists; librarians. The outcomes were exhibited as part of the 2010 Participatory Design Conference in Sydney. [14] The breadth of participants and contexts afforded deep reflection, and the development of the strict structure described above. The whole process shifted the way that people thought about and imagined their bodies in relation to technology. The results were not only enchanting, but were deeply felt. [15]

Some Conclusions

Susan Stewart, in her book *On Longing* proposes that souvenirs are objects of desires that assist in the formation of continuous personal narratives that connect the present with the past. [16] OWL objects and devices connect participants through their imaginations and desires, as well as through the objects themselves, from the present to the future. They give form to, and assist in the formation of continuous, or ongoing personal narratives that support this connection. [17]

The workshops themselves are live, volatile processes, understood in the sense of Dewey's 'experience.' [18] We work with ideas not just in the form of description, where only language can become knowledge and meaning, but rather as a 'process of becoming' that, without turning to either romanticism or mysticism, can allow what may appear as chaos to create order and pattern through embodied experiences. Judith Butler states that we are required to, "risk ourselves precisely at moments of unknowingness, when what forms us diverges from what lies before us, when our willingness to become undone in relation to others constitutes our chance of becoming human." [19] The workshops are purposely built to facilitate this kind of risk taking, to provide a temporary space in which we can 'become.'

In Viktor Shklovsky's view, art resists and overturns the deadening effects of habituation. As our "perception becomes habitual," he argues, "all of our habits retreat into the area of the unconsciously automatic" and as a result "we apprehend objects only as shapes with imprecise extensions." [20] Art promises to recover the sense of immediacy and wonder that habit slowly erodes: "The purpose of art is to impart the sensation of things as they are perceived and not as they are known." [20]

The OWL project confronts desires, bodies and dreams about technology. It affects a displacement of desires, by naming them and giving them form, but it also affords giving account from the place Butler speaks of, the place where we become and remain human. The objects that are made are a kind of souvenirs from the future, but where souvenirs remind us 'what happened then' the OWL objects carry stories about 'what happens next.'

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CRISIS NARRATIVE OF LANDSCAPE

LISA ANDERSON

Landscape is a construction of the mind within the contemporary world. The elements of nature, ecology, urbanity, the sublime, and even the profane swill across the surface in the scars, reflections and symmetry in a cacophony of colors put forward in the elements we call landscape. I narrow my landscape to consider the changing stories being created, heard or repeated that reference weather.

Fig 1. The Gates of Bei Gao. Still from video. Lisa Anderson, 2011

Fig 2. Wheatered Edges #4. Digital Print. Lisa Anderson, 2011

IS NATURE IN ME OR AM I IN NATURE [1]

Landscape is a construction of the mind within the contemporary world. The elements of nature, ecology, urbanity, the sublime, and even the profane swill across the surface in the scars, reflections and symmetry in a cacophony of colors put forward in the elements we call landscape.

The Landscape I am mainly concerned with touches on all of these elements, however, I narrow my search to consider the changing stories being created, heard or repeated that reference weather.

The weather literally shapes the land, the architecture, the color of the sky and the density of the waters. The weather and its archive highlight the depth of history through challenging and shifting story telling about place.

As people, animals and plants migrate across the world, often pushed by the extremes of weather, the stories of particular places also change. The story we over-whelmingly hear now is one of disaster, of extinct species and of the forced movement of people. Often these disasters are the result of human challenges and scientific overcoming of weather and land.

However, the disaster elements like all good stories are told in many ways; within this chapter is the relatively new understanding of people as separate from nature, something perhaps embodied in Thoreau's influential understanding and books about wilderness, as nature. We see this in the idea of frontierism, where we became the conqueror with a civilized attitude that was outside nature. [2]

The idea of nature as a separate part of the ecology – and this is discussed in detail by Tim Morton in *Ecology without Nature* – suggests that we become aligned with the potential to divorce ourselves from any common good or shared experience with the land. We are encouraged in frountierism to create log cabins in inhospitable places, cut holes in the earth, shift tonnes of carbon from one side of the globe to the other, to take up residence on Mars as a future for the planet. That is scrap nature and start again policy. Just expand the frontier. [3]

Thus, my own aesthetic context and action includes looking closely at the stories of place that are often told in indigenous communities as both a keening for a past and a record of what happened. These stories feed an understanding that at times keeps pace with the weather changes recorded. This is the science of proving the winds and rain, the record of temperature and earth-shifts. The science of geology is reflected in the stories of the peoples over time.

For instance, many years ago there was a plan to mine a certain hill/ridge in remote Australia. The local peoples' stories forbid access to the site as sacred. It was the dreamtime sleeping place of a monster native frog. The last time the frog was awoken, the earth was separated and the frog vomited across the land with the soft surface soils washing away to the sea and leaving behind a dry desert; the people, animals and plants had to move or adjust. Thus, to disturb the frog would cause trouble across the land as again it would vomit. Eventually, despite the sheer disbelief that fear of a vomiting frog would stop big business mining, which is the all pervasive force in Australia, the rights of the traditional owners was upheld by the High Court.

The giant frog stays sleeping in the hill. It is worth pointing out that they wanted to mine uranium. Recent disasters around the world, such as the Tsunami on the coast of Japan that caused untold damage to the environment stemming from the Uranium fuelled power stations, could in legend be the result of a vomiting frog; or any similar legends that exist around the world.

These stories abound, and we ask ourselves who tells the story of the *Crisis in Landscape* now? Was it James Cameron in *Avatar, w*here good and bad were depicted as government and big mining (very Australian that), and memories are stored in a tree with cloud-like qualities? [4] Or, is the story of Landscape told by David Attenborough, who whispers to us the details of shifting creatures across the planet ? [5] Or, is it in the new geology comparisons in the TV series *The Universe* comparing our landscape with that of other planets as a goodbye wave at the past and a jump to the future? [6]

Within the potential TARDIS of the Internet we have many stories of landscape, with a hierarchy of stories shifting from the scientifically proven, to the stories we, as a people want or are willing to make up and share.

My recent video work *The Gates of Bei Gao* is created in the small hutong or suburb in the North of Beijing. This area has many children; a sign of unregistered people due to the one-child policy introduced in an attempt to maintain sustainable population levels in China. The next small hutong has already been torn down to allow the government to modernize. The sustainable farming carried out by these people, and the sifting and recycling of rubbish, another local task, are being closed down with the village. These people have already swelled their numbers by moving from the country areas to the edge of the city, due to drought and dust blowing in from the desert. The film hints at Charlie Chaplin's *Modern Times,* to scope this dilemma of a shifting landscape in the hazy dust of evening light.

These stories are research backgrounding my artworks to begin attempting to understand landscape as a touchstone for story, as an important element in the making up of an ecology, and in understanding the shifts in migration due to weather, and the imperialism of taking the land and treasure once remote or difficult to obtain.

My recent photographic exhibition *Clouds and Roses* exploits the similarity of story in locations around the world: perhaps like Tolkien in *The Lord of the Rings,* where he speaks often of the distant mountains. His characters explain throughout their journey across the landscape the make up and mapping of the world as always headed toward the distant mountains. This tenant of creating a story with common touchstones gives a familiarity to something that is also from somewhere else. [7]

My digital photographs *Weathered Edges*, include a combination of the Elgin Marbles, with the torn wallpapers of a long deserted traders' hut in the High Arctic. Both are objects that tell, hint and are formed by our romantic idea of landscape. The appropriated landscape in our mind is fuelled by the story, which I see as a weather story of a forced migration and a landscape under contest. The Elgin Marbles were stolen by an Englishman: he hacked them out of the wall, and paid a bribe to the occupying force in Greece to steal them across the border. He attempted to sell them almost everywhere he stopped, before they eventually came to reside in the British Museum. Every time I walk through the Museum, I hear a high pitched English voice explain that the Greeks just left them out in the weather and would not look after them like we do: they have become British because of this claim to protection from the weather.

The Traders' Huts images also tell tales of people in the wrong place: the attempt by the Hudson Bay Traders as an Imperialist merchant group to trade for furs and gold allowing them to set up settlements. Often these were outposts only visited by the lost in search of fortune. When I visited the hut, which is heritage and UNESCO protected, I had armed shooters in readiness against the polar bears as I quickly took images in the very limited time available.

I have also long visited Lake Mungo in remote Australia. The local indigenous people have allowed me access to the site and story in a very generous and sharing way. They have taken me, or drawn maps for me to follow across the dried lakebed, to various places of significance. The series of lakes dried out some twenty thousand years ago, leaving behind the memories of muddy footprints that tell the stories of dancers, hunters and tribal meetings. The footprints are documented and hidden again as memory of the lost.

The site is of the oldest known ritually cremated human remains, dating some sixty-five thousand years. They are known as Mungo Woman and Mungo Man. These have been documented and re-buried away from prying eyes by the local groups. The site has a long-term history from early, and clearly very fruitful, nomadic peoples as a major meeting place. Then as a rest and watering point for trade and coaches moving across the shifting desert and lonely plains.

They ran cattle there until the 1970s when the local graziers handed the land back into the care of the traditional owners. Much of the local aboriginal population had died off from contact with white civilization, mainly from syphilis and influenza viruses. The site also had Chinese immigrant stockmen, who built the shearing shed.

The local Chinese workers would look across the dried lakebed to lunette being revealed by the continuous weather shift as the long-term drought progressed. They called the lunette the Walls of China in fond memory of the Great Wall. In the evening's shimmering light it does it indeed remind one of the Great Wall and all that it stood for in a vain attempt to keep the people and stories of the nomads of the deserts out.

The multi-channel video installation that I had intended to show here ***sand:bone:clay***invites us into this world of change. Of looking and walking in a landscape that references all landscape through story, through a sense of specialness, a wilderness, a thin layer of earth that reveals the broken bones from burials, the remains in middens, the clay balls for heat and what once would have been really good fishing places.

The Walls of China forms a semicircle shape protecting the lakebed from the giant moving sand dune behind. The dry lakebed serves to channel the drought breezes that carry nothing but sand and dry heat that slowly strip back the layers in the soft brittle remains of the lunette and reveal the histories.

The tribal groups have died or been forced from the land and they cling to these stories; allowing archeological and anthropological intrusion in an attempt to regain their lost past.

The imaginary landscape of our mind is as real as the landscape presented within the images as they rely on storytelling, on the comprehension of a greater narrative being told. The work soundtracks the fear and the loss of the people and land to the intrusions of occupation, and later to archaeology.

My video work *Katiyana: Night Snow* is a lament for a dying way of life and a people in the High Arctic. The imagery was developed while I was doing an artist's residency on a Russian Icebreaker. This group of people told their stories in song, drumming and the ancient keen of throat singing. They gathered along the beachfront, placed themselves at the meeting point, which is in the sun and out of the chill wind on one side of the washed up freighter-shipping container.

They sang the songs of their past, stories of bravery and hunting; of recognizing the guardian with animals and ice and their sacrifice and oneness within their ecology. The stories are also of the Government resettlement into small communities to assist in keeping the north peopled, yet able to be supplied with food, shelter, education and medicine. All the things that remote communities cut off by the weather require.

The Inuit wore a mix of traditional and modern clothing, taking up the singing and dancing across generations. Their small community has been ravaged by change. The mining companies send in workers and equipment for the gas seams that are now accessible due to the climate warming. Drugs and alcohol come with these men and the best attempts cannot stop this. Furthermore, the warming seasons now mean that polar bears come into town more frequently seeking an easy meal. People are such slow moving defenseless creatures under certain circumstances.

The series of artworks that I made from this experience and continued Internet contact with the Inuit artists I worked with there is a lament to the dying culture and the shifting weather and the change it brings.

The *Truth About SnoDomes* is an installation work that explores the sense of loss, and details a place. It tells the story of being there. The story of the location, of the landscape as something connected. Not something that deconstruction would put a line around and segment away.

Furthermore, my current work looking at the *Crisis Narrative of Landscape* also reaches to the stars, to the stories of the intention to build other worlds not just in Vast Park and Second Life but on other planets. My current project also explores touch with landscape and the interaction we have with the skin of the planet. I have begun collaborating with Professor Dias in Tianjin University to work with a new form of robotic hand designed essentially to clean solar panels on satellites.

These are the beginnings of stories that will tell of a different relationship to landscape. Perhaps Tolkien's distant mountains of the Middle Earth are replaced with the distant mountains of the Moon, told in our new stories of the planet and will speak the science of geology over biology.

My questions and attempts to bring together the various elements to suggest the narratives of landscape strives not to simplify or concentrate on the romantic vista, or the nomadic periphery but to combine our research within the flux of our current weather crises. This exploration will source the new narratives as enclaves within science, film, architecture and sociology. The layers of memory adopted within the imagery touches on shared belief systems, spatial planning and geopolitical reconstructions.

The meeting place of the Earth's surface is cradled within these images and the often-intimate exploration of the story. The basic concern is that within past and present actions can be found a future that revels within the sense of belonging. The future could be based within a continuing paradigm or shift

into greater understandings of technologies, new and ancient technologies to outline our potential for creating and investing in a future and visible world.

The projected images and context expand the basis that within the narrative of place, however that can be tapped into, could lay an understanding of the future landscape. This element begins to question and push the science of weather, land and the movement of peoples as a fission wherein may lie a new approach. Thus, using art within this space could create through spectatorship a more contemplative approach to the narrative of landscape and the crisis unfolding before us.

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EEG DATA IN INTERACTIVE ART

Claudia Robles Angel

The paper reflects upon the interaction of music and/or digital media with brainwaves' data obtained from performers or an audience via an EEG interface and to contextualise them as a dynamical system, as defined by Abraham and Shaw. A brief historical overview is introduced, with examples from the past 45 years –included one of my own– based on biofeedback methods developed from the late 1960s onwards.

In 1875, Richard Caton discovered the electric currents of the brain using a galvanometer by experimenting with animal brains, setting the path for the development of the EEG by the German psychiatric Hans Berger in the early 1920s. Berger was the first to record electrical impulses from human brains in 1924 (he called these recordings Elektroenkephalograms); he was also the first to observe the alpha wave activity (8 to 12 Hz), which is accentuated during relaxation. In the 1960s, Neal E. Miller applied such experiments for therapeutic treatments, which resulted in the creation of the Bio-feedback method. This method has been used since then to measure the physiological activity –such as brainwaves, heartbeat or muscle tension– of patients in order for them to learn how to control those activities and improve their health condition by increasing their body and mind awareness. Schwartz and Andrasik state [3] that in 1969, Joe Kamiya, who was studying the alpha and beta brain states, reported that:

"one could voluntarily control alpha waves –a feat that was previously believed impossible."

With his research, Kamiya gave a vital impulse to the usage of the EEG-Biofeedback-method, most commonly known as Neurofeedback. Before that (mid of the 1960s), the use of EEG was incorporated in art by composers such as Alvin Lucier and Richard Teitelbaum with their first performances utilising brainwaves, and hence, giving for the first time a new usage to EEG data other than scientific or therapeutic. The artworks described in the next section show how the use of EEG data in real-time pieces results in dynamical interactive works: their evolution is in constant modification, changing accordingly with emotional and/or mental states by each performance. This variability implies a dynamical system, as Rosenboom [2] explains :

"Dynamical systems may be thought of as those involving forms or behaviors that change over time. The study of such changing forms may also be termed morphodynamics."

EARLY EXAMPLES

In 1965, Lucier composed *Music for Solo Performer - for Enormously Amplified Brain Waves and Percussion*, which is considered the first musical piece using brainwaves. For this piece, he attached electrodes

to the performer's scalp, measuring only the Alpha rhythm waves, which were sent to amplifiers and loudspeakers connected to a large set of percussion instruments, in order to produce vibrations in these instruments via sympathetic resonance.

Some other important examples are Teitelbaum's [4] pieces: *Organ Music* and *IN TUNE*, both created in 1968. In both of them the composer used the EEG signals mainly to control voltages in the Moog synthesizer, including in some cases not only the alpha waves range but

"comprised the broad spectrum from DC to about 50 cycles per second (Hz). It was applied chiefly to frequency modulate four voltage controlled oscillators, and also to control the amplitude and filtering of these audio signals."

For *On being invisible* (1976/77) David Rosenboom [2] developed his own real-time software to create

"a self-organizing, dynamical system, rather than a fixed musical composition."

His dynamical, real-time system extracted patterns from the performer's brain activity that appeared with at certain regularity and compared them with some others stored before. This comparison determined their periodicity in order to influence different music parameters. The software detected and analysed the event-related potential (ERP) from the brain activity –which is associated with the direct response to an internal or external stimulus– in order to activate instruments, creating a circuit between the performer and the sound environment produced by the system.

The EEG has also inspired several artists using different types of media. For example, in *On being invisible II* (1994/95) Rosenboom includes lights, video and slide projectors. In Mariko Mori's *Wave UFO* (1999–2002), brainwaves from three participants inside a sculptural object –a spaceship– are connected to the audiovisual elements in order to create an interactive experience that invites them to be immersed into a deeper state of consciousness and to interconnect with themselves and the universe, representing the Buddhist concept of oneness.

All these examples show rather different approaches to use this technology for artistic purposes since the 1960s. Interfacing EEG data with multimedia continues to raise the interest of artists aided nowadays by several devices/software such as, for example, the open EEG and the Arduino projects, as my piece *INsideOUT* –explained below– shows.

INsideOUT (2009) – Performance (EEG and real-time media)

The name of this project is inspired by the expression of the self, turning the subject's imagination from the inside to the outside, keeping the original intention of the EEG project by materialising the performer's thoughts and feelings on stage. The stage is a place for the appearance of the invisible. Michael Haerdter and Sumie Kawai [1] quote that Yasu Ohashi stated that:

"the actors aim at our senses, our body and our unconscious and not at our intellect. Their gestures try to envision THE INVISIBLE WORLD."

INsideOUT was created during an artist in residence program at KHM (Germany). The performer interacts with sound and images using an EEG interface, which measures the performer's brain activity.

Sounds and images –some already stored in the computer and some produced live– are continuously modified by the values from two electrode combinations via MAX/MSP-Jitter. Hence, the performer determines how those combinations will be revealed to the audience. Images are projected to a screen and also onto the performer, while sounds are projected in surround.

The *Olimex* EEG open source interface (http://www.olimex.com/) used here which measures the brain activity and consists of two assembled boards: one analogue and the other digital. It is possible to connect up to three boards, each with two EEG channels. Only two are used for the piece though: frontal and occipital. The rubber cap and the contact electrodes of the interface are those typically used in medical applications.

I received technical support from Lasse Scherffig and Martin Nawrath at Lab3-KHM to adapt the interface. They modified the open EEG device by replacing the Atmel microcontroller with one running the Arduino firmware and changing the quartz clock accordingly to 16 MHz.

Scherffig wrote a program with the software *Processing*, which reads the values of both EEG channels via a serial communication. The modified open EEG sends ASCII-formatted data representing the voltages of both channels (at a frequency of 100 Hz). In *Processing*, a Fast Fourier Transform is applied to the data and extracts the bins for the frequencies between 0-50 Hz. From these, the median of the frequencies for the alpha channel (8-12 Hz) is extracted, smoothed using a low-pass filter and transmitted via OSC, which is received once again by the OSC-route object in *MAX*.

For the performance of *INsideOUT*, I have tried to train my brain in order to control the media combinations on the stage, putting in evidence different emotional and mental states, which cannot be achieved without the input of data coming from my own brain waves. However, this conscious control is not completely attained due to the enormous and uncontrollable stream of feelings that generally appear under such circumstances.

CONCLUSION

Based on my own experience of performing pieces using EEG data, the common ground is the presence of a behaviour, to produce a dynamic system, as explained at the start of this paper. Whether the mapping of data interfacing with the media is made directly or occurs via more complex systems (e.g. Rosenboom's software) the structure of the pieces is invariably not fixed; instead, it evolves dynamically. This dynamic evolution depends on the performer's or participant's emotional and/or mental state, which is affected by the perception of their own self and by the perception of the piece's environment. The result therefore varies strongly between performances of the same piece, making them impossible to replicate.

The aim of my research in this field is mainly focused on raising awareness of the artistic possibilities of consciously controlling brain activity on stage to steer multimedia events and, at the same time, to allow feelings –the real creators of each dynamical system– to flow freely.

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A CYBERSEMIOTIC APPROACH TO TECHNOETIC ARTS - NEW VOCABULARIES IN TRANSDISCIPLINARY RESEARCH

KATHRINE ANKER

In this paper I will introduce central terms from the Cybersemiotic paradigm (Søren Brier, 2008), and show how they can successfully be applied to interpretational readings of technoetic artworks. I wish to extend the idea that user experience in technoetic artworks is mainly immersive and non-intellectual, and to present new hermeneutical positions that explicitly take ontological and paradigmatic perspectives into account.
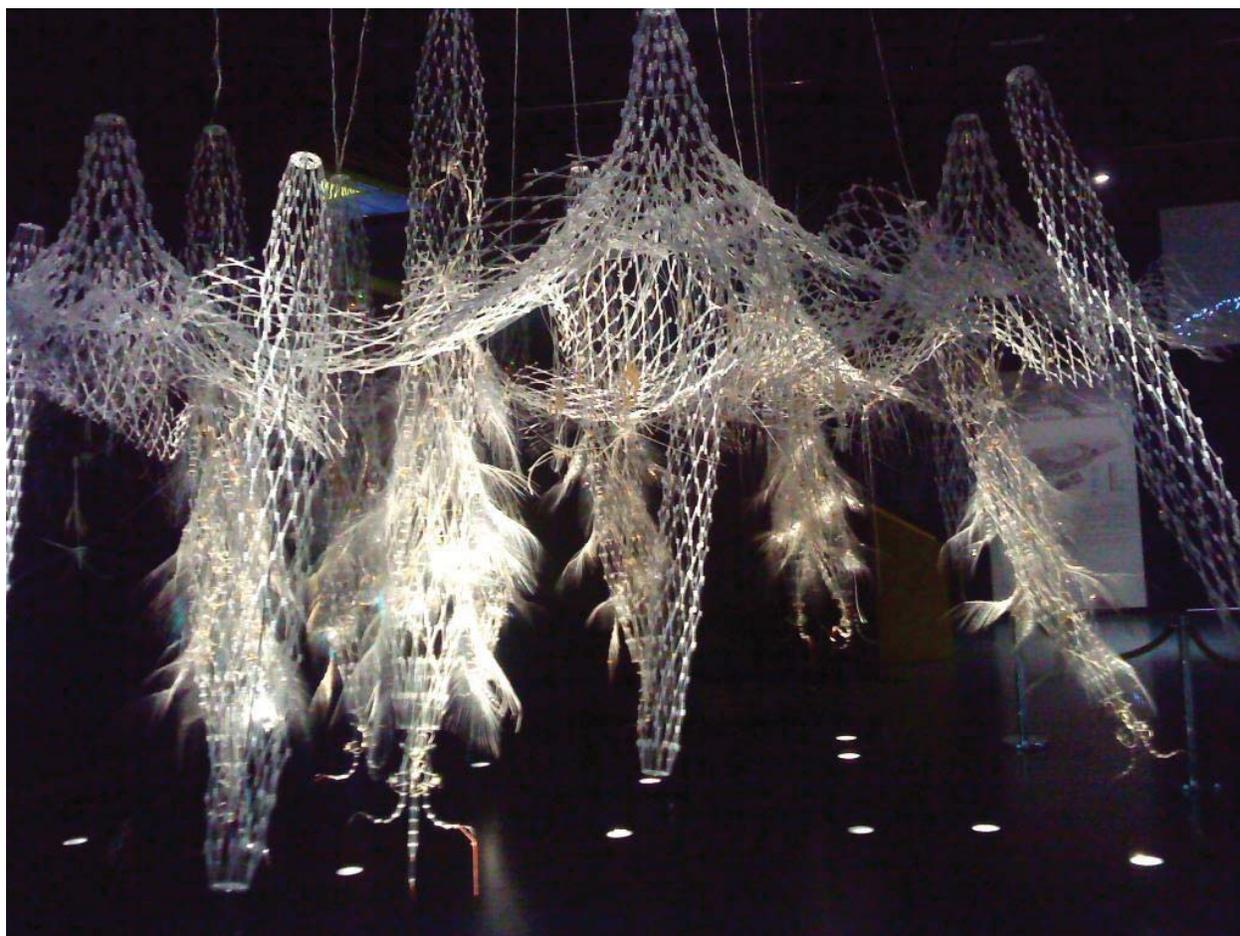
Hylozoic Grove. Ars Electronica Museum, 2008. © Kathrine Anker

Consciousness as "Extended Sentience"

Before moving into the actual subject, I need to define "human consciousness" as it is presented in this article. Human consciousness is understood not only as "the self-", as awareness, as something psychological, or as an emergent property of the brain. I understand the full range of dynamic, interactive processes that allow the organism to be sentient across a range of endo- and exo communications as

overall expressions of how consciousness manifests in humans. Consciousness in humans is viewed as a sign of an external natural force to which the organism has become increasingly adapted throughout evolution.

One way consciousness expresses itself is through the potential of the body structure to generate synthesis between dynamic processes that involve sensation, brain and heart based neuron activity, the autopoiesis of overall organisational systems (such as the nervous system or the reticular system), general molecular and cellular transactions (biosemiosis), and extremely low frequency electromagnetic excitation at the level of superposed quantum connectivity. [1] The connection between all these levels of communication, and the responsiveness that it results in, is what I call Extended Sentience (ES). As viewed from this perspective, it becomes vital to model a complexity of hierarchically divided and qualitatively different processes of communication, if one wants to understand more of how consciousness works within us. To do so is a semiotic and semantic task. This task demands new vocabularies, and a strife towards new levels of meaning in presented narratives.

Technoetic Arts

Technoetics is a term originated by artist and professor Roy Ascott. Technoetic art is art that experiments with the relationship between technology and consciousness, and raises questions of how new technologies affect human consciousness. [2]

It is my view that technoetic art installations address a broader range of processes involved in ES than many kinds of cultural communication to which we have been accustomed before digital media (such as pictures and print literature, which are static and fixed forms that do not inhere functions of physical mobility or behaviour as part of their material foundation) have done. Therefore, forming narrative-hermeneutical interpretations of the experience of technoetic art installations through a constructed "Ideal User" could provoke common assumptions into new thinking. This is because narratives that articulate the way such installations must connect existing technological and scientific paradigms in an open exploration of spiritual insight, expressed in a multisemiotic and multimodal signification, typically force the interpreter towards the "yet unformulated" (which, however, lie as symbolic sign potentials in the installation). This endeavour demands new semantic syntax at the level of general, socio-cultural language games. It forces the meaningful linguistic, narrative to transgress the fragmentation of thought that I experience as widely embedded in disciplinary practices and common socio-cultural language games of today. To accomplish possible formulations of such transgressive narratives, I must operate with several observational positions: that of an Ideal User, and a position outside of the Ideal User.

The Ideal User is a semiotic being

A central idea of cybersemiotics with which I agree, is that humans are by nature semiotic beings. Signification processes and meaning making are characteristic of our presence and navigation in the world. We understand through the processes by which we interpret signs in our surroundings, whether they are the cultural signs of print, image and object, or signs in nature. Therefore, I would claim, the ideal User would always already have a semiotic relationship with the art installation.

As humans we generate signification spheres on behalf of internal and external semiosic processes, which develop into complex socio-cultural language games over evolutionary time. [3]

"Language", in this context, must be understood to include all sign systems that are developed and mediated in all cultural mediation forms. The art installation would be directly related to current socio-cultural "language" and "text forms". It is my claim that Technoetic Arts relate particularly well to central themes and communication forms significant of our current (Western) signification spheres.

But naturally there is more than cultural languages involved in semiosis. This is Brier's point when he suggests the term "phenosemiosis" as a central part of his framework. It is only as the immediate, non-linguistic experience (which Brier names "phenosemiosis") is interpreted in thought processes (which Brier names "thought semiosis") and is represented by signs and concepts from intersubjective socio-cultural language games (Brier's synthesis of Luhmann and Wittgenstein), that cultural semiotics based on triad semiosis is formed. This involves both collective and individual levels.

Thus, there would be a range of semiotic processes of which we are individually or collectively unaware. They belong to the realms of endo- and phenosemiosis. They do rely on the operations of consciousness within us. But they are governed by rules outside of our day conscious awareness. So to equal human consciousness with a "rational intellectual Self" as the "master", would be to focus on only the "tip of the iceberg". For greater clarity, I call rational conscious awareness "day consciousness;" and regard it as a partial subset to overall Extended Sentience. Becoming aware of internal self-generative communications (processes of "intrasemiosis" according to Brier's terminology) of which we have typically been unaware, would imply to signify and identify inner "states" by the use of focussed thought semiosis. I will place the claim that there is a potential for expanding our (self) knowledge from this very position. This demands an inwards perspective.

The four semiotic terms, "phenosemiosis-", "thought semiosis-", "endosemiosis-" (internal molecular and cellular signification processes) and "intrasemiosis-", plus "signification sphere", and the concept of "socio-cultural language games", are all part of Brier's framework; they are the new conceptual terms that he suggests.

Hylozoic Ground

Hylozoic Ground is a kinetic sculpture by Canadian architect Phillip Beesley and a collaborative group. It has been developed as a work-in-progress (2007-2010) with increasing complexity in sculptural components as the work progresses. *Hylozoic Ground* is based on the creative use of lightweight fabric, and the construction of a geometrically patterned "mesh" and skeleton enhanced with micro controller-, actuator and sensor technologies that allow the sculpture to present a range of different responsive behaviours. The first versions of the sculpture were based on "dry", mechanical technologies, whereas later versions involve synthetic biology in the form of artificial cells, placed within the fabric of the sculpture. The different synthetic cells are sensitive to carbon and humidity in their surroundings. *Hylozoic Ground* is centrally inspired by properties of living organisms. To play with the generation of features that are thought to bring matter into "life" involves deep, ontological questions of what life is per se. [4]

Hylozoic Ground can be seen as an experimental research process that questions the overall relationship between laws of physics, geometry, biology and cybernetic mechanisms, all necessary elements in understanding the central characteristics of life. To form a material entity that distributes scientific and philosophical ideas of sentience, proprioception, metabolism, homeostasis, and communication in a concrete, functional sense allows a forward directed, creative approach to knowledge. The generation and distribution of art research alters the experience of knowledge, because the artist is, rather than

seeking exact answers in a reductive manner, making creative suggestions and posing new questions. Electronic and computational technologies, together with the development of new fabrics and various kinds of adaptive chemistries, allow for a degree of complex aesthetic ambiguity for the interpretational seeker of symbols and meaning. Rather than looking for fixed signs, whole mechanisms and processes would be representative of functions in the living organism, which are in *Hylozoic Ground* imitated and related to each other creatively, in a material, aesthetic and dynamic whole.

So, when contemplating *Hylozoic Ground* hermeneutically it is not enough to form narratives based on the language and concepts of science. As Rachel Armstrong points out (Beesley, 2010, p.136), there are aesthetic and poetic layers that cannot be articulated within the semantics of a scientific vocabulary. Thus, the narrative endeavour of our Ideal User would have to be based on transdisciplinarity, and to be unrestricted by current, institutional divisions.

Hemeneutical Positioning through the Ideal User

To understand the position of my Ideal User further, it is necessary to become acquainted with the way I use Brier's concept "signification sphere.

The Ideal User would, further than being semiotic, exemplify the way scientific and philosophical epistemologies have infiltrated the general signification sphere of the user – which is equal to modern, Western (knowledge) societies at large. So the Ideal User has integrated particular scientific positions of both the human and the natural sciences as a prerequisite for her interpretations by her natural use of existing, socio-cultural information sources and sharing, as she takes part in general socio-cultural language games. Certain common scientific assumptions would, seemingly, be part of the "Ideal User's" cultural memory and immediate prejudice. They have become internalized through the socio-cultural language games of her signification sphere (education and media). This might seem simple. But it is my claim that behind the diversification of many individual opinions, there are basic ontologies and general assumptions that dominate a given signification sphere (as in Foucault's "epistemes"). And mainstream science plays a solid role in this. We must remember that many basic assumptions, which dominate the language games to which we are accustomed, are automatized so that we do not notice them, even if we make interpretations that are centrally based upon them. Thus, it is my claim that the signification sphere of the user inheres common assumptions of the nervous system, sensation, skin, breath and a particular way of understanding living processes and consciousness, which are all expressed in *Hylozoic Ground*. However, the creative blend and experiment of the installation presents a natural opening towards combinations of common assumptions and existing knowledge that in themselves transgress existing cultural and semantic borders. The attempt to articulate hermeneutic positions of an Ideal User, thus, is forward directed and creative. And it will demand the formation of concepts of the human subject that transgress existing, common assumptions.

Artificial texts and biotexts: Is *Hylozoic Ground* alive?

In humans, the levels of socio-communicative language games and thought semiosis demand the ability to generate meaning as part of the internal processes of the organism in relation to being part of a specific, eco-cultural niche. Now, an conceptual integration of simultaneous processes relating linguistic, cybernetic, autopoietic, sensorial and motor properties is generally difficult to simulate or materialize in

Robots, Artificial Life and Artificial Intelligence scenarios – no matter how advanced research and engineering practices might have become. In our example, *Hylozoic Ground* cannot be understood to generate its own internal semiosic relations that are meaningful to itself, neither at the level of socio-cultural language games nor at biosemiotic levels. The many distributed micro controllers, along with circuits and the central Arduino board, do allow for local and global information processing in the sculpture. But *Hylozoic Ground*cannot be understood to have properties of true self-maintenance, self-organization or semiosis, even if both the chemical and electronic parts are capable of generating some degree of emergent behaviour and sensibility to external input. And if we extend usual ways of understanding memory with James Oschman, who suggests that stored information can be layered in wet organs and tissues all over the body, [1] it becomes even more obvious that there is a complexity of micro and macro levels of communication that are characteristic of conscious, living beings like ourselves, and the understanding of which becomes severely reduced when using metaphors related to mechanical processes based on signal exchange or pattern fitting (Brier) alone.

So the sculpture has no internal interpretational processes that rest upon triad semiosis (object-representamen-interpretant). It cannot connect all parts into an overall, fine tuned, self-generative communication system that integrates information, mechanics and triad semiosis simultaneously. And this integration is the core of the cybersemiotic model, and Brier's demand for an organism to be conscious and alive.

The mechanisms necessary to generate movement and sentient reaction in the sculpture, however, do demand a system of distributed information and intelligent computation. Otherwise input could not be translated into output, and reaction to users could not occur. This invites us to contemplate the installation from different points of view. We could consider the necessity of computational distributed intelligence and creative human intelligence as central parts of the construction process - but simultaneously, we sense the simplicity of the functions of the sculpture as it is compared to wet, organic living entities as ourselves.

Generally, mainstream academia, particularly the field of biology, presents the idea that molecular, cellular and autopoietic processes of the living organism cannot inhere goal directed properties. This places a dissonance between our understandings of how nature works, and processes where humans play with constructing life like scenarios. We can curiously ask: if organic life came about through random non-semiotic mechanisms of competition and selection without goal direction or intelligence, how is it that we expect our own goal direction, intelligence to be the source of artificial intelligence, synthetic life and the creation of new "life forms".

User interpretation as Internal Semiosis

Hylozoic Ground cannot generate meaning internal to the system and base its further processes upon it. But in our interaction with it as users, these processes do take place within ourselves. If we are taken by the installation and choose to contemplate the different layers of our immediate experience, we can ask ourselves how the phenosemiotic and biosemiotic processes would become linguistically signified and turn into intellectualized experience within our own day conscious minds – as opposed to what happens in the non-semiotic sculpture.

In the Oschman perspective, the experience of being moved and activated in the installation space would be presented as inner excitation and information distribution and storage within our wet organs.

The living sentience of our body and brain in immediate perception automatically generates inner quantum excitations, [1] [5] qualia, and images, thoughts and memories as one kind of signification that has laws, regulations and pathways independent of our intellect.

Simultaneously, there is a potential to intellectually grasp significations related to some of these processes through thought semiosis. My goal here is to have the reader sense the dynamics of the relationship between pheno-, thought and biosemiosis. It is to demonstrate that processes related strictly to the day conscious intellect can never stand alone in interpreting sensation and cognitive mechanisms. They are rather one part of ES along with other equally important parts. And it seems important in processes of (self)observation to add an inwardly directed focus of attention to the external focus that dominates recent scientific and philosophical practices. Brier's distinction between different cybernetic and semiotic processes can help us articulate and understand this potential.

Conclusion

The process of exploring technoetic installations with a focus on their particular creative blends of paradigms into new knowledge compositions, together with the cybersemiotic terms, allows me to formulate transgressive narratives regarding the human subject. As Armstrong expresses, a sculpture like *Hylozoic Ground* cannot be understood by referring to scientific narratives alone.

Hermeneutical narratives related to technoetic arts must incorporate the ambiguity of aesthetic components and seek to reach definitions of Extended Sentience in ways that would be useful to the general development of human knowledge. Classical, philosophical definitions of aesthetics have typically focussed on qualia and sentience. Yet a sculpture like *Hylozoic Ground* demands a narrative that integrates intellectual approaches with aesthetic synthesis, presenting stories at higher-order levels of observation. Trying to locate an Ideal User at this level, forces us to discover a higher-order, narratively structured intellect that cannot be equalled to usual understandings of "a Self" or an "ego".

It is my claim that the cybersemiotic paradigm can aid in fulfilling this wish, and bring otherwise abstract observations down to earth in a comprehensible, linguistic signification. It is my further claim that narratives that present a hermeneutical, pre-paradigmatic, and transdisciplinary perspective on technoetic arts, can add useful dimensions to the new experiences that art installations already offer in Western societies today.

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PHI TERRITORIES: NEIGHBOURHOODS OF COLLABORATION AND PARTICIPATION

Alexandra Antonopoulou & Eleanor Dare

The 'Phi Books' Project is a collaborative endeavour between Alexandra Antonopoulou, a designer and children's book writer-illustrator and Eleanor Dare, a fine artist who works with code. The Phi Books use the house as a metaphor for interdisciplinary collaboration. The two researcher-artists use narrative, audience participation, code-writing, and performance to explore how borders, walls and doors facilitate collaboration.
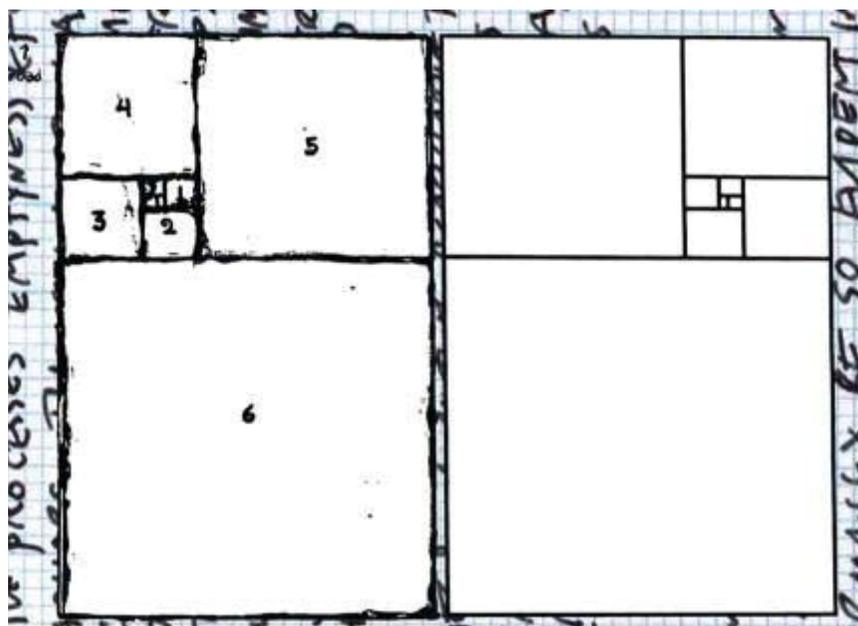
Fig 1. Poster for Phi Books, mixed media. © Antonopoulou & Dare, 2009
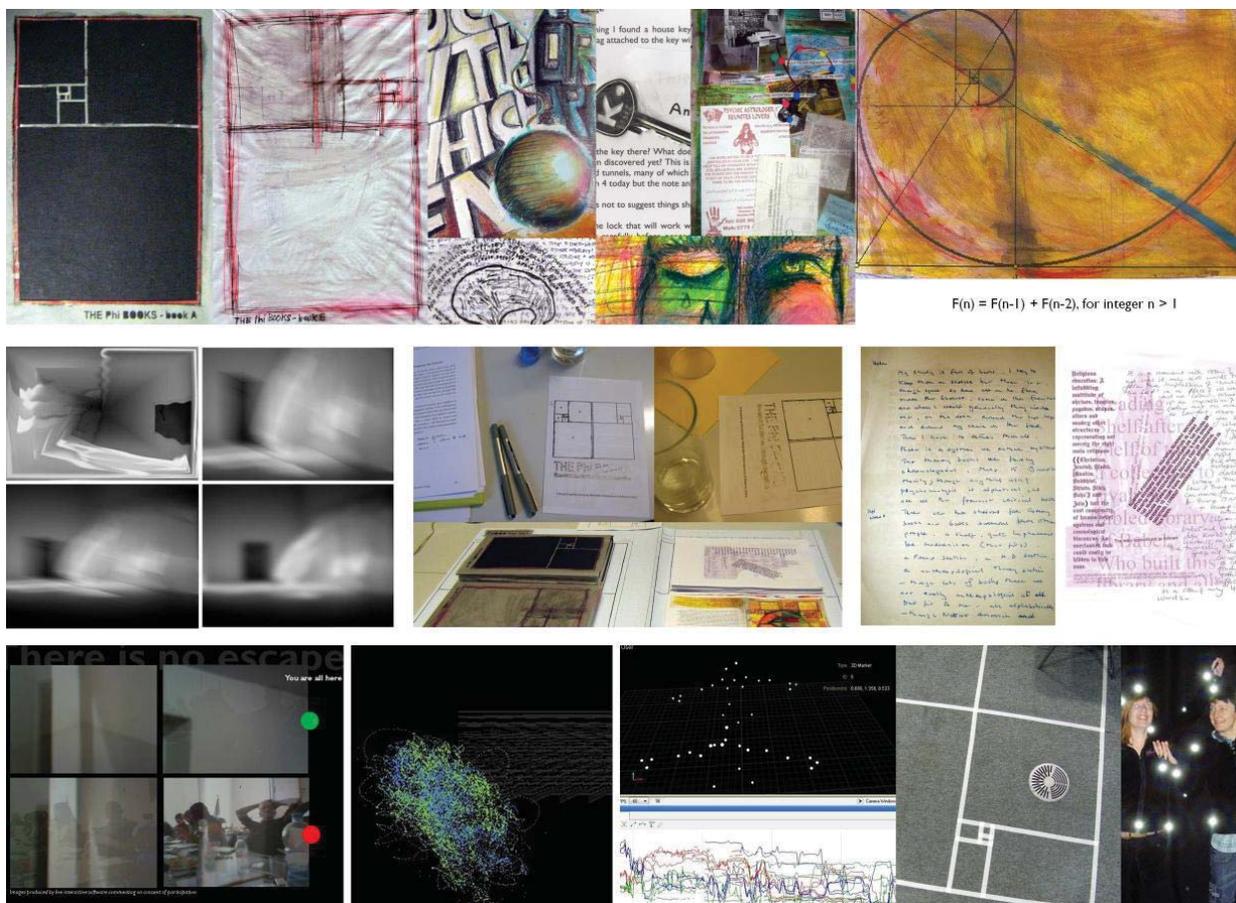
Fig 2. Top: Phi Books, Antonopoulou & Dare, 2008. Middle: Images representing the Phi room's sounds - Phi books installation- Participants' stories, Antonopoulou & Dare, 2009. Bottom: Phi Film, interactive application playing with consent, processing application. Antonopoulou & Dare, 2010. Participants body performance visualization with motion capture system -Phi stage from the 'Thursday Club' performance- Motion capture suit, Antonopoulou & Dare, 2011.

E. The Phi books is a collaborative project between Alexandra Antonopoulou, a designer and children's book writer-illustrator .

A. and Eleanor Dare, a fine artist who works in code.

E. The Phi books use the house as a metaphor for interdisciplinary collaboration. This will be outlined and clarified in an article that is somewhat unorthodox in form, reflecting how our collaboration has become more and more performative. The article is therefore produced here in script-form, where we, as agent-actors (A= Alexandra E= Eleanor) take it in turn to read out and perform our themes and findings.

A. The project evolved in different stages from the initial formulation of written algorithmic fictions to technologically mediated and embodied systems for collaboration. It uses stories, theory, drawings, maps, charts, found objects, photographs, dreams, spies, keys, overheard conversations and meta-critical observations.

E. The Phi 'neighbourhood' or 'territories', representing our expanded practice, has extended into wider collaborative practices in which 'house stories' have been written by participants at our lectures and performances while using reiteration of mediums.

A. We were lead into more performative and interactive forms using real-time interactive programs. For example the 'Phi Film', software that played with people's consent and participation and the use of motion capture technology where we asked people to physically perform their house stories as actors and active agents exploring collaboration.

But let us tell you bits of our story.

E. Our first presentation together was in 2008 when we both presented our individual projects at a regular interdisciplinary event called the 'Thursday Club' at Goldsmiths. During the discussion we found ourselves interweaving the passage of our research projects as if they formed one bisected, inter-dependent narrative.

A. Back then I wrote: Stories were like a secret code, a silent and camouflaged set of communication rules. We needed the stories to continue to communicate with each other, we needed to have a project as a mask to fulfill our thirst for telling stories. But wait a second that means collaboration! We were both odd and we did not even want to admit that we were already collaborating, we were scared of the spies, we were scared of losing our freedom, terrified that we will end up in uncomfortable situations. [1]

E. Our research fields seemed similar and yet they are different in many important ways. The common ground we share is fiction.

A. My research focuses on the educational-social-participative-heuristic role of story-making in designing. It involves partnerships with designers and children, facilitating them to author their own material and learn through play fiction and design, while using story-making as a design concept stimulus. I also create digital and physical tools for interactive story-making and I am interested in the use of story-making as a research methodology.

E. My practice centres upon the meaningful capabilities computation has to offer the arts. Throughout the last five years I have refined my practice into one that interrogates both the collision and synergy of digital and analogue art forms. My PhD research was primarily concerned with programming situated and responsive book forms that react dynamically to contextual and subjective moments in time.

A. We used English terraced houses as a metaphor for our research. Those houses have the same architecture and seem identical, but they are different since different people inhabit them.

E. We bought two identical books which were the metaphor for our houses. We wrote stories for each room in the houses and then we swapped the books to write a response to each other's stories. This seemed to mirror an 'extreme programming' methodology in its agility and rapidity and in our attempts to 'break' each other's stories.

A. We used a mathematical algorithm to write a precise number of words for each room. The numbers of the words in each room were following the logic of the phi ratios, this was the foundational structure

for our collaboration. Room one is 100 words. Room 2 is a room of 200 words, Room 3 is a room of 300 words. Room 4 is a room of 500 words. Room 5 is a room of 800 words. Room 6 is a room of 1300 words. [2]

E. To explain our writing algorithm: Ignoring the seed values, each remaining number is the sum of the previous two or F(n) = F(n-1) + F(n-2), for integer n > 1.

A. Room number 1 story: Room one is a tiny room just 100 words. What could it fit in a tiny space of 10x10 words? 'The little prince was pale with anger, for millions of years flowers have been growing thorns and for millions of years sheep have still been eating flowers, and is it not worth trying to understand why they do go to such lengths to grow thorns which are of no use to them?' (*The Little Prince*, Antoine de Saint- Exupéry). We are all sheep flowers, we eat and being eaten. [2] I used the idea of sheep flower as a metaphor for the collaboration process. We all have thorns to protect ourselves, but it is inevitable to be inspired by others and give inspiration to them as well. In our turn we are sheep taking from others even though they have thorns themselves

E. The stories are followed by note pages that reflect upon our thinking and link our stories with theoretically referenced texts.

A. By the time we reached room six, I had already instigated a full scale rebellion against the phi ratios, bursting out of their numerical constraints and inviting readers to do the same by writing their own stories. Eleanor joined in the rebellion by reverting to code, which is, of course, a type of language. At the same time she wrote in my territory, tunnelling into one of my rooms, and leaving words as provocations. She used stardust in her illustrations and these specks of shiny little dots where transferred into the whole book. That was the collaborative contamination. We used tight structures in order to define our individual territories which were eventually merged, giving birth to a wall-free collaboration.

E. In public we performed the Phi books, blurring the distinction between academic presentation and storytelling by playing the part of our fictional characters, drawing the audience into our ambiguous narratives of research and story-telling.

A. We wanted to maintain the logic of the Phi ratios in our performance as we did in our writing. We aimed to connect the linguistic to the sonic and to the spatial constraints of our collaboration.

E. We used sound to maintain the logic of the Phi ratios and to punctuate the performance. Each sound progressively expanded to reflect the increase in size of each room in the Phi house, according to the ancient Phi ratios. In the books each story's word count corresponded to the ratios of the room it was based in. We modelled the room sizes computationally to get a reverberation that was fitted to the geometry of each room.

A. In Berlin we said: This performance is based on our interpretations of the project, characterising their joint work as a paradigm for joining individual practices, leading to a result that celebrates both collaboration and individuality. We are going to take our audiences inside our Phi houses, where they can interact with the installation of our Phi neighbourhood, looking at our houses and creating their own research houses in this neighbourhood. [1]

E. A participant wrote this: My study is full of books. I try to keep them on shelves but there isn't enough space so some are on the floor under the shelves, some on the furniture, and when I write gradually they circle me, on the desk round the lap-top and round my chair on the floor. Then I have to return them all - there is a system or rather systems.

A. We chose to put this contribution into this article, but we couldn't put them all in. How are we supposed to choose? We put them in a bucket shook them up and pulled one out. We didn't like the first one so we did it again.

E. In London at the Inter-Art Symposium (2010) we devised an interactive application to comment on consent and participation, combining the physical space of writing performance with virtual space.

A. While the application was running we said: 'Please attach a sticker to yourself. Please adhere a green sticker to signal your consent to participate, and a red sticker for dissent, meaning that you do not wish to participate in this performance. Place the sticker in a position that is clearly visible yet tasteful. Are they all in place? Then we can begin (…).Did you hear a smooth, metallic mechanism over by the door? A series of automatic locks have been activated. You are now confined in this room. Your detention gives you all ample opportunity to enjoy the fruits of participatory performance.' [3]

E. The Phi Meta Film was an interactive computer program written in Processing. It enabled us to project our own film of the Phi Books while grabbing colour values from live CCTV images of the River Thames, filtering those into the film and then gradually merging live images of the audience into that film and saving the new version. Here we have very quickly revealed our methodological foundations. Like many houses in London, the Phi houses have water flowing beneath them. The water that flows beneath our houses is an interface to the mutability our visible structures suppress. [3]

A. But is there really an 'interface' between us, a set of doors through which we will walk towards each other? Or is the concept of an interface a fallacy as Matthew Fuller has written? [4] Can there be such a thing? Right here, right now? If so, what form does it take? Is it an object or an event?

E. Our next destination was Stockholm
We stayed in a strange house in Stockholm. It had doors that lead to no where, multiple staircases. geometry was playing a large part everywhere, it all tied in somehow with the logic of the Phi Books.

A. We realized that we don't just make stories, our lives are the stories.

E. We gave a talk in the library at Stockholm University, surrounded by books, in a sort of book womb. Alexandra and I both have a past of working in libraries, we share this silent occupation with our favourite authors, Georges Perec and Jorge Luis Borges. We see libraries as neighbourhoods of story-telling, much like the terraced houses of the Phi Territories.

A. 'The only thing that remains is diving in the alleys of the books, sleepwalking guided by the books' numbers. I feel like a blind mouse guided by the book voices. I have to put them all in place otherwise I will be punished. Sometimes I put them in the wrong place on purpose to separate them from their friends and family. They are suddenly between other books with different interests; they hesitantly talk to them. When they return to their right shelves they have new stories to tell. Certain books fall all the

time in my head, they want to fill my mind with words, they scream, read me you fool...but I am just blind mouse.' [2]

E. In 2010 we asked participants to perform their own stories. With the help of Marco Gilles and Andrea Kleinsmith and the 12 camera motion capture system at Goldsmiths we began to record the gestures and body performances of ourselves and others in recounting narratives of the rooms where we work, rest and create. The cameras translate people's movements into lines or points detaching the self. In that case the participants become agents however their movement can still reveal who they are. We also aim to record the participant's house stories with video-cameras in order to compare their graphically represented movement with their psychical self-represented performances. This will enable us to extrapolate new layers of embodied narrative and subjective articulation.

A. In our latest presentation at the Thursday club in 2011 after we performed our stories, we asked our participants to perform their own stories in real time. Even though, the Phi books became spatial (physical-virtual) neighborhoods and territories, we still want to call our project the 'Phi Books' as we believe that a book can be spatial, performable and independent, detached from its ordinary form.

E. We value, rather than problematize the difficulties of communication and mutual understanding. We looped with our participants through dizzying cycles of research and re-evaluation. The project is also a response to the inadequacy of historical models for both theorising and practicing creative research collaboration, and to an apparent lack of theoretical mobility across diverse disciplines.

A. The Phi Books entail research-by-practice in keeping with the complex and multi-faceted meanings the notion of research-by-practice evokes, and as evidenced by theorists of research and practice such as Graeme Sullivan, [5] Paul Carter, [6] Barbara Bolt. [7] and Henk Slager. [8]
Both our individual research activities and our collaborative work has contributed to our view that storytelling tools, whether analog or digital, must deploy the materiality of mediums, while also drawing upon the situatedness and subjectivity of human storytellers or story-makers.

Conclusion

E. As Stephen Wilson states, [9] we contribute to research by defining new questions, but also, at times, by 'using systematic investigative processes to develop new technological possibilities or to discover useful new knowledge or perspectives'. One of the consequences of this project has been the questions we have generated for our collective and individual research, such as:

A. How can artists/designers/researchers communicate openly with each other during collaborative processes?

E. How can people learn through performing and making stories?

A. What is a book? Is the book-form performable? 'I am the voice of the book you are writing on, your thoughts belong to me, you are part of the white pages, plain material, ink and paper. I am the carnival, I am what others see, I belong to everyone and you belong to me.' [2]

E. Can books be written by humans via methods and procedures more familiar to computer programmers?

A. How can making in conjunction with narrative lead to design innovation? How can story-making be used as a methodology for research projects?

E. We consider the Phi Books a system and a method that was embedded with the productive possibility of its own destruction. The possibility of destroying our own methods might be framed as an aspect of the Phi Book methodology, or ecological intersubjectivity, which, to quote Graeme Sullivan 'acknowledges that the self and others are reflective and reflexive beings. This suggests that meaning is not contained within a form itself, say a person, painting or a poem, but exists within a network of social relations and discourse.' [4]

A. The Phi Books project has illuminated naturalized, internalized notions of what Bill Gaver and Phoebe Sengers describe as 'single, specific, clear interpretations of what systems are for and 'how they should be used and experienced.' [10]

E. This recognition has enabled us to step away from the 'presumption that a specific, authoritative interpretation of the systems we build is necessary, possible or desirable.' [10]

A. This is a voice from the flat next door. I am not a human; I am just a utopia machine, a placebo for my neighbours. I am helping them to hear their thoughts; they justify them through my existence. I might be an artificial pulse for the person living on the right of my flat, something completely different for someone else. I only wish there was another machine elsewhere, to hear myself ... the machine. [2]

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GENERATIVE NARRATIVE IN COMPUTATIONAL ECOSYSTEMS

FILIPE ANTUNES & FREDERIC FOL LEYMARIE

This paper analyses modes of interpretation of that part of the generative art practice making use of computational ecosystems, i.e., virtual reality-based worlds mimicking or simulating an equivalent real-life ecosystem. We discuss the notion of generative narrative, as the model for this genre of works. This argument is illustrated with a case study, *Senhora da Graça*, which artistic concept is grounded on this model.

1 Introduction

By computational ecosystem (CE) we understand an artificial environment, produced in silico in the form of a virtual world, populated by an heterogeneous class of artificial life forms; such class, will in the more complex cases represent multiple trophic levels, forming a continuum in a food chain, with representatives from the plants, herbivores and carnivores. Simplest simulations however often have two distinct trophic levels represented, with one species of producers and another of consumers, such as is the case of Jefferey Ventrella's *Swimmers* or Jon McCormack's *Eden*.

As artistic artifacts CEs appear throughout the last thirty years in different curatorial projects, galleries, and art festivals. This artistic practice had its first major blooming season in the mid 1990s, when produced by pioneers such as Christa Sommerer or Jane Prophet established the roots of the practice with a series of works which are nowadays seen as early landmarks of evolutionary art.

Engaging in a discussion on CEs as artistic instruments, the aim of the present paper is to formalize the concept of generative narrative as the model these works operate. This model of narrative confers CEs the potential to address projects which are significantly distinct from those of their aesthetic cousins: other evolutionary art in the computational medium, such as the Scott Draves's *Electric Sheep*, or carbon-based ecosystems based art such as Ken Reynaldo's *Hydroponic herb garden*.

Throughout this document we will articulate a number of voices (Latour, Klastrup, Hayles, Eco and Holland) to lay out a theoretical framework which attempts to see behind CEs' formal novelty and invention, and understand the mechanisms at play in conveying context and artistic meaning.

Our previous work *Senhora da Graça*, where the apparent two realms (the formation of narrative and the physical ensemble) articulate the artistic concept, will be brought into the discussion as case study to assist in the deconstruction of the processes of narrative.

2 Computational ecosystems as works-in-movement

With an algorithmic and systemic understanding of the artistic artefacts, this practice takes expression in the construction of rich generative computer-based works which renew themselves, and evolve dynamically. Rooted in ALife, CEs operate within an aesthetics of complexity where emergence, self-organization and autopoiesis appear as a focus of interest in an agenda pursuing novelty and spontaneity.

The foundations for the mechanism driving this evolution lie, in the internal dynamics of the complex adaptative system formed by the populations which inhabits the worlds. Its structure follows a bottom-up logic common to ALife systems where the complexity of higher level structures emerges in recursive interactions from lower level building blocks and rules.

To discuss aspects of an aesthetics of emergence it is pertinent to recall Umberto Eco's concept of the open-work. Eco, suggests works of art to operate in a state of potentiality, of unexplored possibilities which they may admit. An open work is not limited to a single linear reading. Its open-ended nature is complex and offers an unlimited range of possible readings, works are 'open' to continuous generation of internal relations which the addressee must uncover and select in his act of perceiving the totality of incoming stimuli. [4]

Particularly critical for this discussion is the 'work in movement', a term Eco uses to describe pieces which operate as invitations "to make the work together with the author," works that "characteristically consist of unplanned or physically incomplete structural units." [4] In CEs, the building blocks of the system interact autonomously. Emergent processes create new trajectories. The work admits a large number of possibilities. However each run will only see one sequence of these potential outcomes. The complexity of the ecosystem generates such wide range of combinatorial possibilities that two different runs of the system will systematically diverge in outcomes. Amongst the illustrations of the 'work in movement' are Calder's generative mobiles. As in CEs the modular structures of the mobiles pre-exist the viewing experience. And in a somehow similar way the work articulates time in its substance. The 'Open work' was first published in Italian in 1962. Three decades later, laying their foundations on emergent behaviors, and bringing the audience to intervene in the evolutionary course of the simulations, CEs seem to be mature ontologies of systemic-open-works. However, the ontology of CEs does not exhaust itself with the production of novelty and the exhibition of multiple scales of visual and audio complexity. They are more than accelerated versions of Calder's mobiles for the digital ages.

CEs are a sub-genre of ALife art, which is art drawing on ALife and is discussed in great extent in Mitchell Whitelaw's *Metacreation: Art and Artificial life.* [13] ALife is a sub-field of Artificial Intelligence which focuses on computational systems mimicking some of the processes of natural life and evolution. Whitelaw sees ALife-art as a natural follow up of the modernist attempt to imitate not only the appearance of nature but also its systems of functioning. [13] The practitioners agenda appears to be ambitious, and is inscribed with an interest in questioning life itself. The project of ALife is the chimera of exploring "Life-as-it-could-be." [10] The strong claim of Alife is that life is reducible to information, and as such, Alife models can extend the knowledge in biology. Artistic uses of ALife inherit this dialectics/ethics.

This forces a change of perspective in the analysis, moving away from mere pictorial and chromatic spheres. According to the anthropologist Stephen Helmreich, cultural pre-conceptions from the dominant western culture such as dominant notions of gender, monogamous families, heterosexual and productive sex appear widespread across models camouflaged in a Darwinian struggle for survival. [7]

To Helmreich, authors of CEs rather than neutral modelers of life actively shape the world and its narrative re-inscribing cultural values in the simulations: they "transport received stories into new hardware." [7] If in the inception of ALife Christopher Langton described it as "life-as-it-could-be", Helmreich argues that these constructions "are built from specific visions of Life-as-we-know-it." [7]

This presence of the authorial hand is also identified by literary critic Katherine Hayles: "Analogy is not incidental or belated but central to the program's artifactual design." [5] She reminds us, "in these representations, authorial intention, biomorphic interpretation and the program's operations are so interwoven that is impossible to separate..." [5] Hayles continues to say "statements about the program's operation and interpretations of its meaning are in continuous interplay with each other." [5] The difference between the material space of the computer and the imagined space appears blurred. In the imaginary space, one 'hungry' creature moves towards another. In the material space, segments of code instruct an agent that as a consequence of the state of some variable, below a certain threshold the agent will adjust its variables defining its position to those of some other agent which global pattern is compatible.

Hayles puts it clearly: it is a narrative that "changes electric polarities on silicon into a high drama of a Darwinian struggle for survival and reproduction." [5] Behaviors restricted to organisms appear juxtaposed with the execution of segments of code in the informational domain. Assumptions we have about natural behavior are transported into the narrative when these two spaces collapse.

John Holland, one of the leading pioneers of ALife, refers to models as maps or cartoons of life. Some features are captured, emphasized, exaggerated while some others are neglected or removed. As in cartooning the skill goes into choosing what is to be emphasized and what is to be thrown away. [8] Practitioners appear, as such, as promoters of a spectacle (in Barthes terms), orchestrators of representations of life. Referring to CEs as representations Holland implicitly concedes that we are operating in the literary realm: the power of discourse and the identification of the audience and its practitioners with a shared common narrative. It is this literary and metaphoric process which transports into the narrative the meaning of death or birth to squares disappearing or appearing in a simulation.

3 Generative narrative

Departing from the understanding of CEs, firstly, as representations of life permeated by structural gaps which are filled by narrative processes; and secondly, as open-works which dynamic interaction of components generates new relationships in a potentially endless evolution, we can start building a theoretical framework under which light we can formalize the narrative process.

As seen earlier, Katherine Hayles alludes to the active role of the viewer, filling in the gaps in the narrative, by the transition from the material to the imaginary spaces. She emphasizes these as works in which the author, the viewer, and the model are connected parts in a gestalt where meaning results from this relationship. [6] Flickering pixels in the screen might become 'alive' in the mind of the beholder when the appropriate story is associated. This comes in accord with the concept of the actant from the actor-network-theory (ANT). Latour disputes any distinction between nature as opposed to culture. In the actor-network-theory an actant is any intervenient, be it human or non-human, in a momentary network of forces in a given situation, in a dynamic network of relationships. [11]

The first of the actants we will discuss is the shared context or story. Lisbeth Klastrup is an internet theorist who studied the poetics of virtual worlds. In her study of the 'worldness' of virtual world. Kalstrup addresses this concept as 'interpretative framework'. The world as interpretative framework, or fiction, is the concept or story behind the world. It constitutes a reference from which the actions makes sense to participants; for instance the story of its creation and evolution, the cosmology of its inhabitants. [9]

The interpretative framework contributes significantly to situate the elements in a common and shared territory, a contextual space and time.

In Klastrup's media-inclusive proposition, textuality is described as 'the place of the reader and text in the process of reading. The text contains signs that the reader, in the process of reading, decodes and interprets, be it graphical, auditive or verbal signs'. She continues 'the text does not necessarily need to be written text, but can be all forms of cultural artifacts with a signifying function.' [9] Extending the notion to 'multiuser textuality' this author widens the notion of textual construction to encompass the networked aspects participating in the interactive experience of the world, as well as the agency from all the human participants in the virtual world. With CEs this textuality also include actants such as the computational forms of life, as well as the processes in the rendering pipeline, or yet the vertices of a 3D-surface (We will illustrate this further in the case study, when some of these elements are brought to the center of the narrative process). In Jane Prophet's *Tecnosphere*, for instance, when the user is selecting a creature to be either a carnivore or an herbivore they are actively participating in the construction of a narrative process which will unfold throughout the 'lifetime' of that creature. The emails the creature will 'send' later informing about who it has fought against or ate are actants which will reinforce this dialectics.

Equipped with this framework we will now attempt to formalize a notion of generative narrative in CEs. Generative narrative is a term we borrow from electronic literature, which is found in [2] to describe some works where integral or partial components of the text are automatically generated, such as in the case of *Prolix* by Christophe Petchanatz, a playable generator. [12] Generative describes here an automatic (re)construction of the system (be it partial or integral).

Deriving from these premises we start by situating the narrative of CEs as the model of story which emerges from the dynamic interactions from the author, the viewer, the computer where the model runs, and the agency of the creatures in the virtual world. Generative narrative can be understood as a dynamic form of narrative emerging by this network of relationships as time flows. A free-understanding of generative narrative is about narratives where the system not only adds new events to the world but, in doing so, it reinvents itself. The author sets the system, the initial conditions of the story which then unfolds autonomously, living a life of its own. This autonomous life might, in turn, recreate the system in feedback loops, in an auto-catalytic process. The interplay of the components generates new behaviors or properties. The system might even generate behaviors which re-define the rules of the evolution of the system. The system and the emergent story become inseparable from each other.

In summary, in CEs, the narrative is emergent. Meaning is conveyed from the textuality of the CE, a byproduct of the conjugation of the interpretative framework and the material aspects such as sounds, or textures implemented as 3D surfaces, or the processes modeled describing the behaviors. The final interpretation of the work incorporates the agency of a triangle in a 3D-mesh of the landscape, and the process driving the way a certain character is displayed, and the text in the website where the work is accessed, and the website itself, and the viewer who accesses the work. The resulting dynamics produces an ever-changing landscape, a context for interpretation.

4 Senhora da Graça

We introduce in the discussion a case study to analyse this narrative process at play in conveying meaning in an artistic CE, Senhora da Graça. [1] Senhora da Graça denominates a valley, near Sabugal, in

North-East Portugal, which in 2000 was submerged to build a new dam. The artwork *Senhora da Graça* is a memorial in the form of a virtual ecosystem composed of clouds of rain, soil, plants, herbivores, carnivores and scavengers. With the help of photographs taken at the site from which this work borrows the name, around 20 years ago, this work was aimed to reference a period or moment in time. However, the photographs of reference are presented in a distorted and somehow abstract way, when applied as 3d textures in the exterior surfaces of the creatures (skin), on the soil, and in the skies of the virtual world.

As the surfaces aren't static, the generative dynamic of the interaction of creatures permanently re-builds the world and the shapes. As a result, the photographs keep making reference to a moment of time, however, the living and dynamic frames where they are applied (the creature's bodies) as 3d textures, evolve over time making them unrecognizable. Having lost their pictorial value as photographic object they keep maintaining their conceptual and chromatic values. In a metaphoric way, as it happens with the submerged place of Senhora da Graça, in this work the photographs appear unrecognizable, they are shadows of the moment they evoke.

Accessing Senhora da Graça, a spectacle is offered, a parade of abstractions that we have difficulty un-ravelling any meaning, if any at all. However, in the website we have access to a text describing the intentions and motivation, illustrated with an introductory short story. Whereas, in an operatic perfor-mance we need a libretto to help to introduce and decode the narrative, the interpretative framework.

One of the keys for our discussion resides in this libretto, precisely, since it provides access to the inter-pretative framework. Gilles Deleuze, in his two volumes of work dedicated to cinema, suggests the 'mental automaton', a circuit made of body, flesh and light, which is formed by the cinematographic ob-ject and the viewer. This cybernetic circuit is initiated by the sensory stimuli of the electrical pulses from the movie and the nerve signals and impulses that are generated in the viewer. Once this circuit is estab-lished the impulses no longer come from the movie but from the circuits formed by the brain, 'mixing a multitude of cinematic signs with bodies.' [3] Extending this concept to Senhora da Graça, we can ob-serve that the object virtual world and the libretto combine to feed this mental automaton.

In Senhora da Graça the virtual world is part of a circuit initiated with the introductory text. Due to its material properties, the virtual world has an obvious interest as isolated sculptural and material object. But the semiotic significant is entirely dependent on the textual narrative, derived from the mental au-tomaton. However, this relation is not passive as the virtual world also prolong, continue and expand the narrative: The texts finds a natural follow up in the deformation of the surfaces and the evolution of the creatures/pictures in the virtual world. In this sense, the virtual world has a dual and hybrid quality since it is only complete when in the presence of the libretto, its extension. Rather than finishing with their physical boundaries the virtual world extends and is extended with/by the mental automaton.

5 Conclusions

CEs offer rich endeavors to those authors interested in exploring this unconventional artistic practice. We have attempted to lay out a theoretical space for situating and experiencing CEs as instruments for artistic dialogues. We have discussed how the story and the material properties of the CE participate in the narrative and might be incorporated in the artistic concept. This process is open and other actants might be invoked in this process.

We propose the term generative narrative as a conceptual tool in understanding these works. We saw earlier how works which are structurally incomplete, which the audience completes in the act of perceiving the work, are suggested to be open by Umberto Eco. On the other hand N. Katherine Hayles emphasizes a gap between the material space and the imaginary space in ALife. This gap, she argues, is filled by narrative. A series of actants (in the ANT sense) are invoked by the artists/modelers filling in these gaps, generating a field for interpretation. Generative narrative is the textual construction articulating the different aspects which define the CE (the actants). This goes to include a wide network of influences, from the language of code used in the implementation of the virtual system, to the the story read by the audience or its processes of diffusion. This process is dynamic and non-stop. Due to its open nature works evolve when new relations and interactions establish and evolve in time.

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ART, TECHNOLOGY AND BUSINESS: TRANS–DISCIPLINARY TEAMS IN THE ARTS

Gavin Artz

The Ancillary IPs hypothesis theorises that, despite myths to the contrary, artist regularly work in trans-disciplinary teams and this way of working is analogues to the entrepreneurial team found in business.

For the past two years I have been working with The Australian Network for Art and Technology (ANAT) to develop and test a model for working commercially with creativity, a model where artists aren't diminished in their creative work, but are able to generate a broad range of revenue from their activity. This Ancillary IPs hypothesis theorises that, despite myths to the contrary, artist regularly work in trans-disciplinary teams and this way of working is analogues to the entrepreneurial team found in business. The hypothesis predicts that if this trans-disciplinary team is recognised while the relationships and commercialisation processes are managed within specific criteria, artists can successfully commercialise intellectual property embed in their artwork while enhancing their artistic output.

In part 1 of this paper an overview of the Ancillary IPs hypothesis is presented with a focus on the proposed five factors for successful commercial outcomes from creative practice. Part 2 tests the Ancillary IPs hypothesis against the findings of an Australian Network for Art and Technology (ANAT) and University of Adelaide's Entrepreneurship, Commercialisation and Innovation Centre(ECIC) investigation into artists attitudes toward career, collaboration and commercial elements of their practice and a case study of the company rezon8 .

Part 1 : The Ancillary IPs Hypothesis

OVERVIEW

Unlike previous representations of the Ancillary IPs hypothesis, in this paper two separate but linked concepts are articulated to make reference to research and case studies more clear, Ancillary IPs and the Ancillary IPs Process.

Ancillary IPs occurs when, in the course of an artist pursuing their vision, they encounter a technical road block that requires the development of a technology, device, process or code. [1] These tools can then become the basis for IP commercialisation.

The **Ancillary IPs Process** addresses commercialisation of Ancillary IPs by seeking to unlock the pent up commercial value in creative activities, while ensuring sustainable ongoing creativity based on equitable trans-disciplinary collaborations.

ANCILLARY IPS: CREATIVITY AND INNOVATION

Creativity relies on intrinsic motivation expressed through curiosity and self directed exploration. [2] Because of this artists are internally motivated to create and discover what does not yet exist and overcome the problems that arise through that creative process. This intrinsic motivation is what drives artists to create intellectual property on an ongoing basis.

A commercialisation process benefits from high level artistic process, because this process relies on sound problem discovery [3] but problems that we did not know existed and problems that often seem unrelated to present concerns. This approach to problem finding sets artist outside of the marketing concept in a commercial sense [4], but makes them perfectly placed to deal with disruptive technology as detailed by Moore. [5] Because artists are engaged in research questions or cultural activity they are often reaching into an unknown, yet linked future. In a sense they are long range strategic problem finders. This means that artists are continually uncovering problems that will have general applicability into the future. But artists can only serve in this capacity if they are left to be creative. It is the open ended nature of creativity that underwrites its value, or to put it another way, personal creativity is diminished when put to work for someone else's ends.

Whether we acknowledge them or not Ancillary IPs are being created all the time as a part of creative practice. The hallmarks of this creative practice are the application of ideas to people, culture and society and this is why the creation of Ancillary IPs in the arts can be seen as an innovation process.

ANCILLARY IPS PROCESS: INNOVATION AND COMMERCIALISATION

The Ancillary IPs Process is based on the commercialisation of the tools that artists create to overcome technical roadblocks, not through setting them the task of applied research or commercialisation. Because of this the Ancillary IPs Process does not compromise valuable intrinsic motivation and because the tool (IP) has been created to resolve a real problem, it is just a case of finding a like problem that the tool can resolve; giving a considerable head start in the R&D process. In this way an appropriate commercial value is placed on purely creative endeavours.

This aspect of Ancillary IPs Process is what sets it about form innovations based on coincidence. The Ancillary IPs Process is not an accidental discovery of a property or application; it is a repeatable approach for any instance of creative practice.

ANCILLARY IPS PROCESS: ENTREPRENEURSHIP AND COMMERCIALISATION

The Ancillary IPs Process relies on collaboration for commercialisation outcomes. This is necessary so as not to compromise the intrinsic motivation. There is a myth that artists are not interested in commercial outcomes. Artists are driven by intrinsic motivations, but this does not mean they do not value commercial activity and the revenue that can come from it. Usually artists do not wish to become business people, but they value their creative output in commercial sense.

In the Ancillary IPs Process commercialisation happens in the context of a team, much like an entrepreneurial team, enabling the artist to focus on the creative process. Artists work with technologists, business people, or any other skills they need to create work while having access to the commercial world.

By doing this, creative practice is placed in a value network as opposed to a value chain, creating a more sophisticated relationship that can transfer the tangible and intangible value. [6] It is the ongoing mutual benefit and the ability of all members of the team to focus on their intrinsic motivations that alows creativity to be successfully commercialised.

This is a trans-diciplinary approach that doesn't separate the non-applied research from an applied research process. By having an integrated approach, innovation processes can be condensed, R&D cycles sped up.

ANCILLARY IPS PREDICTS

The Ancillary IPs hypothesis predicts that if five factors are included in a commercial process then successful long term business outcomes will be possible without diminishing the intrinsic motivation that drives creativity – these are:

1. *Invention and Innovation:* Because Ancillary IPs are created to resolve a real problem they are closer to innovation than pure invention. There is far greater potential to find like problems than from pure invention.
2. *Commercial Partnerships:* There are no expectations that creative practitioners involved in the Ancillary IPs model will have business skills. While it is ideal that a level of knowledge is developed to ensure appropriate choices are made, the Ancillary IPs hypothesis is more focused on commercial partnerships.
3. *Personal Benefit:* There is an expectation that the creator of the Ancillary IPs will derive an ongoing and direct benefit from commercial applications. This is a part of the commercial partnership that allows for ongoing IP to be created.
4. *Personal Vision:* Ancillary IPs relies on the personal vision of the creative practitioner. Their value is in this vision and everything is to be done to allow them to focus on the end vision.
5. *Process:* Because of its importance the personal vision cannot be curbed to commercial ends. Commercial opportunities come from overcoming roadblocks, not the end result of creative work.

Part 2: The Research

In 2010 ANAT and the ECIC under took a survey of creative practitioners who had an existing connection with ANAT. The survey was entitled *"Creative Collaboration, Commercialisation and Career Study."* [7] Those surveyed had been added to ANAT's database either through choice or through participating in ANAT program. The survey itself had two key questions to uncover in relation to Ancillary IPs. One being what is the nature of collaborations in the arts? The other, what is the attitude toward commercial outcomes in the arts?

METHOD

A questionnaire was circulated to 2150 people who were on the ANAT data base, with 36 respondents.

LIMITATIONS

1. The use of ANAT's database selects people who have an interest in collaborations between art, science and technology and who have knowledge of work ANAT has undertaken in the area being investigated.
2. The number of respondents were too low to conclusively resolve the questions.

RESEARCH CONCLUSIONS

The key findings that relate to the Ancillary IPs hypothesis were:

1. 94% of respondents answered yes to the question - "Are you interested in exploring the commercial opportunities that may evolve from, or be embedded within your creative work?"
2. 81% of respondents answered yes to the question – "Are you interested in professional development (seminars, workshops) for commercialisation and / or business developments of creative practices?"
3. That 61% of respondents collaborate with others to develop work and that 61% of collaborations for this purpose are with people outside of the arts.

While there are limitations to this research it indicates that there is a strong interest in commercial activity from some in the arts and there is a corresponding strong interest in professional development in business skills. The research also indicated that a majority of artists collaborate in creating work and that a majority of these collaborations are with people outside of the arts.

CASE STUDY

This case study was based on interviews with rezon8 founders *Jimmy McGilchrist and Darryn van Someren* between April 2010 and May 2011. rezon8 is a fast growth technology start up. In early 2010 they presented a work at Melbourne's Federation Square entitled "Swarm".

"Devised and created by Adelaide-based artist Jimmy McGilchrist and programmer Darryn van Someren, this Next Wave Time Lapse work for March uses human recognition technology and the Fed Cam live feed to create extraordinarily graceful and surreal effects. As audience members stand motionless in Federation Square, virtual butterflies will gravitate towards their on-screen image swarming around them. As the viewer moves suddenly within the frame, the butterflies will dissipate, following them for a time before fluttering off into the distance. Ulanda Blair - Next Wave" http://rezon8.com.au/case-studies

To execute this project they developed proprietary software and a unique configuration of existing hardware that placed an audience inside the digital screen, allowing the audience to use their body to interact with digital content.

Through MEGA SA's entrepreneurial, professional development program I reviewed the work of rezon8 using the Ancillary IP's hypothesis as a framework to assesses their creative work for unique intellectual property. In this case it was the software created to drive their custom configured hardware. The software was developed to resolve technical problems associated with the realisation of their art work. It was then a case of finding a like problem in a different industry where this tool could be applied.

rezon8 applied the IP to the outdoor digital signage industry. Their IP has been able to resolve the problem of measuring consumer interaction with signage as well as increasing the engagement with this advertising investment. They have built a sustainable business that is currently negotiating export of a hardware solution developed from the initial art work. The company continues to use their art practice as a combination of ongoing technology R&D and market testing of ideas and technology.

CASE STUDY CONCLUSIONS: THE FIVE FACTORS AND REZON8

1. ***Invention and Innovation:*** This factor was borne out in that the IP created for the art work could easily be applied in a different market and the application was resolved to the point that rezon8, as a commercial business, could commence commercial work immediately and within six months became a sustainable consulting business with longer term automated digital outdoor signage solution in development.

2. ***Commercial Partnerships:*** The development of this factor followed the predicated path, but also showed a deviation. In line with the hypothesis rezon8 has built strategic partnerships with other business to help deliver a complete product. They formed an entrepreneurial team made up of the core team including an advisory board, but deviated from the hypothesis by creating a virtual entrepreneurial team by including a mentoring business relationship with a business that creates animations for advertising and more distant, but none the less supportive, relationships with advertising agencies. While commercial in nature these relationships developed on the lines of strategic partnerships rather than purely transactional relationships. The other point of deviation is that the hypothesis predicts that a partnership would need to be formed with a business, or individuals that could deliver commercialisation outcomes while the artist continued a creative path. As indicated as common practice by the *"Creative Collaboration, Commercialisation and Career Study"* rezon8 was an artistic practice based on a trans-disciplinary collaboration. The core team has creative, technology and business skills supported by an in-depth professional develop experience in entrepreneurship. This built-in entrepreneurial team helped rezon8 to quickly build a functioning business with the artistic process conceptualised as research and development for the commercial outcomes. This conception of artistic practice as research and development in a commercial business builds on the existing hypothesis in an unexpected way.

3. ***Personal Benefit:*** Due to the deviation from the hypothesis of commercial partners rezon8 was able to maintain ownership and control of IP. By not having to trade a share in this intellectual property for commercialisation partners they always maintained a personal benefit from the artistic IP created.

4. ***Personal Vision:*** rezon8 fulfilled this factor in that the personal vision of the "swarm" meant that the intrinsic motivated creativity encountered technical problems, that when overcome, made up the commercial basis for rezon8. The added dimension to the model came about when this personal vision was contextualised as the research and development investment of rezon8. The new venture, rezon8, invests in the production of interactive art work for events and festivals at a loss. This investment pushes the development of technology while enabling instant, large scale customer feedback from event and festival attendees.

5. ***Process:*** While the process of integrating creativity deviated from the model, it was in sympathy with the overall concept of Ancillary IPs. rezon8 have built and develop the business through looking to the tools created in an artwork, but they have brought that art work creation into their business processes. This integration brings the business closer to the creative process, but the creative process does not produce the end product sold through the business.

Conclusion and Further Research

There are two beliefs prevalent in the arts that prevent artists from being a part of the mainstream economy and more importantly it prevents artist from making a living from their creative practices.

One is that artists do not have an interest in commercial activity. The other is that the artist is a lone creative visionary. This paper begins to reveal these beliefs as unfounded and that a much more complex relationship exists between business and the arts than is commonly recognised. This paper concludes that the Ancillary IPs hypothesis shows promise in articulating more clearly this complex relationship and how this relationship can be leveraged to benefit both artist and the economies in which they work.

The case study reveals that Ancillary IPs are clearly being created in some areas of the arts, but further case studies in other industries and other areas of the arts are need to demonstrate possible general applicability of the hypothesis. Also further research and modifications to the hypothesis are required before the Ancillary IPs Process can become a deeply applicable model. The recommendations being:

1. More rigorous research with a greater sample size needs to be undertaken to get a reliable picture of attitudes to commercialisation of IP in the arts and the nature of collaboration in contemporary creative practice.
2. That the five factors that underpin a successful Ancillary IPs Process needs to be reviewed in the light of the"Creative Collaboration, Commercialisation and Career Study" and real world cases. This review will need to take into account the potential for greater integration of commercialisation process and artistic creativity and to allow for the contextualization of artistic practise as research and development activities in a commercial enterprise. Further to this a more complex view of the entrepreneurial team needs to be considered to take into account a broader array of the types of commercial partnerships that can exist in a value network that links the artistic with the commercial.
3. The notion of knowledge transfer of the tools developed to overcome roadblocks in achieving a creative vision to like problems in other industries or markets needs to be better understood from a process stand point.

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VOICES IN MACHINIMA AS A SITUATIONIST DÉTOURNEMENT OF VIDEO AND COMPUTER GAMES

Isabelle Arvers

Voices in machinimas appear as the human side of the virtual game environment. Behind the gamer performance that produces character actions, dialogs create the sense and the drama of the movie. Voices, through dialogs, songs, or voice-overs, also become game modifications, as they transform the original game function and offer a new set of meaning to the virtual realities initially created by game developers

The French Democracy, 2005, Alex Chan, Machinima directed with the game: The Movies, © Lionheads Studios

The word machinima mixes the idea of cinema, machine, and animation. It is the encounter between a film and a game, in which gamers become film directors. As a technique to produce films, machinima is a new cinematographic genre.

Voices in machinimas appear as the human side of the virtual game environment. Behind the gamer performance that produces character actions, dialogs create the sense and the drama of the movie. Voices, through dialogs, songs, or voice-overs, also become game modifications, as they transform the original game function and offer a new set of meaning to the virtual realities initially created by game developers.

In the art world, works making games, modifying games, and using games for machinima can be seen as following in the footsteps of Dadaism and Surrealism, which saw play and entertainment as the most subversive and also as the ultimate forms of art. Even outside of an art context, it is important to remember that as soon as the first personal computer was created, MIT computer scientists hacked the computer code to conceive the first digital creation: Spacewar! And Spacewar! was a computer game. So, if computer game history is related to the roots of digital creation and to digital code hacking, machinima can be understood to follow this tradition.

Machinima represents the particular moment when gamers begin to produce content and where games become tools of expression. These movies are mostly narrative, but they can also be experimental, artistic, or related to music, documentaries, ads, and feature films. They can be seen as a new way of representation in the digital age, along with 3D animation, digital cinema or video.

During the riots in Paris in 2005, Alex Chan, a graphic designer based in the northern suburbs of Paris, directed the short film *The French Democracy* using The Movies game engine, from a game created by Peter Molyneux. This was the first political machinima. It explained how and why the riots began. Alex Chan had never made a movie before, but faced with the media coverage of the riots, which was massively biased against the youngsters, he decided to give them a voice by the means of a game. He directed the movie in one week, subtitled it in English, and posted it on The Movies website. Alex Chan's movie was downloaded more than a million times.

Alex Chan chose to subtitle *The French democracy* in English to be able to post it on The Movies website, but also because he wanted it to be watched by the international machinima community. As Cillian Lyons, resident machinima artist and producer for Machinimasia (The Asian Machinima Festival), also explains, voice is something they specially discussed for Asian movies because the majority of the machinima community is English-speaking. [1]

Apart from the gamer's performance that creates the action in the movies, voices are the human side of machinima. As machinima are entirely shot in 3D environments of games, they are made of digital images. These images are part of already existing worlds, and even if machinima directors modify them, they remain digital and mostly unchanged. Each of these worlds bring their own visual imaginary: a fantasy world with World of Warcraft, an urban modern life with The Sims, futuristic landscapes with Halo, or a violent suburb atmosphere with Grand Theft Auto, for instance.

More than an aesthetic, it is a 3D vision of the world—a digital representation of it. And in these environments, voices transform the meaning of the scenes. Originally imagined by hard-core gamers, machinima are a way to come back to the virtual universes with which they feel so comfortable. Voices are a tool to appropriate these worlds by adding their own stories, thanks to dialogs between characters. Voices bring sensitivity, a sense of humor, or an absurd touch to these virtual spaces.

Games are created to be fun, rather than to make you laugh or cry—even though this sometimes happens. Nevertheless, machinima voices offer a new set of emotions and allow us to perceive images in a different manner by getting closer to game characters and landscapes. It also brings an "as if analog " feeling to the machinima—a counterpoint to the digital. There is a sort of uncanny feel here, as the voice and image are out of phase with the warmth of the voice and the coolness of the image. The performed and scripted quality of the voice gives a not-digital feel to this very digital world. Polygons

and avatars take a new dimension, a new personality—as if a human body would fill them up and breathe inside.

Furthermore, the voice works to bring about a reverse engineering of a mass consumerist object into a tool of narrative and artistic expression. With machinima, we can talk about an emerging game play: an unsuspected use of a game for an artistic objective. Here play operates in the fullest, most artistic sense of the word. Even though, of course, now ads are also created using the machinima techniques—for commercial purposes— nevertheless, machinima remains a tool that is available to anybody who has a game engine at home and who wants to express themself by combining voice with the games' visuals.

By using virtual spaces and changing the perspective as an artistic strategy, machinima allow a distanced critique of a simulated world. They tend to erase the boundaries between reality and fiction and redefine the transgressive power of the game. "There, where the real world is changing into simple images, simple images become real human beings and efficient motivations for an hypnotic behavior." [2] They reactualize the Situationist conception of cinema, in which images, voices in dialogs or interviews or voice over, act as different layers of content. Guy Debord and Gil J. Wolman, in a joint text written in 1956, added to the Situationist theory of détournement [3] the point that cinema is the most efficient method of détournement where détournement tends to pure beauty. It doesn't need to be a parody or a critique of a movie. In this text, both authors argue for the strategy of diverting a movie like the racist one *Birth of a Nation* by D. W. Griffith by just changing the soundtrack in order to denounce the horrors of the war and the KKK activities.

Some machinima, like *This Spartan Life (TSL)* by Chris Burke, or *Landlord Vigilante*, written by artist Eddo Stern and writer Jessica Hutchins, could, I would argue, be compared to Situationist movies. This Spartan Life is a talk show about digital and gaming culture directed in the virtual space of the network game *Halo 2*. Chris Burke, aka Damian Lacaedemion, has special guests in the game: for instance, he interviewed Bob Stein on the future of the book and Malcolm McLaren about the 8bit music and the roots of punk music. As the talk show is filmed, players are fighting around Lacaedemion and his guests. Sometimes, other gamers, who don't realize that a talk show is happening live in the game, actually kill the guests. For instance, while Damian Lacaedemion was defending Malcolm McLaren against futuristic monsters, we could follow McLaren walking through the digital landscape, in the shape of a strange purple animal, talking about "magnificent failures better than little successes." [4]

Landlord Vigilante combines the visuals of a car chase with the musings of a cab driver about the economy. It allows a second level of reading the images. Based on a true story about their ex-landlady, *Landlord Vigilante* is an artistic monologue of a women cab driver directed in the game *Grand Theft Auto*, according to its makers, because of its gritty depiction of Los Angeles and prospective violence, and the Sims, which is property/real-estate oriented. Each game presents a "world" or narrative arena confined by a set of prescribed, "rules"—we wanted to stretch and play with those rules to tell our own post-traumatic story. [5]

Why do I compare these machinimas to Situationist movies? Because, thanks to the voices, they add an artistic or a theoretical content to the images of violent games, and for that reason they are close to a Situationist film like *Can Dialectics Break Bricks?*This movie, produced in 1973 by the French director René Viénet used a martial arts film—The Crush by Doo Kwang Gee—overdubbed with French revolutionary philosophic ideas. It was a radical critic of cultural hegemony designed to entertain and amuse, while demonstrating a number of artistic and political points.

With machinima, the images come from a video or a computer game but are then transformed into short films. Though the Situationists had the idea of using a movie as the most efficient détournement because of cinema's capacity to reach a popular audience, new kinds of audience encounters are now possible with the extensive games audiences. Machinima began in the gamers' community, but it has expanded very quickly. The audience tends to be quite young and movies are often downloaded millions of times on websites such as Machinima.com or The Movies, You Tube and Dailymotion also distribute these films widely. Among the varying kinds of machinima, some like TSL or others mentioned earlier offer an alternative vision of the world. And it is voice, in particular, which gives the deturned edge to these machinima.

As Roland Barthes wrote, the grain of the voice is an "erotic mix between the language and the tone." [6] In the human voice, the body travels from thought to its expression as language. Joseph Beuys once said during a conference given at the Dokumenta VI in 1977, that voice is a sculpture of the thought. [7] It is the information sculpted by the air through the organs. It transforms the immateriality of thinking into materiality by bringing the body inside the sound.

Voice reflects the idea of alterity and the relationship to another person. Voice is the simultaneous presence and absence of human corporeality. Voice is the content and the meaning in language but also the sound of a person and their body through time and space. With recorded voices in cinema, the grain of the voice takes another dimension: it is the "anonymous body of the actor in my ear." [8] As we move into the digital domain, this materiality of voice is essential to machinimas and their virtual game spaces. Besides the narrative in the dialog writing, the voice over represents a huge part of machinimas. Paul Marino talks about it as the "humanness that is otherwise missing from the digital package":

The voices of actors in machinimas "animate" the virtual spaces. They give life and personality to digital puppets, which were not a priori conceived by the game developers to have dialogs with each other. And as machinima directors cannot play with the facial expressions of their digital puppets in the way cinema does with live actors, or in traditional animation, they need to work very precisely on the voice-over.

To illustrate the importance of this voice-over matter, the machinima Bill & John tells the story of two advanced pilots inside a military flight simulation game: Lock On: Modern Air Combat. The directors took the opposite of the cold atmosphere of the game by the use of hilarious and absurd dialogs between the two pilots. The first scene begins with two military flight aircrafts on the ground, and one of the pilots amazed by the beauty of a flight aircraft yells:

"What-the-fuck, mo-ther fu-cker, that's fucking beautiful! Hey John! See, even after all these years, I'll never get tired of it . . . That's when I think to myself . . ." "Bill! You piss me off! You've been pissing me off for ages! But now you're really pissing off! You yell, you yell! It pisses me off hearing you yelling from the minute you get up . . . and you, you, and you yell, You never shut up. ""Well, You're in a great mood this morning . . . we're gonna have a great day. ""But do you realize that because of you . . . we are stuck in these shit wrecks!"

As they try to take off, the more foolish of the two pilots has forgotten how to begin and launches a missile instead: "All right, now, let me see, slowly give it some gas . . . and ease up on the brakes. Wrong switch. So, brake, switch . . . and releasing brakes. Wrong switch again. Oh right . . . there it is . . . and let up on the brakes."

The authors played with the rhythm of each scene during the editing:

The silences in the sound track were more than essential to give life to characters we do not see on the screen but from which we guess the gesture. . . . The succession of uncontrolled events provoked by the two protagonists creates a distance effect which puts the spectator in the skin of an accessory witness. [9]

In a game, the imagination of players is driven by the actions of the play, scripts, and maps. In machinimas, our imagination can fill the empty spaces between the dialogs and, as with books, we can imagine what is happening inbetween. As in traditional cinema, we find elliptic narration in machinimas, which allows us to take an active part in the story and to go back to a more personal perception of what the images mean.

Bill & John reminds us of Beckett's absurd theater, where clownish characters hold discussions in strange spaces—cold and mostly empty. This confrontation between humorously edged and warmly human dialogs and "cold" digital spaces is also prominent in the voice performances of the famous machinima series Red vs Blue. Shot in the futuristic game Halo 2, it tells the story of the battle between Red and Blue. These two characters seem to be lost in the game space, talking endlessly about the meaning of life and death. The dialogs' script and its deep sense of humor is what made the series enormously successful and allowed machinima in general to achieve significant success.

Interviewed about the link between the dialogs written for the serial Red vs Blue and the Theater of the absurd, Burnie Burns agrees: "Yes, especially the early episodes. We wanted to know what would happen to videogame characters after the games were turned off. It's funny to think that these guys would have a life where they wait for someone to come along and play their game." [10]

This shift in meaning isn't only used for comic effect in machinima. To create a fictional effect and an artistic work by a détournement of game images, Eddo Stern and Jessica Hutchins worked differently with voice. *Landlord Vigilante* is a monologue and the tone of the voice is monotonous. Based on a true story that happened to the authors with their ex-landlady who tried to dupe them, as mentioned previously, we follow the thoughts of a woman cab driver. The authors chose third-person narration because it"gives the whole (first-person) monologue a disembodied, artificial feeling. Maybe these qualities allow it to be perceived as a subjective work of fiction, instead of blatant slander!"
[11] Watching *Landlord Vigilante* is like traveling constantly from the text of the voice to the images, as if sometimes they couldn't be connected to each other, operating on different levels of perception.

This unnatural voice deals with the complexity of human identity and the boundaries between the fake and reality. We are lost, because we'd like to believe in 3D images, but we know that it's a fiction, and the monologue reinforces this feeling, because it doesn't seem to take any side. It doesn't entirely reveal the identity of this woman.

Even though there are some machinimas that are not dubbed with voice for technical or linguistic reasons, I have tried to demonstrate that voice in general constitutes the major game modification in machinima. Following the hacking tradition, voice gives another dimension to the use of games, transforming them into a form of expression. Voices in machinima provoke a shift in meaning similar to the way that Pascal Bonitzer discusses in relation to voice-over in cinema—they reopen the doors of our imagination as we watch preexisting digital images.

"To bring the focus to the off screen space, as another screen space," writes Pascal Bonitzer, "is to displace the focus from the gaze onto the voice, to release the voice from the dictates of the reality of the image." [12] Voices move our mind to another range of perception, diverting us to immerse totally in digital images and allowing us to keep a critical distance while getting closer to characters.

References and Notes:

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PIXEL PERFECT: PERFORMATIVITY AND SELF-PORTRAITURE

Erin Ashenhurst

In the context of social media, a 'profile picture' calls for the production of a thumbnail-sized self. The individual may act as both subject and photographer while building and tending to an online identity in moments of seclusion. Exploring self-portraiture and visual narrative, this research offers a study of the web-based project *At Arm's Length,* and works to provoke discussion around performativity and the construction of identity.

Fig 1. Wide-shot in apartment from At Arm's Length, Erin Ashenhurst, 2010

Fig 2. Wide-shot on beach from At Arm's Length, Erin Ashenhurst, 2010

Fig 3. Portrait on beach from At Arm's Length, Erin Ashenhurst, 2010

INTRODUCTION

The photograph is the advent of myself as other, a cunning dissociation of consciousness from identity.
– Roland Barthes [1]

On busy city sidewalks, an emerging hazard may be observed – the digitally engaged pedestrian. Easily identified by their down-turned gazes, they are those for whom the act of walking has been compromised in order to accommodate their absorption in the screens of Smartphones. Leisurely-paced steps act to lessen the likelihood of blind collision while they read emails, compose texts, select music, or post images. The increasing number of mobile devices outfitted with camera technology suggests that more and more individuals hold the potential to create and share photographs almost spontaneously. Digital images are used as evidence to construct identity and illustrate personal histories on blogs, photo-sharing and social networking sites. While these images are framed as representations of lived experience, they are fraught with fabricated cues. Vamping for the lens, or gazing off towards fictional distractions to suggest 'candid' shots, subjects use performativity to compose their preferred visual narratives. In the operating room of programs such as Adobe Photoshop, remaining flaws may be smoothed, filtered, nipped and tucked.

Offering irreverent commentary on the practice of self-portraiture, *At Arm's Length* begins with a set of images resembling those commonly used in online profiles. This set is matched by a series of wide-shots exposing the contrasting environments existing beyond the boundaries of the subject's framing.

PERFORMATIVITY AND THE IMAGE

Although the process of staging a photograph is far from that of Robert Cornelius' first daguerreotype self-portrait in 1839, there remains a moment of arrested movement in which the subject, aware of the camera, surrenders to a pose. During the course of creating this pose, the subject anticipates how he or she may appear in the future photograph. Of his role as the subject of a photograph, Roland Bathes wrote, "once I feel myself observed by the lens, everything changes, I constitute myself in the process of 'posing', and I instantly make another body for myself, I transform myself in advance into an image." [2] This transformation, the styling of the body into a deliberate, static self, can be examined as a performance. In his book *The Presentation of Self in Everyday Life* (1952), sociologist Erving Goffman examined human interaction and how subjects use performance to construct social identities. Exploiting the language of dramaturgy, Goffman describes the subject as a social actor using various contexts as theatrical stages. [3] Assisted by props and costumes, an actor may learn to navigate a breadth of social environments by recognizing the codes of behaviour expected in each, and adjusting his or her performance to fit.

In order to communicate qualities and character in the static performance of a photograph, subjects must depend solely on visual cues devised from cultural archetypes and social norms. Visual anthropologist Richard Chalfen proposed that when photographed, "the individual can choose and select among many codes, each of which may have its own standard of 'correctness.'" [4] Framing gender as a matter of performativity, Judith Butler noted that constructs such as femininity "cannot be understood outside a process of iterability, a regularized and constrained repetition of norms." [5] In this sense, the performance of the subject is not purely voluntary. In order to be understood, behavior is constrained by a specific set of conventions that are built through collective repetition. Each culture can be said to provide "a tool kit of habits, skills, styles, perspectives, norms, roles, and values out of which each individual can construct a potentially unique strategy of action." [6] It is with these tools that a subject builds an identity and a visual narrative as the subject of an image. In her photographic series, *Untitled Film Stills* (1977–1980), artist Cindy Sherman manipulated the tools of cinematic culture to fashion herself into archetypal female characters surrounded by narrative clues. In artist JK Keller's experiments in self-documentary, props, costuming, and grooming, are treated as playful trappings. Over the course of 12 years, Keller took headshots of himself posed with an expression reminiscent of those required for government-issued identification. Edited in rapid succession, the portraits taken from 1998–2006 make up the video project *Living My Life Faster*. In the space of two minutes, the video shows a quick moment of each image – creating an effect that holds Keller's face as a constant while tendrils of hair, beards, moustaches, glasses and clothing thrash in a frenzy across him. Behind the variations in styling, Keller presents a starkly coherent self, face broadening slightly as it ages by the second.

In the research for the project *At Arm's Length*, I considered a selection of profile pictures posted on Facebook and noted consistencies in the compositions of the portraits. Some subjects made eye contact with mischievous grins, or glanced to one side of the camera, chins tilted down coyly. The observable similarities of expression used for self-portraits shared online point to this repetitive use of cultural norms to inform a subject's performance and aid in his or her transformation into a perfected, readable document. As Chalfen wrote, "the fact that people sharing the same culture will independently agree so well on their patterned choices of appropriate imagery and associated conventions makes many collections of personal pictures 'look' so much alike." [7]

Although camera phones have extended the role of photography in creating and maintaining social relationships, researcher Lisa Gye found, "the typical photo taken with a phone is often reinforcing the user's identity more than their ties to a group." [8] The pursuit of identity as described by anthropologist Marcel Mauss is based on the "universal desire to master consciousness and project a social presence."

[9] Sites such as Facebook have developed systems with which individuals can articulate their social identities through text and images, while the designs of many camera phones favour subjects ranging from 2–5 feet in distance from the lens. This facilitates the production of self-portraits taken by holding the camera at arm's length.

AT ARM'S LENGTH

Presented in a web browser, *At Arm's Length* begins with three close-cropped headshots arranged in horizontal alignment against a white background. The minimalist design can be seen as a nod to the supposed 'neutrality' of the white-walled gallery or the interface of many photo-sharing sites such as Flickr. com. The series of images feature the same woman. In each, she appears distinctly styled in a new setting. Without interaction, the brightness of the images gently dwindles. If a cursor moves over an image, it changes to a quick frame featuring the animated shutter of iPhone's camera application before revealing the portrait at full opacity. Lines of text commenting on the image appear in sequence below. A click of the mouse transitions the frame to a wide shot revealing the environment surrounding the woman at the moment the selected portrait was taken. In these wide shots, the subject can be seen acting as her own photographer, camera phone obstructing her face. With the woman setting up for the portrait, the viewer is privy to the cues of the setting existing beyond the portrait's framing.

In the first portrait, the subject is sporting dark sunglasses, which obscure her eyes. A necklace and the straps of a halter-top are all that is seen of her attire. In the background, the stretch of sand and sliver of water suggest a beach under a bright sky. Mousing over the image reveals several lines of text below including the words, "OMG, you live in such a beautiful city! I would kill for a decent beach day!" The style of writing mimics comments made by users of online photo-sharing sites. Positioned below the image, it acts as captioning and plants suggestion.

Transitioning to the wide-shot, the subject can be viewed posing in a small section of beach. The landscape is unpopulated by other visitors with the exception of two figures sitting on a log far in the background. A large portion of sky is grey and cloudy while thin, bare trees appear in the foreground. The subject is seated on a log with her fall coat pushed off her shoulders and shirt pulled down to accommodate only bikini straps in the frame of the portrait. On a stump beside her rests an umbrella along with her assorted belongings. The culmination of cues points away from the portrait's sunny scheme towards a moment of fantasy created by an individual in the solitary hours of an autumn day.

Clicking on the wide shot of the beach brings the viewer back to the series of portraits. In the second image, the woman smiles radiantly into the camera. With a bright feather in her hair, the straps of a red satin dress frame the necklaces adorning her collarbone. Resting the mouse over the image, text materializing below comments "Holy hot dress! Looks like I missed another crazy night…"

The wide shot reveals the woman taking her own picture while seated in a room. The room is yellow with recessed archways framing the wall above a marble floor. The subject sits cross-legged in a party dress. Around the corner, another woman in a red coat can be seen walking by a wall of elevators. The space appears to be a lobby. The viewer may speculate that the two women are connected. Perhaps the subject is waiting for a friend and taking pictures to pass time in the sterile surroundings. Or perhaps the

red-coated woman is a stranger about to come around the corner and trigger momentary embarrassment with a glance towards the vamping photographer. The subject may be on the cusp of a glamourous social event, but in the flash of her portrait, she is alone.

The third portrait features the woman, hair sleek, looking intently into the camera. The subject's wide eyes and the subtle downward tilt of her chin verge on seductive. Hovering the mouse over the image, the text, "Hey sexy, we still on for Tuesday?" appears among the comments below. The background is flat beige with an edge of wooden furniture peeking out on one side. With only the neck of a white sweater featured in the portrait, the viewer may be surprised by the wide shot's colorful display: the subject stands to one side of a cluttered apartment, framing her picture so that an overhead light is hitting half of her face. While her hair appears to have been freshly groomed, the portion of her body cropped out of the portrait is dressed in a casual sweatshirt and red flannel pajama pants patterned comically with moose silhouettes. The wide shot reads as a private instance, where subject and setting are unprepared for public presentation beyond the tight framing of her camera phone.

Online, the activity of people watching translates into trolling through profiles. The portraits of A*t Arm's Length* are revealed as charades. In the wide shots, the woman's environment is dressed with ample signs while the viewer is positioned as a voyeur, a passer-by. In the act of creating the portrait, the woman's performance is for her own camera. The viewer watches as the subject constructs herself as an object, seemingly oblivious to the viewer's omnipotent gaze.

The images can be seen to culminate as a character study of an individual constructing a socially engaging self through photography, while her daily life consists of time spent alone. Taken as a general comment, *At Arm's Length* points to questions around the disconnection between the lived experiences of subjects and the constructed self they choose to project in their online identities. Photographic activity becomes about imitation, trickery, and assembling a tableau of ciphers.

LITTLE NARRATIVES

In the mid-1990's, Mark Poster described the World Wide Web as a host for "little narratives". Poster wrote, "the internet seems to encourage the proliferation of stories, local narratives without any totalizing gestures and it places senders and addressees in symmetrical relations." [10] Over a decade later, social media has made the development and maintenance of personal narratives a daily activity for many. While consumer culture emphasizes the importance of the individual through services and products geared towards self-advancement, the Internet provides the ability for a person to act as a brand. The beliefs and values of the brand are enforced through the constant generation of words and images. Researcher of visual culture Liz Wells, writes of the modernization of society since the Industrial Revolution, commenting, "The twentieth-century consumer-led economy has shifted these new individuals away from a culture based on work and self-discipline to one based on libidinous gratification which encourages us all to identify our pleasures in order to develop and refine them." [11] Online profiles ask users to list their 'likes' and 'interests', integrating these factors into the concept of a user's identity.

Much like a traditional marketing campaign or the building of a cult, a poorly managed Twitter feed may result in decreased 'followers'. Sites such as Facebook or MySpace act as contemporary promenades with conventions mirroring those of late eighteenth century Parisian bourgeoisie. Historian Richard Sennett described the lively city centres of Europe as stages upon which individuals continuously practised

being "somebody." [12] In contemporary society, the offering of virtual gifts, acknowledgements or salutations written on each other's pages, allow individuals to publicly enforce social connections within the larger group. Online 'friendship' is obtained through a standardized click-through process that may simply result in the viewing of another's page (comparable to 'people watching'), rather than any written exchange.

In *At Arm's Length*, the performativity involved in the process of creating self-portraits is inspected through irreverent fabrications. The narrative of a subject's headshot is seen in a new light when matched with a wide-shot revealing the moment of capture. However, one may question if any image can really be measured as 'truthful'? In an interview American photographer Richard Avedon has commented, "a portrait is not a likeness. The moment an emotion or fact is transformed into a photograph it is no longer a fact but an opinion. There is no such thing as inaccuracy in a photograph. All photographs are accurate. None of them is truth." [13] In *At Arm's Length*, narrative folds in on itself: an actress plays a character, performing as a subject, parading as her idealized self. In the performances of social actors, Goffman warned, "A single note out of key can disrupt the tone of an entire performance." [14]

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REENGINEERING OF THE SENSORIUM AND IMAGINARY LANDSCAPE: MIXED REALITY

Leci Augusto

The landscape is understood as the space of experience dominated by the embodiment of subjects and objects. Thus, the space is part of the body. Body and space are blended, mixed, impregnated because the spatial structure of landscape belongs to the description of our surroundings. Geotagging transforms the territorial configuration of the landscape by creating an abstract projection of connection nodes in a global cartography.

Fig 1. 14 BIS, Funarte Square, Brasilia, 2010

Fig 2. 14 BIS, Latin America Memorial, Sao Paulo, 2010

Art and Landscape: Mixed Reality

The landscape as the mediator between different levels of perception and action is also a testimony of the civilizing process that is taking place today in the Occidental Arts. The art has not always resulted exclusively of visual processes, it has also been conceptual throughout its history, reveling the typical phases of development in which it will come to pass in time. The idealization of natural elements resulted in the creation of gardens, as appropriate places for the admiration of nature and it has also resurfaced the Garden of Eden's myth.

Centuries after, the painting presents great panoramas, totalizing visions, geographies of places and the human attitude against the ground space, the construction of a miniature world in scales perceptible with the body in the ground, as in the landscape paintings of Pieter Brueghel (1525 -1569).

In Europe of the sixteenth and seventeenth centuries, both artists and cartographers used the same vocabulary to describe the geographical representations. Jean Marc Besse [6] states that 'painters and geographers share the same cognitive attitude and visual acuity,' they depart from the empirical experience of understanding the world's signs, driven by the same interests: the rock colors, the movement of river water and the wind. The cartographer and the painter share not only the perception of the earth's surface, but mainly its subject – the landscape. It is important to emphasize the relevance of Leonard da Vinci, who, during his several journeys, studied the geological formations of the areas he visited. This work is expressed in the local maps and feature richness of detail considered in greater degree to cartographers. The artist painted the rivers, settlements and valleys in such a realistic way that we have the impression of looking at a landscape from an airplane.'

In the late 50's – another representative historic moment – artists are once more interested in the landscape with the purpose of relating it to artistic productions. Land Art offers a way of relating art to the countryside in the context of *Earth Art*, and the 'protagonist of the aesthetic experience is the environment, space in which individuals interact, while *the other*, in the broadest sense, in which the *self* is confronted.' [3] It also means a rupture with the traditional position of the viewer, who in *land art* no longer gazes upon the work of art, but inhabits it, expanding the notion of a conceived, perceived space. Instead of mapping roads and landscapes, the art intends to record processes of translating contemplation into human action next to the landscapes that it constantly modifies.

In this century the work with technologies, the 3D world of computers has the ability to take the viewer back to the scene. They allow the creation as action, the works are interventions of embedded data in the urban and cultural spheres, creating geographies of emergency and transience, updated in time of the communication context. Louise Poissant, [8] regarding the interactivity in the Arts, states 'that it is a response to the feeling that the audience has to be aware of: they want to move the representation registration to that of the action.' In fact, interaction prevents the user to maintain the distance, the intellectual distance, the criticism, compared to the *trompe-l'oeil* of the view paintings, in which three-dimensional perspective functioned as a visual recovery of a tactile experience.

Interactivity art has also demystified the role of the artist as a creative author, giving him/her the function of a context designer, the one who prepares the ground to the reception. The work presents itself as a field of co-creation in which users interact with the device and create a renewed aesthetic experience.

The work *14 Bis* is an intervention in Augmented Reality (AR) done collaboratively, in honor of the 50th anniversary of Brasília (Brazil). It had as a poetic reference the song *Tropicália*, by Caetano Veloso, which deals with the construction of the new capital of Brazil, inaugurated in 1960 and idealized by the architects Oscar Niemeyer e Lúcio Costa. Recreating Santos Dumont's (1873 - 1932) invention as a synthetic image, the project was idealized with the intention of honoring the Brazilian cultural thought.

So that the work exists in Mixed and Augmented Reality, it was necessary to measure the point of appearance, by using a GPS (Global Positioning System) and inserting the geodesic coordinates in the *Layar* software, a free browser for augmented reality, compatible to the android operating system used in cellphones and tablets.

The Mixed Reality (MR) is the hybridization that connects us to the physical and digital worlds, the 'real' and the 'virtual.' Domingues [4] states that 'with today's locative, ubiquitous and mobile technologies, men realize their fictional desires of living in parallel worlds, in paracosmos that mix physical materiality and data immateriality, placing them in what we call cybrid realities to cybrid existence.

In loco, this cybridization is reflected in the level of the sensory perception of a combination of information from the physical environment, from the user and the data generated by a computer system and from the mobile and locative interface. Thus, we have the anthropomorphic proposal of Peter Anders, [1] based on the human body, in the experience, between space and information. Domingues [4] states that the subject *cybridizes* himself/herself in the subject-object-environment flow.

The boundaries of our body

Human sensory changes in the speed of the development of technological devices. In nineteenth century industrial capitalism, the machines actually assume the leadership of the economy. Transforming cities, taking farmers from their lands and turning them into workers, change customs and the relationship with the world. Charles Chaplin criticized this poetically in the film *Modern Times*, whose protagonist works continuously on a treadmill, making himself an integral part of the machine, his consciousness remains attached to the mechanical movements. With the advent of high-tech machines, computers, robotics and telematics, in post-industrial capitalism, machines get an amazing power and influence over subjectivity. This happens because these new technologies, besides their ubiquitous nature, possess a high degree of sophistication that promotes, with the wishes production system, characteristic of this model of capitalism, a high degree of interaction and relationships. That is, machines are not only literally negotiating human relationships through a variety of portable devices such as telephones, television, computers, and the Internet, but also promoting the emergence of a direct human-machine relationship in the re-engineering of senses and of life.

We model our sensuousness in accordance with the mechanic production of subjectivity that behaves like mechanic gears on the interactive interfaces. Roy Ascott [2] states that the interaction presupposes a reciprocal effect, so that one thing affects the other, adds or transforms, and if we are dealing with a work of art, a 'transformation of consciousness' that emerges from the experience, in which the opened meaning models new relations to reality, new ways of feeling in a context interactions with artistic systems. In mixed reality worlds the interaction between art objects and protagonists allows a multisensory that carries the redefinition of the human.

In cyberculture, artistic creation with new interactive media shows a rejection of old art categories, in its place, new fields that pervade the human-computer interaction (HIC), imposing 'shareable affections' within a set of sensory experiences that coordinate signals and that trigger the body's perception and proprioception. Diana Domingues in the article- *Ciberadão e a magia das cibercoisas pervasivas-*, speaks of a 'biology of interactivity' in which the technological apparatus adapted to the biological alters profoundly the sensory synthesis, because they allow symbiotic processes that expand to virtual worlds the body's and environment's natural signals in regenerative changes. The authoralludes to the book *Symbiotic Man: Perspectives for the Third Millennium*, by Joël de Rosnay, that describes the evolution of the interfaces between humans and machines and speaks of numerous functions that are being studied from biological signals, access roads funding and decoding of information.

Interacting on the landscape where the plane *14 Bis* is located, the body falls into places, searches territories, compares landscapes and explores relationships. In this sense, the landscape is contaminated by this being-in-the-world, ontological condition of coexistence. And so, Geography, as the science of concrete things, allows itself to be invaded by external processes, categories that transcend disciplinary boundaries and the landscape defines itself in categories of natural and artificial objects that make up space and time for the present and past relations of human work, confirming the assumptions of Milton Santos [9] that 'nothing is fixed nor motionless in the landscape'. Therefore, the human experience of occupying the existential space creates natural and artificial streams, vital directions and of interactions with communication networks, demonstrating the existence of the symbiotic relationship between human - landscape - communication network, and in 'the frequency of shifts reveals in the human, a body with a materially sensitive certitude.'

Merleau - Ponty's [7] Phenomenology of Perception, aiming to reach the things themselves, describes the phenomena as they are experienced by consciousness, understands that subject and object are interrelated in the process of dialectical knowledge. He assumes that world knowledge, even in scientific terms, is given from the subject's own experience in the world also as is a body in the world. The body is the subject of perception, seen as the source of the senses, as significance of the relationship of the subject in the world, and the subject seen in its totality, in its structure of relations to thingsaround it. The author draws attention to what is perceived by man, the phenomenon, occurs in a field which he belongs. The emphasis is to demonstrate that the relationship in the world is physique and always significant.

From this perspective, consciousness is not separated from lived experience, it acquires a meaning and is defined as perception, so that there is no separation and opposition between the rational and sensitive data in the act of apprehension of things, and our experiences are the source of all knowledge acquired in the world and the world comes into existence only when we assign it a meaning. Thus, consciousness is continually tuning itself to the world.

Derrick de Kerkhove [5] speaks of how media edits the environment and therefore the user, our sensorium is being edited by the daily media, by electronic devices: cellphones, computers, tablets affect our strategies of information processing. The author also speaks of a 'biotechnology,' this experience can be observed with the use of sensors and devices attached to the body as a means of projecting emotions, media that act as interfaces between language, body and world. In the book culture the consciousness subjectivity performs a psychosensorial synthesis within the body. With the screen, there is a reversal of the consciousness to the outside, it is projected on the screen, we enter in the information.

Interaction in the mixed landscape of the *14 Bis* reveals the state of presence-absence as a result of computer vision of cellphone cameras and of post-extrusion biological human vision, the act of looking is shared between the eye of the satellite in the sky and the human eye projected on the screen of the phone, neuropsychophysiology expanding human perception that characterizes the biocybrid condition. Our cognitive and motion models are expanded in the landscape, geo-referenced by a Geographic Information System (GIS) and by computer codes information. And the body attached to the mobile device translates the reengineering of sensuousness.

The living space in this context is presented as historical and mixed reality in which man is a modifying agent. And time updates the immateriality of the work process which, when completed, returns to the void in its timelessness. Because the 'real' time, in *14 Bis* is just the point in time in which it updates the system that is composed by the user's input. In this sense, the concept of time is linked to interactivity, the presence of the object *hic et nunc* before the perceiving subject.

In the art's field, the landscape intervention in mixed and augmented reality represents acultural transgression that moves from the excessive, the unknown, the hidden, to clarity, to order, the revealed in the becoming of the cybrid landscape, the one that results from the sum of natural elements with the cyber data, which the ordered set of categories creates a new meaning to the everyday experience in the space in the reengineering of life.

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HYPERPRESENT AVATARS

Elif Ayiter, Selim Balcisoy & Murat Germen

This paper will discuss two student projects, which were developed during a hybrid course between art/design and computer sciences at Sabancı University; both of which involve the creation of two avatars whose visual attributes are determined by data feeds from 'Real Life' sources by following up from Biocca's concept of the Cyborg's Dilemma, we will describe the creative and technological processes which went into the materialization of these two avatars.

Fig 1. The Facebook Avatar, virtual photograph by Elif Ayiter.

Fig 2. The Miro Avatar, virtual photograph by Elif Ayiter

Hyperpresence

If the body is the primary communication hardware, then what is its relationship to a medium which is made up of steel, plastic, and silicon given that instead of pulsing blood, pulses of electrons and light animate the computational hardware?

Marshall McLuhan long ago pointed out that communication interfaces attach themselves to the body. In the words of McLuhan, "Media are extensions of the senses," in that the view of the world associated with print is being replaced by a world view associated with electronic media that stresses feelings and emotions. [1] This is a different vision than Licklider's [2] for whom "mancomputer symbiosis" is a subclass of "man-machine systems" in which the human brain is coupled to its machine counterpart. This coupling of one brain to another made sense in the early days of computing when the communication between human and machine was still one of conversation where instead of a mind communication through a body to another body, we have only two disembodied conversations, a sterile coupling of abstract symbol generators. At the close of 20th century however, the development of advanced computer interfaces is characterized by progressive embodiment. Progressive embodiment is the steadily advancing immersion and coupling of the body to an advanced communication interface.

Intelligence augmentation applies itself to the theory that communication technologies can be cognitive prostheses amplifying or assisting cognitive processes or by developing cognitive skills. This leads to the question, of what it means to be virtually embodied, particularly if this state also contributes to intelligence augmentation. In other words, what arc the psychological effects of goals of embodiment in virtual environments? What are the psychological effects of embodiment in virtual environments? Most commonly these are expressed as various forms of 'presence,' which is described as the perceptual sensation of being in a place other than where you physically are, or a sense of transportation to a 'place' created by media. [3] It is the illusion of 'being there' in a virtual space.

Compounding the dual concepts of (virtual) environment and (virtual) agent are Giuseppe Mantovani and Giuseppe Riva's findings which point at the social nature of 'presence,' challenging the notion that experiencing a simulated environment is merely a matter of perceiving its objective features: Presence (real or simulated) means that individuals perceive themselves, objects, as well as others not only as situated in an external space but as immersed in a socio-cultural web connected through interactions between objects and people. [4]

This social aspect of 'presence' is further picked up by Frank Biocca, who seems to question the issue both from an externalized as well as an internalized viewpoint, bringing to the fore the notion of self-presence:

"When the user's body enters the virtual world and inhabits an avatar, a number of changes in self-presence are possible. Self-presence is defined as the effect of virtual environment on the perception of one's body (i.e., body schema or body image), physiological states, emotional states, perceived traits, and identity. To use a phrase, self-presence refers the effect of the sensory environment on mental models of the self, especially when that model of the self is foregrounded or made salient. As with other forms of presence, designers share the assumption that increases in self-presence are correlated with higher levels of cognitive performance, and, possibly, emotional development. In the words of Socrates, the goal to 'know thyself' is a worthy journey. It may be the only journey." [5]

And it is at this juncture that Biocca formulates a vision, a hypothesis, a wish:

"… it may be possible to develop a medium in which one feels greater "access to the intelligence, intentions, and sensory impressions of another" than is possible in the most intimate face-to-face communication. One aspect of what might be called hyperpresence" (Biocca, 1997) may be possible in the social presence domain as well. Of course, it is hard for us now to imagine a medium that can create greater intimacy than face-to-face communication. But this misses the point of social presence and the very artifice of the body itself. In face-to-face communication the body is used to communicate one's sensory experiences, observation, and inner states to another. The body is the medium for this transfer. Communication codes such as spoken language and non-verbal codes such as facial expression, posture, touch, and motion are used. But, for example, inner states might be communicated more vividly through the use of sensors that can amplify subtle physiological or nonverbal cues. These can augment the intentional and unintentional cues used in interpersonal communication to assess the emotional states and intentions of others." [5]

Data Avatars

While Biocca's deliberations seem to focus on sensor based technologies, there may well be other means of conveying data, which is likely to bring about the communication of inner states, emotional responses and non-verbal clues, including an immediate manifestation of interests and inclinations.

Two avatars which may fulfill such demands, through non-sensor based technologies, were created by two separate groups of students, during different semesters, as course projects for a hybrid art/design and computation course entitled CS450, co-instructed between two artists and one computer scientists at Sabanci University. [6]

Both projects deliberately go against the grain of the prevalent mindsets of metaverse residents which, more often than not, involve a wish for concealment of real life attributes: A study conducted by Brosnan, [7] using 126 participants recruited from Second Life, shows that while the physical persona may be predictive to a certain extent in virtual embodiment, nonetheless in many cases significant differences between physical and virtual appearances and identities is to be expected.

This typical behaviorism is being challenged by bringing data from the physical realm into the metaverse: Rather than create avatars which are vessels of concealment, revelations regarding the physical state of the wearer are being sought. Thus, what is aimed for are wearable virtual technologies which allow their users to be represented in a manner in which both their real life and virtual life traits can be visualized simultaneously, by using data imported from the physical to the virtual realm.

The Miró Avatar

The project originates from the desire to integrate an emotional presence into the World Wide Web. In real life, emotions are not communicated consciously; hence the idea of using Electroencephalography (EEG) to collect a person's emotions. However, since EEG data cannot have reliable or interpretable meaning concerning any emotional state, one may only speak of collecting the 'idea' of one's emotions. EEG is used to accumulate an individual's brain signals; signals that occur each moment, unconsciously,

in response to the interaction with the immediate environment. Since it was seen to be desirable to interpret these signals as the idea of one's emotional presence in virtual reality, the three dimensional metaverse of Second Life became a natural platform to apply such a metaphor of reality.

Figure 1: The Miro Avatar, Işıl Demir, Can Şen, Yiğit Yüksel, Second Life, 2008.

The collection of EEG data is done by an open source program, *BrainBay*, which outputs the biosignal as EDF files. These files are converted to ASCII text files with another open source program, *Polyman*. The content of these files are integers between -4000 and 4000. The ASCII files are uploaded to a website from which custom made scripts in Linden Scripting Language (LSL) read the files that contain the EEG data.

The avatar changes according to incoming brain wave. When the avatar is activated the script begins reading data from the server and a change in the shape of the avatar according to the incoming integer values is brought about. Thus the user's brain waves form a virtual manifestation that represents his/her virtual appearance which can also be considered as a metaphor for the representation of one's mind; since, figuratively, what is thus visualized are the person's 'thoughts.'

As far as the creative process is concerned, the visualization of one's emotional presence has been inspired by the idea of the four dimensional painting which Miró proposed in his later years. Thus, the avatar, composed of the various visual elements featured in Miró's paintings, continuously changes its shape and is redrawn, transcending the two and three dimensionality of painting and sculpture. As expected, this representation stands in contradiction to the prevalent tendencies of metaverse and MMORPG players who, will either create accurate physical reflections of themselves by making an avatar corresponding to their actual appearance or conversely by giving the avatar physical traits to which they aspire to in real life, but which are entirely out of their reach in the physical realm.

As a general rule three dimensional virtual spaces tend to be simulations of real spaces and as such they can solely be interacted with and experienced through mental processes which are the visual, auditory, and cognitive stimulations in the brain. So, instead of creating an avatar based on actual physical traits, the output of the project offers to create an alternative visual entity, usable as an avatar, derived from the fact that users cannot have a real physical presence in virtual spaces and the fact that their mental input is the only factor that creates the illusion of presence in a virtual space. Other users can 'see' them, not because they are physically there; but because there is an avatar that is shaped via their thoughts and desires with which one may interact in a manner similar to face-on-face physical interaction. Thus it may be concluded that, in terms of representation, virtual appearance may well rely on the output of unconscious thoughts, which are what is also mirrored in the surrealist approach of Miró's paintings.

The PersonaSkin Avatar

The second project involves an avatar who carries several body attachments which change color saturation values based upon a data feed which is generated from the arts and entertainment section of a facebook user's profile. Although the project was initially intended for real life usage, inspired by an RFID based real life event which tied facebook data to physical bodies, launched in Israel in 2010. However, despite this physical precedent it was decided to first discover the possibilities of identity matching

through accessories and outfits in a virtual world. Thus, a metaverse resident who also owns a facebook account can utilize these attachments to project his/her interests to the outside (virtual) world.

Figure 2: The Personaskin Avatar, Ayse Naz Pelen, Doğukan Malbora, Mustafa Cağrı Güven, Second Life, 2011.

According to Swann's self verification theory, during most social interactions there is a general desire for outside evaluations which verify self-views; in other words, a wish to get others to see us in the way in which we see ourselves. Given that Facebook users create their profiles themselves, very much along the lines in which they want to represent themselves, self verification theory has become an important part of this project. The aim is to achieve an understanding as to how persons may choose to introduce themselves in social networks, real and/or virtual, in order to attain states of self verification through identity matching: The avatar is expected to bring them to the notice of persons of similar facebook status, in terms of the frequency of interests presented in the arts and entertainments section thereof.

In terms of technology the data is being taken out of Facebook via php and a Facebook api. Subsequently the data is sent to a server and from there imported into Second Life, where LSL is being used to embed the data into the objects which represent the various categories either by heightened/lessened saturation values or alternatively through different levels of transparencies.

Questions such as age, sex and geographic location appear to become increasingly less relevant in a metaverse environment, where people seem to interact mainly through their ideologies and their creativity which are taken to be standalone attributes which exist independently of the 'real life' persona behind the keyboard. Under such circumstances an avatar of androgynous appearance, whose adornments are created out of his or her areas of interest seems to be particularly apt design strategy. Since some kind of legend is needed to decipher visualization of the incoming data the skin of the dramatic full avatar also serves as a legend. In cases where residents who wish to go for a more conservative appearance, a t-shirt and various colorized male and female skins are also included in the package.

Conclusion

In the brave new world of three dimensional, online virtual worlds yet another aspect of our grappling with embodiment is coming to the fore. This is in accord with the notion of cyborg as an interface which couples the physical body with technology [8], within which three dimensionally embodied avatars can also be characterized as a form of cyborg coupling. For Biocca this coupling underscores what he calls the cyborg's dilemma, which for him is nothing less than a Faustian tradeoff: "Choose technological embodiment to amplify the body, but beware that your body schema and identity may adapt to this cyborg form." [5]

Thus, a germane question would appear to be whether such attire would be powerful enough to provoke change and transformation not only on the virtual agent but extend its influence into the physical realm, bringing forth new modes of presence as well as self-presence not only in three dimensionally embodied online virtual worlds but also in the one which we inhabit with our flesh and blood selves.

Can avatar attire which reveals, rather than conceals a metaverse resident's persona aid in the process of self-presence and (virtual) self verification? Can personal change be brought about through technologies which not only reveal our pixelated flesh, but also reveal the biological and cultural fields which we

weave around us? Can social interactions be transformed and enhanced through virtual wearables which reveal our inner beings to those around us? Can novel states of creativity and play, of unique observations breeding new forms of authorship and understanding, come about through virtual candor?

While both avatars address these issues, when it comes to the Facebook avatar a further consideration is the integration of a heavily used 'real life' virtual social media platform (Facebook) into the metaverse as a socialization tool is a prolific area for further study.

This text has attempted to discuss some of the technological and artistic means through which such questions may be posited, through two projects employing such devices for the creation of two data driven avatar costumes.

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"LPDT2": LA PLISSURE DU TEXTE 2

Elif Ayiter, Max Moswitzer & Selavy Oh

This paper will discuss the artistic processes involved in the creation of the three dimensional, virtual art installation *La Plissure du Texte 2*, which is the sequel to Roy Ascott's ground breaking telematically networked art work *La Plissure du Texte*, created in 1983 and shown in Paris at the Musée de l'Art Moderne de la Ville de Paris during that same year. While the underlying concepts of the original art work, as well as its capability of regenerating itself as an entirely novel manifestation based upon the concepts of distributed authorship, textual mobility, emergent semiosis, multiple identity, and participatory poesis will be underlined, the main focus of the text will be upon the creative strategies as well as the technological means through which the architecture was brought about in the contemporary creative environment of the metaverse.
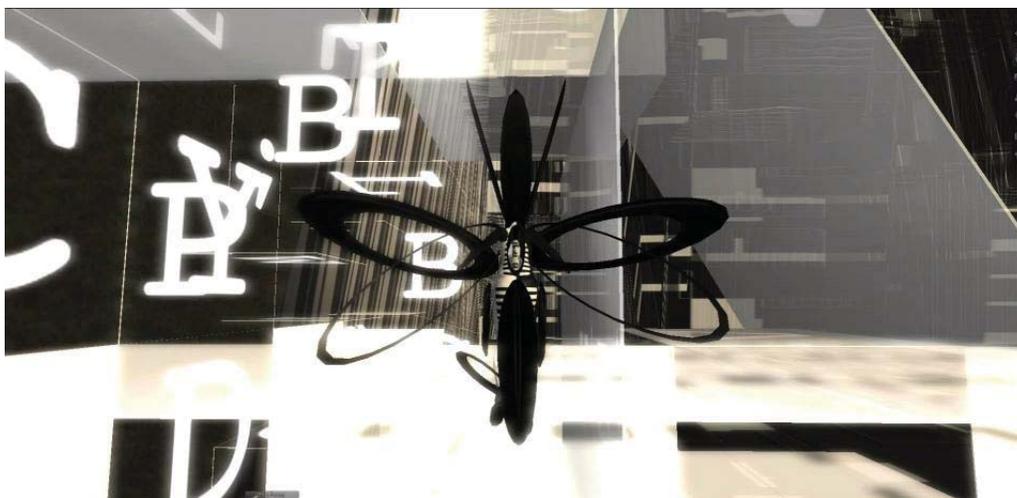
Fig 1.
LPDT2, Avatars playing in text ecology, Second Life, 2010. Architecture showing three dimensional textual deconstruction. Virtual photograph by Elif Ayiter.

Figure 2: LPDT2, The Letter Cube, Second Life, 2010.

Text Transformed

The title of the project, *La Plissure du Texte: A Planetary Fairy Tale*, alludes to Roland Barthes's book *Le Plaisir du Texte*, a famous discourse on authorship, semantic layering, and the creative role of the reader as the writer of the text. As was also the case in its first incarnation 'distributed authorship,' a term coined by Ascott [1] has been the primary subject of investigation of *La Plissure du Texte 2 (LPDT2)*.

LPDT2 consists of a geography/architecture constructed entirely out of dynamic input text, which is built in a three dimensional, online, participatory virtual world, i.e., a metaverse. While an earlier version of the work was created in the proprietary metaverse of Second Life, the current location is an independent artist's grid called the New Genres Grid which is a part of the newly emerging independent online hypergrid system.

Whereas in 1983 the text was pleated by a number of human storytellers positioned around the globe; in the three dimensionally embodied metaverse the storytellers show novel and unexpected attributes: An emergent textual architecture/geography, as well as a population of autonomous 'robot' avatars which dwell inside this bizarre, literary landscape are pleating the text by acting as communication nodes between the narrators of this new version of the tale: The primary persistent distributed authorship is now accomplished by many writers throughout the ages:

A text generator telling a non-linear, multi-faceted, often times poetic, story harvested from the online *Project Gutenberg* is now distributing its output amongst an architecture and its inhabitants, generating dialogues and iterations taking their trajectories from masterworks of classical literature. The pleating resembles musical sampling, the connection between the sentences fades, text becomes noise, from which the audience generates meaning.

While the virtual structure on the simulator provides the primary layer of pleating by visually mixing the different sources of text, yet another layer of textual input has been provided through which Real Life visitors can contact *LPDT2* by sending SMS messages as well establishing contact via Twitter. All pleated text - the generated, the contributed, and the stored - is simultaneously visible as a massive, ever evolving literary conglomeration. Consequently, the participatory pleating involves not only a meeting of individuals from the same timeframe but extends into a meeting between the past and the present, the bringing together of voices of many ages, then and now.

Although *LPDT2* has been planned as a virtual installation which will nonetheless be predominantly visited in a physical gallery space, the interaction with *LPDT2* is by no means limited to the physical realm alone: Since the project unfolds in a freely accessible, participatory online virtual world visitors throughout the globe can visit the installation with their avatars at any time of their choosing. Thus, an added layer of participation is provided through the three dimensionally embodied interactions of geographically dispersed individuals amongst each other, with the 'resident' robotic avatars, as well as the avatars of the artists themselves.

Creating a System: Generating the Text

Various means of gathering the input text, which would get the entire system operational, were discussed during the early phases of the project; however even from the onset a wish to create a system whereby the text would be generated rather than be contributed by discrete individuals was seen as an

exciting option. That this was a distinct possibly was evident from the existence of various online text generators and particularly the *Dada Engine.* [2]

Although text can be harvested from many different sources such as search engines and even text determined upon by the artists themselves, *Project Gutenberg* [3] proved to be an inspired choice, since not only does the vast repository provide a huge resource, but also the text thus harvested reinterprets Roy Ascott's key phrase of 'distributed authorship' by adding to it a dimension of temporality, if not indeed a transcendence of the here and now: The repository holds over 30,000 texts which have been authored by countless individuals throughout history. However, beyond this aspect of temporality, the startlingly poetic nature of the harvested text has proven itself to be an additional blessing which came out of utilizing *Project Gutenberg* as a means for achieving 'participatory poesis.'

The Dada engine has been reprogrammed to select a sentence (S1) as the starting point and to search for another sentence (S2) in text (T) which is randomly chosen from *Project Gutenberg*. This search procedure is done by first searching the text for the longest word of S1. Once the related word is found the next sentence in the text becomes S2, the assumption being that S2 has a logical relation to S1 through the shared longest word. These consecutive sentences are then sent to an HTML server from where they are mapped onto the architecture. However, the same text generator also sends aggregated text via email directly into the metaverse where it is used as the conversational material for the robotic avatars who are the indigenous residents of the architecture.

Although the text generator does provide the bulk of the text, additional input is provided through an AI system contributed by *i-DAT* from Plymouth University through which visitors to the physical gallery space can send SMS messages which are then displayed as an additional text layer by means of a screen based heads-up-display. Finally, visitors to the virtual installation can send Twitter messages by clicking on a message board which displays a short sentence obtained from the text generator.

The Aesthetics of *LPDT2*: Typographic Deconstruction

In both versions of the build, the architecture stretches itself over an entire metaverse simulator and reaches thousands of virtual meters into the sky, materializing on several platforms which show differences both in terms of visual appearance as well as content. Beyond this, the second incarnation of the project does not copy or mimic what was created in the first version, but strikes out into different visual investigations, searching for novel means of utilizing the generated text in a significantly more restrictive environment: While at a cursory glance the open metaverse operates in a similar fashion to the enclosed world of *Second Life*, nonetheless there are considerable differences when it comes to scripted objects and especially those involving virtual physics. This inevitably necessitated omissions of architectural components upon which the success of the *Second Life* structure had much relied. However, as is all too often the case, necessity gave rise to invention and the second version of *LPDT2* shows marked differences as well as improvements. As an example, the ground level of the second build puts us into a space of letter columns which form sentences from the harvested text. These columns surround a space filled with one hundred tables. Tablets of a single sentence each have then been placed upon these tables and through them the entire table hall bears testimony to the anonymously distributed authorship of the authors coming to us via *Project Gutenberg*, whilst at the same time reflecting upon the symbolic attributes of the 'tabletop,' a recurring conceptual element of Ascott's throughout his artistic career.

What remains consistent throughout both the first as well as the second formation of *LPDT2* is an adherence to the basic key phrases formulated by Ascott: Textual mobility, distributed authorship, emergent semiosis, multiple identity, and participatory poesis.

This brings about the installation in which the generated text is mapped onto architectural components such as floors, walls, as well as spaces which are more difficult to make sense of, such as a strangely configured cube upon which an ever changing text flow is mapped, or an ever changing labyrinth of sentences and letters of the alphabet. While the text can be read as full stand-alone sentences on the individual planes onto which it has been mapped, oftentimes the layering of the planes as well as the juxtaposition of typographic elements results in typographic deconstruction.

In the early 1990's the potential unleashed by desktop publishing and graphics software, allied with the methodological potential offered by deconstructionist philosophy, produced a style of graphic design and typography known sometimes as deconstructionist graphic design, and sometimes as 'The New Typography.' Although the later influx of deconstructionist philosophy cannot be denied, nonetheless deconstructivist typography has its origins in the early 20th Century. Thus, Marinetti writes in 1913:

"My revolution is aimed at the so-called typographical harmony of the page, which is contrary to the flux and reflux, the leaps and bursts of style that run through the page... With this typographical revolution and this multicolored variety in the letters I mean to redouble the expressive force of words." [4]

Modernist typography had engaged in such structural games, even before Marinetti. The printed word was liberated from printing's traditional constraints by Stéphane Mallarmé with *Un Coup de dés* in 1987, pioneering an expressive form of visual presentation for poetic language. One might have expected Marinetti to enthuse over *Un Coup de dés*, however he had other views:

"Moreover, I combat Mallarmé's static ideal with this typographical revolution that allows me to impress on the words (already free, dynamic, and torpedo-like) every velocity of the stars, the clouds, aeroplanes, trains, waves, explosives, globules of sea foam, molecules, and atoms." [4]

One of Marinetti's basic Futuristic tenets, the relegation of human experience to a continuum of sensations, underlay the techniques he proposed to use in achieving a Futurist literary expression. Marinetti described these procedures by declaring that "nouns will be scattered at random, infinitives with their greater elasticity will replace the pedantic indicative." [5]

Marinetti's attack on typographic convention, taking Mallarmé's work several stages further, had considerable prescience. His directness, vigor and visual augmentation of the power of words, the entire Futurist ethos of treating words as ammunition, helped formulate the solutions which the new needs of the 20th century demanded. [6]

Although separated in time though a period of 80 years, Ellen Lupton seems to pick up on certain aspects of Marinetti's outcry when she sees deconstruction in graphic design as a process – an act of questioning typographic practice. In Derrida's original theory deconstruction asks several questions which are crucial to typographic design as well: How does representation inhabit reality? How does the external appearance of a thing get inside its internal essence? How does the surface get under the skin?

A crucial opposition in Derrida's theory of deconstruction, and one which is also highly pertinent in terms of typographic design, is speech versus writing. The Western philosophical tradition has denigrated writing as an inferior, dead copy of the living, spoken word. When we speak, we draw on our inner consciousness, but when we write, our words are inert and abstract. The written word loses its connection to our inner selves. Language is set adrift.

Parallel questions for graphic design which preoccupy Lupton are how visual form may get inside the 'content' of writing and through what means has typography refused to be a passive, transparent vessel for written texts, instead developing as a system with its own structures and devices throughout the ages? A typographic work can be called 'deconstruction' when it exposes and transforms the established rules of writing, interrupting the sacred 'inside' of content with the profane 'outside' of form. [7]

Added should also be that, more often than not, deconstructionist typography exhibits a fascination with contemporary technology, in both its utopian and dystopian possibilities, as well as its glamour, adopting tropes and strategies of appropriation, juxtaposition, détournement, montage, collage, repetition, facilitated by or reflecting upon the extraordinary capabilities of digital technologies. It is thus of no surprise that the outcome often resonates upon a world of diffused and distributed communication mediated through networks of powerful information technologies. Even when the artifact itself is presented as a static printed page the reference to a cyberspace driven by hypertext is very often implicit, underscoring that "communication for the deconstructivist is no longer linear, but involves instead the provision of many entry and exit points for the increasingly over-stimulated reader." [8] Thus the page is no longer to be just 'read' but also to be 'perceived,' beyond the pure textual content, into all of its associative conjunctions: We are also meant to 'feel' rather than just to 'read' a page.

In *LPDT2* typographic deconstruction is mostly achieved through space; that is the Z axis of virtual three dimensionality. As one wanders through the conglomeration the text planes containing their individually coherent sentences will inevitably fall upon one another, creating overlapping layers and presenting the visitor with configurations which will juxtapose as well as superimpose different sizes and angles comprised of many different sentences, enabling readings which may present many entry and exit points. Since the input text not only manifests upon two dimensional planes but also materializes as three dimensional objects, another juxtaposition which deconstructs the typography is the perception of two dimensional and three dimensional text simultaneously, often one blending into the other, falling upon each other, creating waterfalls and cascades of words, which are indeed meant to be 'felt,' as well as be 'read.' The conversations held by the robotic avatars, as well as the SMS text sent from the physical realm add further layers to this deconstructive process. Furthermore, the entire typographic system is in an ever changing state of flux depending upon the motion and view point of the avatar who traverses it.

This visual deconstruction would appear to enhance the transmission of Ascott's fundamental key phrases: Textual mobility, distributed authorship, emergent semiosis, multiple identity, and participatory poesis are augmented not only through the contributions of the countless historic authors whose words reside inside *Project Gutenberg*, but additionally through the layers of deconstruction which brings these words and sentences together in ever changing novel visual expositions.

Future Work

La Plissure du Texte 2 is expected to be an evolving work which will continue its residency in the meta-verse. As online, three dimensional technologies continue to develop many new interventions to the existent structure, as well as entirely new structures which may or may not emerge from the already existent one can be contemplated: An increasing availability of kinesthetic-somatic interfaces which can be expected to vastly augment avatar agency into states of online hyperpresence, [9] as well as research such as the AMBX system [10] and magnetic levitation haptic interfaces (Berkelmann et al, 1999), are only two of many projects aimed at an enhanced integration of physical and virtual sensory experiences which may vastly enhance, if not indeed fully alter, the adventure of yet to materialize future generations of *LPDT2*.

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A COZY PLACE FOR INVISIBLE FRIENDS

Birgit Bachler

Social networking sites appear to be cozy environments where we can chat with friends and share our daily experiences. But through our continual participation in these spaces we run into new definitions of power and privacy. This talk looks at how our personal data is turned into capital, how we engage in participatory surveillance, and how we have become increasingly dependent upon these market-oriented platforms.

Social networking sites lead us to believe that our social spaces can be expanded using online services. We presume that communication becomes faster, easier and more efficient. Having a profile on a site like Facebook opens up the endless possibilities of online communication, promises constant connection and offers free sharing with the people in our lives. Facebook claims to be a space for real people, giving them the power to share and make the world a more open and connected place. But how are we handling this power?

Before connecting to Facebook, one must fill in a registration form and set up an account. Only registered users can access Facebook, allowing them to find friends, send messages, upload photo albums, write stories and comment on other people's activities.

What social networks are really interested in is their users' personal data, which is of great value to anyone eager to find potential customers (rather than an old high school friend) on Facebook. Personal data is valuable to marketing specialists, since it allows them to identify, understand their target groups, and aim their advertisements directly at potential customers, thus maximising profit.

The data required for setting up a Facebook account includes one's full name, e-mail address, birthday and sex. Providing this data to Facebook turns the anonymous web user into a person with a name, an age and a gender. This data then makes it easier to locate and identify the real-life person behind the profile. Also, the personal data is adapted to fit the requirements of databases. By filling in a registration form, the user agrees to the structure and requirements of text fields and drop-down menus, so that the network can generate a compatible set of data. Jaron Lanier calls this "personal reductionism," something which has always been present in information systems:

"You have to declare your status in reductive ways when you file a tax return. Your real life is represented by a silly, phony set of database entries in order for you to make use of a service in an approximate way. Most people are aware of the difference between reality and database entries when they file taxes." [1]

Social networking turns digital reductionism into a casual element of mediating contacts between new friends. The Facebook 'like' button is a good example of how human affection can be translated into a binary value. Simply clicking a button supersedes the need to think about writing a personal message. The phrase '1 person likes this' then refers to this one person at least taking note of the content and wishing to make this acknowledgment public to other users. Nothing more, nothing less.

Words like 'friend' and 'like' are overused terms in the realm of Facebook. They can be deployed to express our appreciation not only of actual people, but also activities, companies, brands and products. Such terms create the feeling of a seemingly personal environment. Everything we 'like' on Facebook becomes part of our profile. We are described through categories such as music, books, games and sports as well as political views and religious beliefs. These descriptions are a perfect base for a categorising our personal preferences into a target group, which is of interest to marketing specialists. While Facebook suggests that creating a profile of ourselves is a way to express who we are to our friends and family, what we are actually doing is filling in a form that makes it easier for algorithms to analyse us.

We even assist in optimising these categorisations of each other's content through participatory surveillance. Because we are visible to people who actually know us, we live under constant mutual scrutiny. The ability to comment and react to each other publicly creates a more clearly defined profile. Our friends will share and tag photos of us, which normally we would not proudly present to the public. This form of participatory surveillance subjects us to the feedback of our circle of friends. We control and govern each other by constantly keeping an eye on our thoughts and actions and the accuracy of our data. In other words, we are faced with (and participate in) something Danah Boyd has described as "invisible audiences." [2] Incidentally, there is no possibility for 'taking back' content once it has been posted online. What we are actually dealing with here is a new form of publicity in an environment that wrongly suggests that we are surrounded by nothing but friends and likeable things. And we must constantly reassess our demands for privacy, as both the rules of the platform and the content are constantly changing.

"Even though people obviously communicate online with a specific audience in mind,*e.g.*, their friends, the public nature of online social networking makes the information available to a much larger audience, potentially everyone with access to the Internet." [3]

The privacy settings on Facebook allow us to control what we are comfortable with showing and sharing. But we can only choose between a set of options relating to the visibility of content. There is no option for deleting content from the Facebook databases. So being visible is key to having a profile on Facebook. When privacy and visibility are so closely tied together, openness can be mistaken for overexposure, while reticence may raise suspicion. And perhaps the content that we are not comfortable with publically sharing, says more about who we are and who we want to be, than the content through which we allow ourselves to be defined. We can easily become overwhelmed by the complexity of our social circles, and the multitude of our own identities within those circles, not to mention the possibility of these identities interfering with each other. In the swamp of hundreds of online friends, it's hard to draw a sharp line between public and private content. And as our online networks grow, we run the risk that our engagement with each other becomes less personal and more standardised.

"After our initial introduction to the place and its orgy of transient friendships, most of us only want to bother with people at one degree of separation from ourselves." [4]

Managing a multitude of online profiles and contact lists becomes a time-consuming business, whose main benefit is to help maximise the profit of advertisers. So why are we participating in this business of sharing and being shared in order to optimise the profit of others? Mark Andrejevic quotes Toby Lester, who refers to the way consumers are compelled to go online as the "tyranny of convenience." [5] Just as the convenience of shopping online spares us the trouble of going to a store, socialising online spares us the trouble of going out and actually meeting our friends. We should not make the mistake of confusing friendship with a product, which can be easily maintained through a few mouse clicks. And we should be

aware that all the time spent on a social networking site, is ultimately feeding databases with personal, perhaps even intimate data, which is invaluable for Facebook's marketing strategy.

This marketing factor, and the exploitation of user openness, is the basis of Facebook's success. The promise to only bother users with advertisements, which they might actually be interested in, seems to be a winning marketing strategy. Obviously, we accept to generously provide free labour for marketing research, so that we may enjoy the convenience of the social network. Our online presence becomes a product, interesting for marketers and Facebook.

As long as we believe clicking a button can really improve our social status, the trade in our user data will remain big business. While we spend time with our invisible friends online, we risk neglecting our offline relationships. Not only are we responsible for the content we share about ourselves, but also for that which we share about others. In the end we must decide for ourselves, what the role of a commercial website should be when it comes to managing our friendships; and also, how much the limitations of a blue-and-white user interface change the way we see ourselves and our friends.

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A MAZE ABOUT MAIZE: A MESOAMERICAN DIVINITY AND ITS TRANSGENIC AVATARS.

Pat Badani

"Al Grano" project explores GM maize contamination and the risk to biodivesity and cultural diversity in Mexico. Decade-long debates have been re-kindled after the recent lifting of a moratorium forbidding multinationals to conduct GM maize experiments there. The convoluted stakes derive from history, ethnology, sociology, biopolitics, intellectual property, agronomy, ecology, science and technology of maize.

Maize specimens, 2011, Pat Badani, photographic document, © Pat Badani.

Introduction: "Al Grano" Project

"Al Grano" addresses the massive industrialization of corn in North America andtransgenic contamination of native maize varieties discovered in 2001 in Mexico, the genetic home of that crop.

This is the first instance of contamination in a crop's center of diversity and it has ignited a huge world controversy about maize's genetic code (whether 'pure' or genetically manipulated) in the alimentary, political, economic, ethical and symbolic structures entangled in the debates. The "Al Grano" project gives visual and aural access to these structures via an installation that includes a 4-channel-synched-video-playback piece showcasing documentary footage with GM maize debate participants. The video footage is currently being filmed across national borders in the North American Free Trade corridor.

By investigating cross-sections in time and place, the project reveals the multiple viewpoints and discordant voices about issues that affect the environment as much as peoples' lives – from basic subsistence for small Mexican farm holders, to food safety and physical health for the population-at-large. These issues pose serious questions about the nature of borders and about notions of identity, immunity and contamination.

A contested grain and its contested spaces: North America

Mexico is the center of origin and biological diversity of maize. Domesticated varieties can be traced back to the year 6000 B.C. in the valley of Tehuacan in Puebla, Mexico, where native peoples called it 'Zea mays.' These 'criollo' maize varieties have been maintained in 'milpas,' an advantageous polycultivation system that prevents the risk of crop loss in the event of natural adversity. To this day the 'milpa' provides an essential subsistence strategy for small farm holders because produce is used as food, as crop and as small commodity. Today, maize monocultivation is practiced in large farms in Northern Mexico.

The association between maize and Mexican identity is so central that a commonly used slogan claims: "Sin maíz no hay país!" (Without maize there is no country!) Maize is the cornerstone of ancient Aztec and Mayan cosmologies, and main protagonist in many myths that include the origin of woman and man. [1] Today, maize is considered Mexicans' 'Vitamin T' in a staple diet of Tortillas, Tacos, Tostadas, Totopos, Tlacoyosand Tamales consumed throughout all economic groups. Yet, paradoxically, Mexico is also a large importer of corn from the United States.

Maize was also a staple food for Native Indians in the United States and Canada who equally practiced polycultivation, although these native varieties have mostly disappeared today. European settlers adopted maize cultivation and practiced polycultivation in family farms as early as 1620. Much later, in search of greater profits promised by new technologies and genetic advances introduced in the mid 20th century,farmers were gradually absorbed by agribusiness with its increased specialization, standardization, and corporatization. Policultivation gave way to monocultivation andthis process has impacted the countryside and the family farm as a social body. Today, the United States is the world's largest producer and exporter of yellow corn (mostly transgenic) grown in the Corn Belt encompassing the states of Illinois, Indiana, Ohio, Iowa, Missouri, Kansas, Nebraska, South Dakota, Minnesota and Wisconsin. In Canada, corn is grown mostly in Ontario, Quebec and in Manitoba, yet Canada is a big importer of corn from the United States.

In 1994, with the intention of opening up and facilitating trade, the presidents of Mexico, the United States and Canada, signed the North American Free Trade Agreement that has created intense anti-free trade debates ever since. One argument is that business owners and elites in all three countries have benefited financially, to the detriment of small farmers. Mexicans claim that the most affected are 'campesinos' due to cheap imports supplied by agribusiness from heavily subsidized corn growers in the United States against which they cannot compete. Other important arguments include concerns over gene flow and contamination of native varieties by imported GM corn from the United States that would place the biodiversity of maize in Mexico at risk.

In Mexico the importance of maize is quite different from the importance that the crop has for the other two NAFTA partners, specifically regarding the debates on food sovereignty, land use, biodiversity and biotechnology of maize.

What follows is a discussion about maize primarily focusing on Mexico, because the debates there center on politics that go hand-in-hand with the introduction of new technologies informing the way in which maize is defended today as diverse crop, as food, as commodity, and as cultural symbol.

Maize technologies in Mexico

Maize cultivation and domestication systems and technologies in Mexico have been dynamic, evolving and changing, even to this day, through a type of expansion and innovation that, since the Spanish conquest, has engaged a process of transferring technologies from the global north to the global south with the promise of economic growth. [2] This process is marked by five periods of intense political, social and technological change with the most current one being the Biotechnological Revolution under the neo-liberal regime.

In pre-Hispanic times, the valley of Mexico had a complex system of floating gardens called 'chinampas' maintained by means of an efficient technique of recycling of nutrients, connected by a network of channels of drainage, irrigation and navigation that provided for the livelihood of about one million people. There is evidence that these floating gardens produced many plants and herbs including four to five tons of maize per hectare. Today, the United States averages the same amount per hectare with current technologies. [3]

With the Spanish conquest of Mexico, a long process began where the traditional use of land for 'milpa' cultivation gave way to other methods of cultivation. New agricultural technologies were introduced and the native polycultivation using simple instruments and small-scale farming was gradually replaced by methods and technologies used in Europe, including monocultivation over large expanses of land.

Maize's transgenic avatars: Multiple viewpoints

The convoluted stakes related to GM corn are huge but unevenly distributed. The debates are different in Mexico than what they are in the United States and Canada, because maize has added nutritional, historical and cultural importance there. However, some issues are of concern to the three nations, such as:

Conflicting interests that inhibit collaboration in an interdependent economy; food regulation under food safety laws that jeopardize the survival of small farmers; the remaking of the countryside and the disappearance of the family farm; the increased domination by agribusiness of agricultural land to plant limited crop varieties that gradually destroy biodiversity and erode the environment; the increasing expansion of GM cornfields not to feed people, but to supply a lucrative industry of animal-feed, corn fructose syrup, and bioproducts such as corn ethanol and corn plastics (PLA). [4]

In Mexico, in addition to the above issues, debates also encompass the risk of gene flow and GM contamination of 'criollo' corn varieties. Other arguments include:

Food sovereignty; labor and human rights debates concerning the livelihood of indigenous populations; debates about the importance of traditional maize cultivation for the world at large; debates about the need of government support for sustainable production technologies that include the preservation of traditional methods of agriculture; and debates about the need to protect Mexican genetic maize patrimony. [5]

Embroiled in numerous controversies, corn has become biotech's godsend and curse because of the current inability to identify and anticipate all the hazards involved. What is certain is that agricultural biotechnologies are here to stay. Some experts claim that the biggest risk is not from science and

biotechnology but rather from the control of this knowledge by agribusiness that create monopolies with copyrights and patenting of seeds for profit regardless of the human and environmental consequences (e.g. by Monsanto, Pioneer, Syngenta, DuPont, etc.) In self-defense, industry representatives argue that indigenous Mexican farmers have manipulated corn for centuries to fulfill individual demands, and that today biotech super-giants manipulate corn genetics to do likewise, but with different tools. Yet, this is reductive because although both techniques are aimed at crop improvement, there are many differences between domesticated and genetically engineered crops.

Maize is a self-pollinating plant with male and female parts, and reproduction happens when the plant's male gametes release pollen and fertilize female gametes located in the cobs. Crossbreeding selected plants by transferring pollen of the desired types by hand from plant to plant has been practiced for millennia. Indigenous peoples in Mexico have developed an extraordinary level of expertise throughout generations, obtaining and conserving diverse populations of 'criollo' maize, interchanging seeds with other 'campesinos' as part of ancestral social practices denoting ritual kinship and civil-religious systems that are in place to this day, albeit dwindling; practices that have been an intrinsic part of indigenous Mexican identity. [6]

Agricultural biotechnology uses genetic engineering, tissue culture and other techniques, and transgenic plants are the product of such tools. [7] These maize avatars are not the result of natural crossbreeding or recombination. Transgenic maize is genetically modified in laboratories to develop agronomically desirable traits whereby specific genes are introduced into the maize genome resulting in modifications such as resistance to herbicides and insect pests; mutations that have proven to be problematical at many levels. Moreover, because of the increasing control of agriculture and related biotech research by corporations who not only fund research efforts (Monsanto, Syngenta, etc.) but who also own these GM avatars through copyright laws and patents, farmers cannot save their GM seeds for replanting – contrary to traditional farm practice – forcing them to buy new seed from GM companies each year and to pay these firms a technology fee. This phenomenon places farmers in a pervasive money-spinning loop of government subsidies and corporate control.

Genetically modified maize was grown for the first time in the United States and Canada in 1997. Today, the United States is the world's biggest supplier of transgenic corn. Mexico no longer produces enough corn for local human consumption due to disappearing 'milpas' resulting from obstructive government policies. Yet, paradoxically, it is the large transnational GMO corporations in the United States who value the Mexican 'campesino' technologies most. Unfortunately, transnational corporations appropriate native maize varieties extracting what they find useful to create transgenic avatars for profit, establishing an elaborate system of patenting that ultimately harm 'campesinos.' This has generated great controversy surrounding regulatory frameworks governing the approval, production, use, and trade of crops.

For Mexico, the initial promise that agro-biotechnology would feed the increasing population and prevent starvation has actually resulted in greater social exclusion, greater inequality and a divide between two types of agriculture: the agro-industrial one based in new technological packages with official support; and the small holder, traditional maize production, increasingly cornered in zones of indigenous cultural resistance with little access to government subsidies. NAFTA practically condemned maize to disappear from Mexican commercial production. It is claimed that trade policies have contributed to the devastation of the countryside and of peasant production; to the increasing substitution of polycultivation by monocultivation and the associated risk of biodiversity loss; to water depletion, and to an impoverished soil that now offers diminished yields. All of these factors deeply

affect the livelihood of 'campesinos'. [8] Indigenous populations argue that the current neoliberal regime considers them backwards and inefficient, and that their policies are forcing them to migrate from the countryside in order to seek employment in local industries or in 'maquiladoras' (such as jean factories) and across the border in the United States. This situation further condemns the 'milpas' by deskilling a new generation of younger farmers who do not inherit knowledge and expertise about classical plant-breeding developed and transferred from generation to generation for centuries by their elders.

This state of affairs increases Mexican dependency on GM corn imported from the United States, and further aggravates the risk of gene-flow contamination of 'criollo' maize. GM seed infiltration through imports and cross-pollination contamination bydominant GM genes are seen as a real danger to biodiversity by some experts, and contested by others. Yet, this type of disagreement points to the real need for caution and regulatory measures.

Sustainable agriculture/sustainable culture

In the United States and Canada the need to feed people at lower costs was the economic and social logic behind the increased industrialization, specialization and marketing of agriculture that began in the mid 20th century. Now, the claim that corporate agriculture and its technologies are the solution for the world's starving poor is dubious because millions of hectares of land are being used, not to grow staple foods for human consumption, but to grow GM corn for the bioproducts, processed-food, and animal-feed markets. A devastating combination of factors – climate change, depleting natural resources, a global scramble for land and water, the rush to turn food into bioproducts and excessive corporate concentration in the food sector – is creating an era of permanent food crisis that will require radical reform of the international food system.

In earlier decades the ecological question and the complex connections between agricultural technologies, rural and urban life, maize production and the environment, worried very few people. Many now agree that corporate farming causes the decline of family farms and rural communities, threatens the environment and the natural resource base, and compromises the future of society. For some there is now a high/low tech divide. Others see a more hopeful 'post-industrial' future, a new paradigm of agriculture informed by ancient agro-ecological technologies combined with supportive state policies. Despite the maze of impediments that make policy amendments difficult due to agribusiness' influence in government, numerous lobbying groups are making headway in effecting change. For example: NGOs and advocacy groups such as WWF, ETC, ActionAid and Oxfam, lobby for fair shares for the poor in a world of resource scarcity and environmental limits. [9]

In Mexico there are several civil groups and national organizations such as the Coalition in Defense of Maize, and an increased group of academics wishing to maintain traditional native agriculture. Some have been documenting knowledge of seeds and practices that constitute a true patrimony for the country and for the world, and there is now a live seed bank in place (CIMMYT). These actions validate native practices and recognize their scientific expertise.

At present, there is a growing tendency to develop new types of dialogue where tradition and innovation can meet and share a place, thereby extending alternatives and potential for change. Growing consumer worries about how we feed ourselves fuels a paradigm change in agriculture and marketing, and many are developing different models of food production and distribution where valued

goods and services are created by ecologically sound and socially responsible means, customized for specific markets. [10] Some farmers are already venturing into a new era of sustainable agriculture defined as a way of raising food that is economically viable, healthy for consumers, does not harm the environment, supports biodiversity and animal welfare, is socially just, and enhances rural communities. These initiatives proliferating in the 1990's (diversified farming, organic farming, biodynamic farming, urban farming, community supported agriculture, local food chains, etc.) look to combine traditional and contemporary technologies and systems not with the intention of returning to an idealized past, but with the intention of building a different future.

Transdisciplinary research and practice

Informed by the issues discussed above, *"Al Grano"* delves into new structures for life in the 21st century, seeking to re-define 'growth' for a sustainable future by evaluating knowledge about arcane and contemporary agro-technologies. Throughout the process of collection and interpretation of exploratory documentation, I maintain an inter-subjective role with a broad spectrum of individuals who share their expertise and wisdom: farmers, grocery store owners, agronomists, policy makers, researchers, personalities and the public at-large. The intention is to set in motion receptivity by intertwining research methodologies used in ethnography into my new media artist's tool-kit. These strategies allow me to craft a variety of narrative grounds about issues that are central to my body of work: border-crossings, migration, and foreign status.

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READING LA PLISSURE DU TEXTE "BACKWARDS"

Jan Baetens

In the history of new media art and digital writing, Roy Ascott's *La Plissure du Texte*(1983), has proven a watershed moment. In this paper I will give a historical contextualization of the first work, in order to better understand the challenges of its today's reappropriations.

Don't forget to read

In the history of new media art and digital writing, Roy Ascott's *La Plissure du Texte*(Electra, Musée d'Art Moderne, Paris, 1983), a work using telematics to create in real-time a world-wide, collective narrative (more specifically, a collaborative, multi-player fairy tale), has proven a watershed moment (Plissure, n.d.). Basic concepts and issues of authorship, text, invention, and linearity, among others, have been dramatically redefined as well as implemented in a concrete practice (as much a process in itself as a model for further development) of distributed authorship, text as "work" (instead of "product"), users' participation, and multimedia connectivity, that it is no longer possible to study the art and technology field without taking into account this major achievement.

Putting the stakes of Ascott's involvement with collaborative world-making even higher, the recent up-grade and reconceptualization of this seminal work in the metaverse of Second Life, *LPDT2*, proves that the creative potential of *La Plissure du Text* is still intact, to say the least (LPDT2, 2010). Yet by creating a distance between the "old" and the "new", i.e. by making the (once) "new" now (supposedly) "old", *LPDT2* gives also the opportunity to come back on an aspect that may have been overlooked in the euphoric reception of the truly utopian first version of the work, namely the question of its "read-ing." So strong has been the emphasis on the shift towards the new paradigm of participation and con-nectivity, that the very question of the work's reading did no longer seem relevant. Reading instead of "doing", "performing" and "cocreating" *La Plissure du texte* seemed an example of McLuhan's "rear-view mirror" approach of the future: (1967: 74-75). The neglect of reading, however, is not fully motivated here. First because reading is much more than just decoding the words of a text, it has also to do with the various stances and attitudes one takes towards a work (in this sense, reading has to do with global cognitive and cultural issues of "perception"). Second because Ascott's key innovation has not been made from scratch. *La Plissure du texte* is indebted to all kind of textual ancestors (texts, models, au-thors). The revolution it brings about is not a tabula rasa, yet one new (big) leap in the history of art as connectivity, and it is plausible to argue that the relationship with this cultural and literary context –and hence the reading of it– is part of the work itself, so that participation can only be complete if one also takes into account the work's background.

To a certain extent, *LPDT2* functions as a device that reframes *La Plissure du texte* and forces us to un-derstand it in new ways. In that sense, the rethinking of an old work in and through a new one is not

very different from what had been done in the retrospective of Ascott's work (Plymouth Arts Centre, 2009.) In this retrospective, the curators had made some surprising but very clever choices, for instance by blocking any attempt to make their exhibit "interactive". By confronting the reader instead with the intellectual questions that had triggered Ascott's own artistic ideas, they stimulated the visitors to redo the creative thinking that preceded the realization of the works themselves (see Baetens 2009). To a certain extent, *LPDT2* works the same way: it helps us reread *La Plissure du Texte*, disclosing aspects that may have been gone unnoticed, for being totally self-evident, at the time. Among these aspects, that of the very reading of the work is a crucial one, and it is on this reading issue that I will focus my contribution here.

As already argued, the question "How to read (a work such as *La Plissure du Texte*)?" may be for some a false or even deceptive question. Isn't Ascott's work, they suggest, something that must be "performed" (actively, by what he likes to call a "participator") rather than "read" (more passively, by an ordinary "reader")? True, it would be absurd to ignore the priority given to participation, but that does not mean that the project is not accompanied by a whole set of more or less hidden instructions that do influence our interpretation, our approach and finally also our use of the work, since participation is not something that starts from scratch. Even in the case of works allowing and even encouraging very open forms of participation, as in *La Plissure du Texte*, the reader-participator does not experience the work in a "virginal" way, but is channelled through all kind of pragmatic markers that help make sense of what is about to be read. Many elements of this textual and cultural network that program, although never in a deterministic way, her contact with the work, can be found in the work's "others": paratext (the textual and iconic elements that surround the material appearance of a work), metatext (the critical writings and analyses devoted to a work), hypotext (the works that are adapted of transformed in a given work, which becomes then an inferred version or hypertext of the hypotext), intertext (the textual network that sprawls around a text), and architext (the relationships between a text and the discursive genre or genres it activates) (for an overview, see Genette 1992). A theory and practice of global connectivity as illustrated by the work of Roy Ascott, can of course not ignore the weight of such a network, which implies inevitably a certain number of reading instructions. This is all the more the case since electronic literature, is, contrary to print forms of writing strongly characterized by the blurring of boundaries between the text and its others. In the digital sphere, to avoid or to skip the textual "others" is, practically speaking, almost impossible (or at least much more difficult than in the case traditional print culture, which craves for clear-cut distinctions between the text and its others).

Reading and writing in light of Barthes and the Surrealists

The reader of *La Plissure du texte* has to pass through two major locks (next of course to the dominating discourse on participation, which can be read as the official and authorized user's manual of the work). The first lock is named Roland Barthes, the second one is the *cadavre exquis* technique of French Surrealism.

Barthes's thinking on writing and textual practices is conveyed through a double filter. On the one hand, there is the very title of the work, which is a variation on his famous book *Le Plaisir du texte* (1972). On the other hand, and perhaps more surprisingly, the "meaning" of this book is processed via well-chosen quotations, such as the one that opens today *LPDT2*: "The brio of the text (without which, after all, there is no text), is its will to bliss, just where it exceeds demand, transcends prattle, and whereby it attempts to overflow, to break through...." This quotation, which opens the door to *La Plissure du texte* for the contemporary reader eager to know more about the work, involves a strong interpretation or reinter-pretation of Barthes' thinking, for instance by putting between brackets the distinction between *plea-sure* (of the "readable" text and*jouissance* (of the "scriptible" text) while bringing to the fore the seman-tic fields of "joy" and "innovation". Of course there is absolutely nothing wrong with such an interpreta-tion, for after all this is the way we interact with texts and to refuse interpretation would only signify a lack of connectivity, but the use of Barthes as a self-chosen gateway to the discovery of the work is also open to interpretation and debate, certainly in the case of a temporally evolving readership (hence my emphasis on the Barthes quotation that opens the new version of Ascott's work, *LPDT2*).

But there is also a second cultural reference, that of the Surrealist "exquisite corpse" a method by which a collection of words or images is collectively assembled. Each collaborator adds to a composition in se-quence, either by following a rule or by being allowed to see the end of what the previous person con-tributed. This technique, variously mentioned by Roy Ascott himself, describes quite faithfully the mak-ing of *La Plissure du texte*, produced collectively by participants in 8 different locations all over the world. The participants, who had been assigned the role of traditional fairy tale character: princess, witch, fairy godmother, prince etc.., did not have to follow a given script or storyline and could therefore only expand on what had been written previously by the other participants. Here as well, the reference to Surrealism, with its numerous attempts to exceed traditional visions of authorship, text, and art, does not come as a surprise. But once again, the (contemporary) reader does not have to take this reference at face value, he or she can on the contrary, question the value of this position which puts a strong claim on what the text actually means (and asking questions on meaning means... starting to read).

In my brief presentation of the role and weight of Roland Barthes as well as of the "exquisite corpse", it has already become clear that issues of chronology and temporality are absolutely crucial. Since we are discussing here the question of rear-view mirror ways of reading and perhaps more specifically the ques-tion to what extent *La Plissure du texte* escapes such ways of reading–, the temporal distance between the readers that we are (and we are all today's readers, whatever our tastes or habits may be) and the reading instructions as given by the double mention of Barthes and Surrealism, is all but a detail. As a matter of fact, that distance is a key element in our contemporary reading of both Barthes and Surreal-ism, since we do no longer read them today as they might have been read in the cultural environment that made the emergence of *La Plissure du texte* possible.

To make a long story short, what has changed is the fact that, for contemporary readers, neither Barthes nor Surrealism (at least not the Surrealism as epitomized in the exquisite corpse and automatic writing in general), are considered good examples of the type of participation and connectivity that Ascott and his friends were looking for. In today's reading of Barthes, who used to define his position as that of the

rearguard of the avant-garde, the feature that is being underlined is the author's *antimodernism*(Compagnon 2005), the melancholic inability to let go certain aspects of the past while embracing more or less enthusiastically the challenges of the future. If we think of Barthes today, we think of Proust, of Stendhal, and above all of Chateaubriand, much more than of the revolutionary visions of textual practice that he has been defending as well. Or to put things even more sharply: if we want to "save" the revolutionary aspects of Ascott's "plissure", we would prefer today a mention of Deleuze's "pli" (fold) rather than one of Barthes's "plaisir". Too strong an emphasis on "pleasure" might jeopardize the understanding of Ascott's major breakthrough.

The case of Surrealism is even clearer (or worse, if one prefers). Since quite some time (and the work by authors such as Maurice Blanchot and Roger Caillois has played an important role in this reinterpretation), automatic writing, of which the exquisite corpse remains a good example, has been accused of doing the contrary of what it claimed to do, namely helping the author to get rid of old-fashioned ideas of literature and authorship, on the one hand, and to discover absolutely new forms of (collaborative) text production, on the other hand. What is being stressed today, is more the counterproductive aspect of these automatisms, which do not foster imagination or invention but which on the contrary condemn the author to mechanically repeat what he or she already knows. And it cannot be denied that most specimens of automatic writing are highly formulaic and weakened by semantic stereotypes and syntactic poverty.

One might object that the (partially) inadequate relationship between the reading that*La Plissure du texte* is expecting (namely a "participation" that goes beyond traditional frontiers between reading and writing, author and reader, etc.) and the concrete reading instructions that surround the work (but which program its reading in very constrained ways), is a false problem, since its relies upon an anachronistic approach of these models and metaphors. It is not fair, one would say then, to question the importance given to Barthes "pleasure" and to Surrealist games, given the fact that in the early 80s these two models functioned in a completely different way (at that time, both textual pleasure and exquisite corpses were convenient, useful, appropriate models and metaphors). Yet for two reasons, this objection does not hold. First of all, the reading of a Roy Ascott work must take into consideration the fact that things change over time, and that it would be absurd to stick to readings of the past which achieve a kind of supratemporal status. Such a stance is simply contradictory with everything Ascott is thinking and what his work stands for. Second, and even more importantly, Roy Ascott as well as Roy Ascott scholars are highly aware of the ambivalent status of the metaphorical tools one uses while elaborating new forms of thinking. On the one hand, it is impossible to do without, for these metaphors are not merely "ornamental" of human thought, instead they make human thought and innovation possible. On the other hand, each metaphor or model has also its limitations, and one has always to remain suspect of them and take care of not taking them too literally. In that sense, our current reflections on the double model of textual pleasure and automatic writing is very similar to Edward A. Shanken's meticulous rereading of the twofold model of the *noosphere* (the model of expanded consciousness, borrowed from Teilhard de Chardin) and the *global brain* (Peter Russel's elaboration of that same idea). These models have been key to Ascott's own thinking on interactivity and connectivity, yet as Shanken rightly argues, it is important to maintain a critical distance towards these (necessary) speculations (Shanken 2003: 4-5).

Reading as a form of "screen-thinking"

Looking for new reading models is therefore necessary, but should not be seen as an aim in itself. Therefore, it is important to know which kind of features one wants to highlight. In the case of *La Plissure du texte*, it might be interesting to further reflect on two basic characteristics of contemporary writing that have undoubtedly been enhanced and accelerated by Roy Ascott's work: spatialization and digitization. The modern literary text is a spatialized text, not in the sense that its material presentation accentuates visual parameters (typography, lay-out, illustrations, etc.), but in the sense that its very writing and reading are producing new experiences of space. One may think here of Stéphane Mallarmé's groundbreaking poem *Un coup de dés* ("A Throw of the Dice", 1897), whose visual pattern, which it is not possible to start analyzing here (Cohn 1949), offers an experience of a process in which nothing is taking place, except place itself. Spatialization, which in the case of Mallarmé has also to do with the abolition of old forms of authorship and the introduction of chance operations, is more and more linked today with computerization. Literature is becoming more and more digital born (Hayles 2008), yet many consequences of the shift from page to screen have still to be discovered.

It seems plausible, however, that works such as *La Plissure du texte* (and even more LPDT2) should be paramount in our reflection on all these aspects, provided we can use or elaborate new tools that help makes sense of their novelty. An interesting candidate in this regard may be Anne-Marie Christin's notion of "screen-thinking", as defended in numerous publications on the history of writing as a profoundly visual system, and whose usefulness for spatialized and computerized writing is very promising.

Christin's notion of screen is much broader than the technical sense of computer screen. It involves both a material and a cognitive aspect. Materially speaking, it implies that the meaning of a text is not (only) determined by the meaning of its linearly and hierarchically organized units, but (also) by the metonymic relationships that are being established within a certain frame or screen. Cognitively speaking, it implies that the production of meaning has not only to do with the recognition of already meaningful units but also with the contemplative and meditative creation of new meanings within the energized field of the screen. And just as in the case of Mallarmé, this new vision of the text involves also a new vision of authorship and text. It is the viewer who makes the text, and this text is an open network of relationships within a given frame.

Christin's screen-thinking is obviously compatible with Ascot's work. First, it strongly emphasizes the link between art and technology. The screen is indeed a device, not one that is mechanically imposed, but one that is creatively activated according to permanently shifting contexts. Second, screen-thinking appears also as a form of participation, for interpretation is much more than the identification of already given elements. Third, the agents involved in this whole process are clearly supra-individual. Even in the case of a solitary meditation of the textual object or the writing process, there is a strong awareness of the mutual implication of subject and object: I am shaped by what is being shaped by me, in an eternal movement of mutual enrichment and questioning. For all these reasons, and given the highly productive and stimulating character of Christin's work in the field of literary and visual scholarship, it may be highly

relevant to try to implement screen-thinking in our reading of *La Plissure du texte*. Of course, screen-thinking may prove in the (near?) future as problematic as the reliance upon Barthesian pleasure and Surrealist automatic writing, but in the meantime it can only enrich the already existing network around Ascott's work, which it helps connect with the key issues of LPT2: textual mobility, distributed authorship, emergent semiosis, multiple identity, and participatory poesis.

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DEEP/PLACE: SITE-BASED IMMERSIVE HISTORY

Bridget Baird, Özgür Izmirli & Andrea Wollensak

DEEP/PLACE is a flexible system for site-based, immersive, interactive installations that allows participants to explore historical and cultural information in a hybrid physical/virtual space. This multidisciplinary collaborative artwork merges materials from discrete domains; navigation is through an intuitive gestural interface. The experience provides an interplay between the real and the virtual, allowing the past to infuse the present.
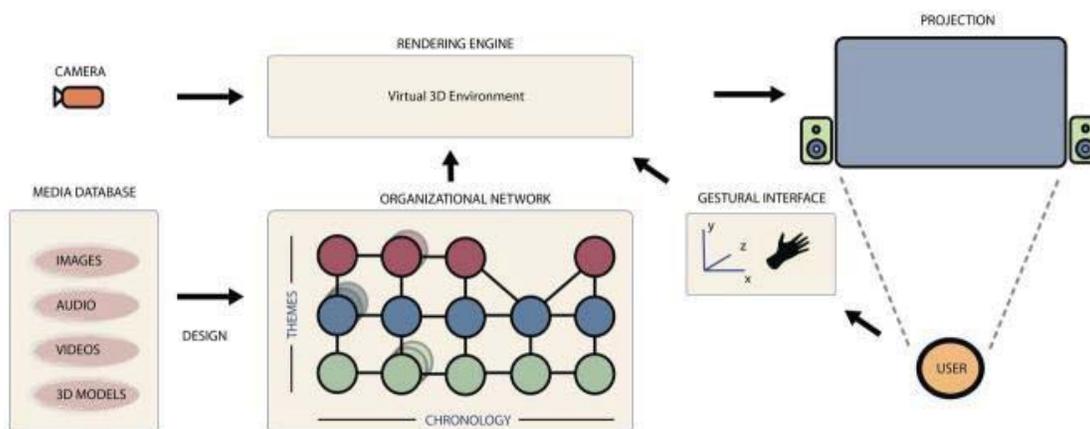
Fig 1. Overview of the DEEP/PLACE system.

Fig 2. DEEP/PLACE system installation in Harkness Chapel.

Introduction

We have joined together as an interdisciplinary team of collaborators to explore, through technology, experiences of place and history that are engaging and interactive. As part of this endeavor, we began with a set of core guiding principles that would govern our investigations. The first principle is the experience of a hybrid physical and virtual space in which to situate site-specific enriching information such as socio-cultural and historical artifacts and audiovisual elements. In other words, we began with the premise that we would curate a wealth of site-specific information about a selected place, and that the end user would engage with the material not solely through a computer, but rather, by way of a digitally enhanced and augmented experience in the place itself. The second principle is that we would develop a customizable system that can be configured and deployed to different sites with the ability to define semantic categories to organize the curated media content. The third principle is that the user interface will be as simple and intuitive as possible in order to promote the users' engagement and provide a relatively transparent mode of interaction. The fourth and final principle is that the information architecture of the system will be non-linear and contextual so that the user of the system can navigate through the site-specific information by means of gestures within the space.

DEEP/PLACE features an expanded interactive audiovisual space consisting of diverse media elements. This multidisciplinary collaborative artwork merges materials from discrete domains—such as architecture, cultural geography and geology—in an immersive site-specific experience. Participants explore the multifaceted information by navigating a rich media landscape through an intuitive gestural interface. The media landscape is represented by a system of interconnected nodes of site-based information that include spatial and geological information, archival blueprints and images, 3D models, video and recorded audio material. A live camera feed of the site into the virtual space connects the built architectural space to the digital multi-modal history. The overall experience provides an important interplay between the real site and the virtual experience, allowing the past to infuse the present.

System Description

The DEEP/PLACE system is a flexible and customizable environment that will allow others to design their own site-based interactive explorations, populated with relevant media. The underlying structure provides coherence and ease of use while allowing the designer great freedom to individualize the experience for the particular site. The user communicates with the computer application through a gestural interface that consists of a wireless multi-sensor glove and position trackers. It implements a 3D virtual environment in which the rendition of the media elements within this space are projected onto a large screen and played through loudspeakers.

The process for a typical deployment of the system includes an archival research phase followed by digitization, recording and modeling of artifacts. In the next phase the designer organizes these media elements into thematic and chronological clusters called nodes. The final stage of the design involves the organization of media elements within the nodes, which are 3D subspaces in the virtual environment. Once the design phase is completed the system is placed at the chosen site in a location that best underscores the dual experience, that is, the interplay between the presence of being at the real site and the

virtual experience. The visuals are rendered in real time and projected onto a screen that is located directly in front of the participant; the size of the screen and the location of the participant are chosen to balance the immersive aspect of the rendered content with the presence of the immediate surroundings of the site.

In Figure 1 we provide a schematic overview of the system. The media database contains assets collected during the research phase. The organizational network represents the overall design of the content and includes information about all media elements. The rendering engine implements the virtual environment by combining information from the organizational network, digital assets, the gestural interface and the on-site camera to produce the visual and auditory output.

The main organizational construct in the system is the *node*. Conceptually, each node represents a theme and a chronological moment in the history of the site. Each node may include multiple media objects: possible media formats include images, audio (either spatialized or ambient), recorded video and 3D models. Within the virtual space, each node occupies a defined volume. Each piece of nodal media, as appropriate, can be positioned and sized within this volume, as specified by the designer via a text file, creating a visually dynamic layered information space. The design can specify a variety of properties for each media object in the virtual space such as: theme, chronological period, type (image, audio, etc.), location and size.

Within the organizational network, nodes are linked conceptually in two manners: chronologically and thematically. The designer determines the thematic subjects and the temporal divisions based on how s/he wishes to organize and aggregate the elements in the media database. If one thinks of the themes and chronological divisions as a two-dimensional planar grid, the nodes are objects in this grid which, in turn, contain multiple media objects. In other words, each node represents both a theme and a moment in time. The system is designed so that all nodes do not have to be populated on this grid. The designer also has the ability to designate multiple nodes that depict a theme and the same chronological division. In this case, when the user arrives at a node, one of the possible nodes will be randomly chosen by the system.

In addition to designating the nodes, the designer can also choose background images and colors that correspond to themes. There is also the ability to import filtered and manipulated video from the live camera feed. The system is structured so that, once the designer has prepared the media and conceptualized the organization of nodes, it is straightforward to implement.

User Experience

As a system focused on realizing site-specific installations, the *DEEP/PLACE* system is portable and can be set up in any site location. The main components include the interactive system (with a gestural recognition glove and position trackers for the user's hand), video projection, stereophonic audio and an on-site video camera. The user learns to make a number of navigational and exploratory gestures with the glove and attached trackers, moving through historical time and across the chosen themes for the site. The user explores the rich media landscape by navigating within and between nodes. Exploration within the node involves moving the viewpoint to a position and proximity of a media object. Object-specific audio is spatially triggered during this exploration. In contrast to node-specific ambient audio, object-specific audio may be heard based on the user's proximity to the objects that have attached

audio elements. During the exploration a live camera feed that has been filtered contributes additional media.

The experience opens with a node that contains media (video, image, audio) elements within a volume of space. The user can navigate through this volume (through gestures) and examine the media more closely. When the user has finished with the current node, a change of gesture (using finger pointing) will cause the user to navigate to a different node: a gesture in the horizontal direction will cause the user to move backward or forward in time (the movement will be either left or right) and the same gesture moving away or toward the user will cause the theme to change. As the user navigates to a new node the old node will fade and move away as the new node, populated by its media, comes into view.

The gestural interface consists of a wireless glove and 3D position sensors. Gestural movements allow the user to explore the media within a node. Gestural movements also allow the user to travel to the nearest adjacent nodes, either chronologically (the theme will stay the same but the user will move forward or backward in time) or thematically (the user will stay in the same time period but change themes). Other gestural movements also help orient the user by returning to an initial view of the current node or moving back to the system's starting node. A timeline at the bottom of the screen helps orient the user chronologically; background images and color orient the user thematically.

First Realization of the DEEP/PLACE System

For its initial deployment and configuration, we authored the *DEEP/PLACE* system to focus on Harkness Chapel (Connecticut College, New London, USA) with three main themes: architecture, culture and land. Harkness Chapel is a landmark building on the Connecticut College campus that was designed and built in 1938 as a reflective gathering place. As a public site, it has a rich history of performances and events. Much of the materials we have found on the architecture of the building are in the form of letters, architectural pencil drawings, and some black and white photographs. Current material within the architecture theme include video and audio and a virtual tour of the interior public and crawl spaces and the bell and its tower. Archival materials for the architectural theme include schematic drawings and photographs of the construction of the chapel. We have included in the culture theme a large collection of letters, telegrams, and notes from meetings during the time of construction between the architect, Roger Gamble and the donor, Mary Harkness, in 1938. There are also many time-based audio and video clips of performances. The geology (land) materials include GIS (Geographical Information System) data of land use, historical maps and information about the geological rock formations. We have produced layers of 2D images and 3D models that show the site within a larger land mass. This context includes both the surrounding area and also a visualization of what is under the surface of the earth in this location.

We have elected to position the screen in front of the altar in the chapel. This choice allows the main architectural elements of the chapel (windows, ceiling, organ, beams, arches, organ grille) to be visible to the participant in addition to the panorama of the screen (see Figure 2). The background visuals of the virtual space are informed by the images obtained from the on-site camera. The wireless camera is positioned inside the chapel so that the changing light conditions are captured and used as part of the digital background in order to accentuate the quality of light coming through the windows throughout the day. This connection portrays the interplay between the actual site and the virtual one. We have also used color codes to signify our themes (architecture, culture, land) to provide thematic orientation to the participant.

Conclusion

DEEP/PLACE is a flexible site-based interactive installation that can be configured to allow participants to explore site-specific historical and cultural information in a hybrid physical/virtual space, creating new opportunities to enhance apprehensions and relations of place. We have created the first iteration of this system by designing an explorable topography of site-specific historical/archival, geological, architectural and audiovisual elements based on Harkness Chapel in New London, CT, USA. This collaborative project involves three core faculty (in Studio Art and Computer Science) at Connecticut College as well as students within the Ammerman Center for Arts & Technology. Expertise in history, architecture, geology and geographical information systems was provided by affiliated faculty at Connecticut College.

Acknowledgement

TACTILE VIDEO LOVE LETTERS: FINDING NEW MODALITIES FOR NON-VERBAL COMMUNICATION

CAMILLE BAKER

This paper will discuss new research repurposing the mobile phone from a textual and voice device to a more multi-modal, synaesthetic, tactile, expressive, and gestural device. 'Tactile Video Love Letters' seeks new modes for individuals to express themselves intimately, visually and non-verbally—akin to remote 'touch', immediately and intuitively understood in a pre-conscious sense—direct and tactile route to interpersonal communication.
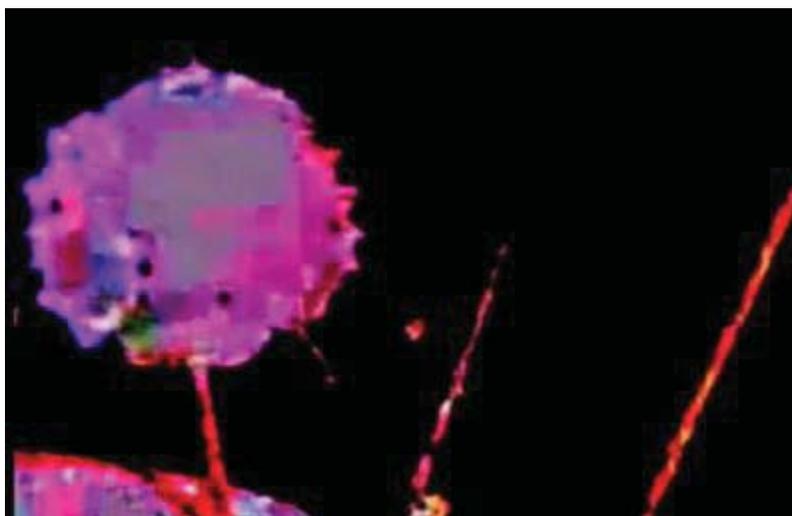
Image 1. © 2010 C. Baker – screenshot from MINDtouch project mixed video

Image 2. © 2007 C. Baker – still image by participants part of MINDtouch PhD research workshops
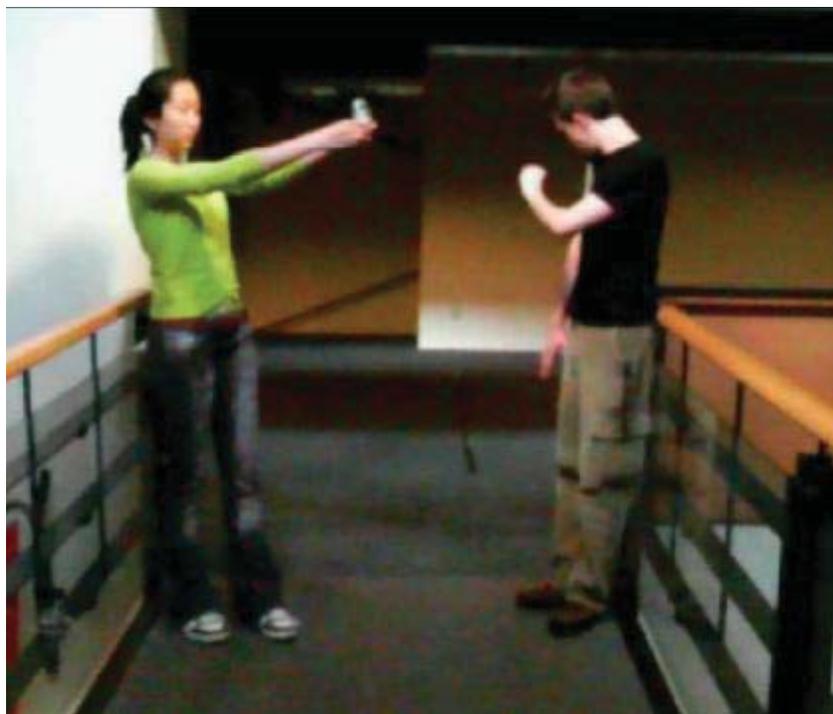
Image 3. © 2007 C. Baker – still image of participants in a MINDtouch mobile video workshop

ABSTRACT

This paper will discuss new research that repurposes the mobile phone moving it from a textual and voice device to a more multi-modal, synaesthetic, tactile, expressive, and gestural device. The project 'Tactile Video Love Letters' seeks to find new ways for individuals to express themselves, in an intimate, visual and non-verbal way—akin to sending remote 'touch' messages, immediately and intuitively understood in a pre-conscious sense—direct and tactile route to interpersonal communication.

CONCEPTUAL APPROACH

Currently, we live in a world where we are increasingly more distant from our friends and families. Mobile video cameras can be repurposed to visually convey emotions and sensations, rather than merely a device for documentation of events, or as an entertainment gadget. As such, this new project 'Tactile Video Love Letters', aims to continue to bridge this emotional and physical divide between users.

Based on previous neurological research on human development [[i]], it is evident that humans *need* in-person, physical contact (as do all mammals) and interaction to establish and maintain intimate bonds, as well as to continue to develop strong neural pathways in the brain. According to psychiatrist neuroscientists Lewis et al (2001), this physical contact is essential for survival (and the only authentic, tangible, focused interaction). Therefore, communicating via written word, voice etc. is only part of this interaction.

Portable devices and increasingly ubiquitous forms of mobile media and communication devices have transformed the modalities in which we can communicate our affective and emotional "states," however they are still predominantly via text and language. Mobile images are often experienced as personal, intimate, and private expression. Once sent, the immediacy of these media images feels like a receiving a virtual kiss blown to you or of invisible pieces of them [[ii]] through the network. Therefore, if one thinks of a text message as a thought transfer, then an image or video is sensory or sight transfer, sending visual experiences, feelings, as well as one's unique expression and perspective.Thus, people might wish to send their internal perceptions, instead of relying solely on words to communicate when using the mobile phone.

Tactile Video Love Letters' involves developing a novel method to repurpose the mobile videophone, using wearable technologies and smart textiles. This fresh approach hopes to replicate physical experience as much as possible. The system will use both the mobile connection using a wearable interface for tactile interaction. This will create a reciprocal exchange with a way to reply to a mobile message sender in a non-verbal, embodied, multi-sensory, two-way dialogue. Thus, this media project studies to relay 'felt' experience or touch sensation ways through a sensitive interface that is a skin-like membrane or bio-material responds with a reply directly to the recipient's mobile phone application.

To address the problem of extended absences, global travel, and distance relationships, methods will be developed to enable the translatation of emotional content contained in the visual construction and patterns of mobile video messages into 'touch' messages. Visual interpretation software technology will be designed to transform and transmit the video messages recorded by mobile videophones into physical feedback and sensations. These emotional video messages will then be sent through to the tactile textile/membrane's interface to pass the message to the person directly through the surface of their skin, by contracting, emitting heat, pulses or vibration and other such actuation outputs. Also under investigation are methods to relay the 'felt experience' or touch sensation back through to sensors, via the garment, to send a reply or notification response directly from the garment to the initial sender's mobile phone. This is intended to better enable a person to have more realistic 'contact' or interaction with a friend or family member at a distance.

CuteCircuit designed the first mobile connected sensory wearable garment with their HugShirt© in 2006. Others have since followed from their lead, with variations of mobile-to-garment projects. Tactile Video Love Letters builds on the innovation of CuteCircuit's ground-breaking, interactive garment, the HugShirt© [[i]]. It aims for a two-way exchange and experience, with sensitive textiles, and mobile video, taking this interchange to a more complex level, with mobile connection to skin interaction. To achieve these aims involves a systematic approach in three key areas: video messaging lexicon development, sensor/textile interface design and mobile media application programming and development.

Tactile Video Love Letters asks users to draw upon the visual material in their environment and any imagery they think relevant or essential to their expression. The 'tactile textile to video' exploration will develop a customised video symbolic vocabulary or lexicon to express and construct visual 'sentences' or 'utterances', to then be translated into distance touch or embrace. The intention is to create a structured semiotic system for expression, especially for people with physical, verbal or linguistic challenges, to use for personal interaction and to have an embodied, tactile and visual means of messaging [[ii]].

Through a participatory design processes project will develop a method to use videophones and mobile imagery together as an alternative to the current textual or voice uses. It will utilise visual patterns and common approaches to the use of visual material in one's environment, including users' movement and

gestures with the device. As the sensory experience/conceptual/interaction designer and facilitator, my role is to explorethe physiological tactile experiences of emotion on the body and brain of the message receiver, as well as to develop (with the aid of the users) the video language used by the video message senders [[iii]].

The first step for this 'tactile video' research, is the development of a symbolic video message lexicon to express with. This involves:

1) exploiting the possibilities and limitations of the mobile device and its video technology;

2) studying users' comfort with the device;

3) understanding the limitations of available environmental visual material as an aid in communicating such messages;

4) testing/studying users' ability to utilise the visual environmental material to represent their emotions, internal perceptions, sensations, or experiences;

5) studying visual content, meaning, patterns and representations to create a mapping of symbolic vocabulary to translate into touch sensations;

6) create structured activities for test users to be guided through, in order to find ways to express or record patterns and other visual elements as meaningful messages.

From this process, a vocabulary or syntax of representations of internal experience should emerge.

User interaction workshops for this process will be conducted starting before the end of 2011. This will begin with a designed set of structured improvisation activities to explore various types of expression as the impetus for developing a symbolic code for non-linguistic video expression. These workshops will be based on previous PhD research (Baker, 2010), where it was observed that the key aspects of mobile video-making process include these four features:

1.   an innate performativity, movement, gestural qualities, afforded by the device size and its features;

2.   portability factors (i.e. ability to watch or shoot anywhere), which allow one to notice the mundane more acutely, and causing people capture all that catches their eyes;

3.   the phenomena that users start to view the world through the camera 'vision' of the mobile screen, rather than their eyes alone, adding novelty, and a re-engagement with the scenery;

4.   an innate intimacy of expressivity, fostered by ready access to the device, and the predilection of users to record close-ups – framing only that which is to be seen, allowing for abstraction.

In previous user recording workshops, users were observed capturing their experiences and exploring the immediate space of their bodies, as the main intrigue and focus of the mobile medium. This has become a common approach to mobile video capture, as other artists and researchers have found [[iv]]. It was found that the device inherently encourages movement, often resulting in a smearing effect making

abstracted patterns through gesture. This instinctive approach to mobile video recording is facilitated or afforded by the device size itself (possibly not intended by the manufacturers). Thus, it appears that users' immediate impulse is to wave the device around, as if it was part of their hand, blurring the images intentionally to experiment with the visual results. To exemplify the gestural and intimate aspects of mobile recording practice, artist Dean Terry states that the phone encourages one:

*[…] to project [the] **very private space immediately surrounding the body** into meta-space. Many of the videos show objects little more than a few centimetres beyond the tiny lens, often some body part, like hands or forearms that obscure an unknown, overexposed background space. Other pieces are **gestural performances**, recording the movements required when following a line, or when trying to create shapes by moving the camera in certain ways (2005, my emphasis).*

One can only conclude that the videophone inspires a playful, gestural, or performative exploration resulting in a new video aesthetic unfolding merely of the qualities of the device.

A new modality for non-verbal communication

The primary dimension of this new project is in determining what non-verbal, visual communication can result when users are asked to express a certain types of inner experiences or perceptions using videophones. The aim is to harness users' own ingenious nuances of representing their inner sensations and emotions through the imagery. Thus, the focus of my work has shifted from facilitating non-verbal, internal, visual and synesthetic expression.

Non-verbal communication generally involves using eye-contact, gestures, body language, touch, tone of voice, and other physical indicators, to express certain information to others without words [[v]]. It can also be used to highlight a conversational or linguistic exchange, or to make a point more clear. Sometimes it is a mode of communicating the unspeakable or a way to interact prior to formal verbal exchanges or introductions being made. It is a means of initiating contact, or expressing something intimately without the need to verbalise the sentiment. We all use non-verbal modes of expression and learn them at a very young age, possibly before we are able to speak.

In his research on mobile phone use, Murtagh noticed that non-verbal behaviour:

[…] focus[es] on bodily gesture and eye contact emerged from the data when it was noticed that activities with and responses to mobile phone use were almost invariably non-vocal in nature […] Yet, so much of mobile phone use in public is organised through non-verbal action and interaction. It is suggested that these non-verbal aspects of phone use display the 'unwritten rules' of usage behavior in public. (2001: 82)

In my previous research, participants were asked to use videophone imagery to speak for them, to draw upon visual material within their immediate environment, as well as from their own sensations, perceptions, thoughts, and emotions, to share with others without words. Through gestures and movement it was evident they could represent their internal experiences via the external world visually and could have meaningful non-verbal expression. This modality falls outside of the usual physical or body language and is more akin to the cinematic language [[vi]] of video art, abstract cinema, audio/visual performance. This method of non-verbal expression does not require in-person presence, but could be transmitted in a visually with a mobile connection. This digital mode of remote non-verbal expression

transmits different layer of emotional presence, beyond tone of voice or turn of phrase that is currently used. The embodied interaction through technology replaces the in-person physicality.

Also to be investigated here, is how a receiver of video messages might experience and interpret these messages, especially if the messages are abstract, emotional and visceral. A direct, literal approach to constructing the visual expression may be the key to meaningful exchange (or may not be). Thus, one option is to construct a semantic language or symbolic representation for video messaging. While it can be argued that, like a dream or an artwork – the receiver/viewer/dreamer should also be free to interpret the message any way they like, in some cases the representative imagery is clear enough in content that the message is evident and obvious [[vii]]). Yet, the way the communicator constructs the message can also help in its interpretation and how it is decoded, especially if they use recognisable signifiers and symbolism (see Image 2 below). As such, this research will develop activities to develop a visual lexicon, building on past research that can provide tools and a structure to guide users to create a video language of their own. The intention is to develop a coding system for direct personal, embodied, sensual, and meaningful visual messaging using synaesthetic possibilities of mobile expression. The goal is to enable the average, non-artistic user to communicate in playful, creative, intimate, and novel ways [[viii]].

CONCLUSIONS

This project hopes to help people to maintain close personal bonds when it is difficult to be phyically present or infrequent. Yet, most people likely do not seek a digital replacement for in-person contact with the spouses/partners, friends, family, or business associates. Ultimately, fleshy, corporeal, in-person interaction will always be the most sought-after and 'real' experience. We have evolved to a condition in which this the optimal form of clear human understanding, trust, survival, and connection between people. Global travel for business, pleasure, and trade necessitates that we develop better solutions to bridge the gaps between face-to-face interaction and immediacy to maintain relationship. The only reasonable justification for substituting fully embodied experiences of in-person interaction are to save money, resources, lives, and other life threatening activities that otherwise cause problems in our current socio-economic, political, and environmental state of the world. Instead of using 3D surround projection TV to bring us closer to a sense of real, live, in-person experience with others, this project seeks a more sensual, tactile, present, and cross-sensory approach.

Artists and scientists will continue to develop alternatives to in-person contact, ones that feel real and authentic, both emotionally and physically. This media art research will expand on previous work by continuing to seek new interpretations of everyday technology, to improve the quality of life through non-verbally express and transfer messages through various embodied modalities. As always, my overall goal is to devise deeply experiential interactions, in order to improve and expand communication options and traverse vast distances through creative, multi-sensory modalities.

This project is only beginning so all suggestions are welcome.

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NANOART- SCIENCE AND MAGIC

ANNA BARROS

In the nano world the transmutation of elements by manipulation of its molecules, the superstar of nanotechnology, introduces an almost magical connotation. The condition of invisibility and the presentation of its images provided by the electron microscopes increase the sense of touch to the first magnitude. This text discuss ways that have been updating Nanoart. The emphasis is on the presentation of works and research by the author.
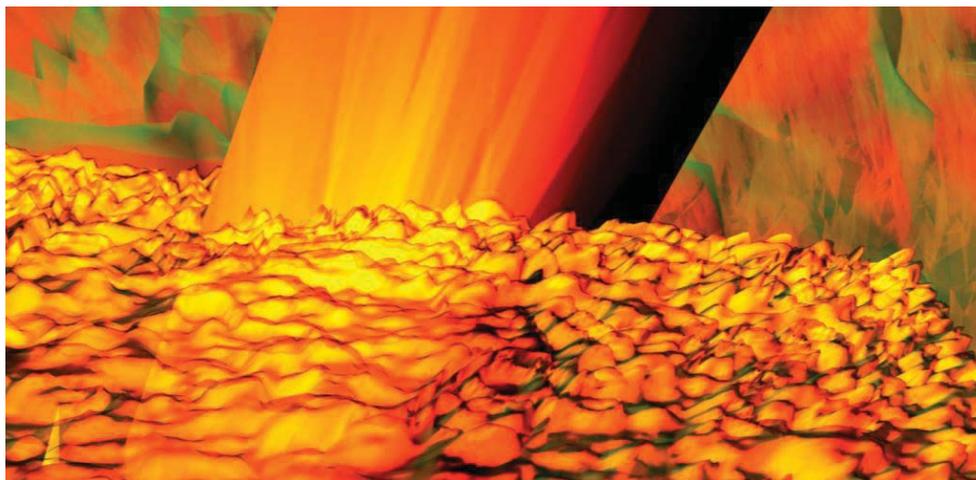
Fig 1. 200 Million Years - Durée, 2010, Anna Barros. Still frame of digital animation.
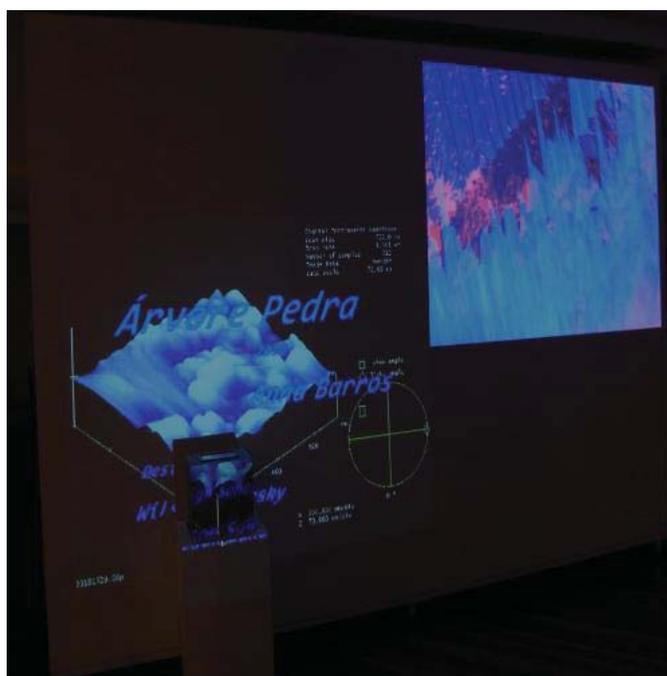
Fig 2. Petrified Tree, 2010, installation, Anna Barros. Photo Carlos Donaduzzi.

The integrated circuits and optoelectronic devices that enabled the first steps on the path of nanoscience and nanotechnology – molecular technology – were invented in the last century, in the 1960's. Art and science together aimed at researching and presenting nanometric particles (a nm designates a billionth fraction of a meter), which are placed beyond human perception, in a horizon where the material and the immaterial are perambulating a space dominated by quantum functions, under a never experienced behavioral way. With this, a hybrid discipline was created, where two knowledge categories start to be experienced in mutual transformation, able to amplify the perceptive qualities of humans.

The techniques that opened up the mysteries of nanoscience may be classified in the general category of Scanning Probe Microscopy. The Scanning Tunneling Microscope have a tiny tip made of conducting material with one or a few atoms at the top, controlled by a mechanical arm that executes a tridimensional movement scanning the sample. The laws of quantum mechanics permit the electrons to move (tunnel) between the tip and the sample. The images are in 3D and have a virtual character, what you see on the screen is their transcoding by a computer program. The same for the Atomic Force Microscope images.

The domination of seeing was altered by the entry of these three-dimensional topographic images, closer to tactile sense. The existential condition of nanoscience lies between matter and energy, a world unseen but felt, here it is possible to blur the boundaries of mind, and dream of the creation of new materials, even artificial life, throughout a new disposition of the atoms organization.

A new world is the dream of all creators; in nanoscience this is taken to a higher level raised by the possibility of the human being to recreate himself, which can be a marvel or a damnation. At the nanoscale, matter has different properties. A new cultural paradigm is formed by the convergence of several disciplines: nanotechnology, biotechnology and biomedicine, information technology, cognitive science, together under the acronym NBIC that refers to nano-bio-info-cogno.

These conditions generate a feeling of magic, of presence of an occult science, a source of power beyond that provided by the perceptive experience, already settled in knowledge and recorded by culture.

SCIENCE AND MAGIC, SCIENCE FICTION

The importance of science fiction in the course of researches in nanotechnology strengthens this enchantment, while science still searches for a narrative to describe what happens in this world by the difficulty to understand its properties. The science fiction narrative is more intuitive and fantastic, contributing for an opening to new scientific perceptions.

In literature, Suzan Lewak presents nanotechnology and nanoscience focusing on an analysis between her enchantment and that found in Alice in Wonderland, by Lewis Carroll. She shows Alice's journey as a useful metaphor to nanotechnology, which "is a magic that is predicted to become a valid part of human experience." [1]

In Carroll's book, it is not the tiny scale of the environment where the story takes place that enchants, but the enchantment presented and validated by itself. The child's imagination is set free, with no moral messages. What Alice must realize to experience this new world is that "there is a 'logic' to Wonderland,

she must... learn to accept Wonderland's microscale logic as a separate entity which operates according to its own set of principles." [2]

In a similar way, we realize as magical the properties and the matter behavior in nanoscience, but they are ruled by the laws of quantum mechanics. Used to perceive the world as a set of things, more or less solid, how do we react to this set of molecules swirling in a frenetic dance of electrons?

THE SENSES AND THE POETIC IMAGINATION

Let's bring back the question of the predominance of sensing over seeing in the nanoscience and nanoart world. William J. T. Mitchell claims the nonexistence of a sense, in a pure state, as to the specificity of media to organize them: "there are no visual media." [3]

Since the avant-garde movements, art seeks the integration of all senses: in nanoart, this has to start from scratch because one can not physically touch the matter; there lies a perceptive ambivalence, between the microscope and human.

In the mean while seems to be a clear consensus about the classification of first-order senses: sight and hearing have been dominating our occidental culture and art. Some current thinkers as Roy Ascott, in digital art, and Madalina Diaconu, in aesthetics, follow this classification.

Diaconu says that touch would be among the secondary senses – touch, smell and taste (according to phenomenologists), which in principle could not produce art because "they deal with ephemeral stimuli and consume their objects." [4] Diaconu gives careful considerations to the exceptions in arts that are transitory, such as dance, theater and music, where the touch prevails, to what we add digital animations.

The properties of digital animations are introduced at the beginning of the new Technologies of Communication when Mario Costa places the Aesthetics of Communication in Cyberculture as an aesthetics of events that are not reduced to a form; they present themselves as a space-time flow, an interactive living process. They are a mobilization of the energy that replaces form and object.

This energy mobilization in digital art is updated by bits, in nano, is present in atoms and molecules allowing us to speak of a quantum event.

Roy Ascott identifies "digital, somatic, and pharmaceutical" [5] as second-order senses. Within the first order, he includes further senses according to neuroscience: "pain, balance, proprioception, kinesthesia, sense of time and of temperature", similarly so with the ranking of secondary perceptive senses by Diaconu.

Ascott identifies four forms of sensibility, among which we travel freely in our current experience: physical presence in ecospace, apparitional presence in spiritual space, the telepresence in cyberspace and the vibrational presence in nanospace", what makes us return to the domination of the tactile and haptic system in nanoscience and technology.

The philosopher Gaston Bachelard assumes the universe of imagination and poetry where senses are never seen as isolated or working separately. According to Bachelard the poetic image does not germinate from a perception of the senses, but comes from a "poetic revery as a phenomenology of the soul." [6] This classification echoes in Ascott's "second order senses. Technoetic senses." [7]

ART BEING GENERATED IN NANOART

The presence of atoms and molecules energy, decoded in images, is something quite new to us, artists, and the way we display it in artworks is still in its earliest stage.

Having no history, it asserts itself by the search of artistic techniques for its own achievement and, at the same time, aims at breaking them. If Art History depicts the struggle of artists to destroy parameters and evolve in the interstices of accepted knowledge, nano art performs in a space without boundaries, where the constitution of the artwork-subject conflicts with the continuous flow of energy, in a cosmic dance of molecules, which becomes visible in this field where the real and the virtual, the potential and the actual still flirt, things that we are just starting to perceive. To us, artists, it offers the opportunity to penetrate our creative interiority, a magical space where the act of creating explores the possibility to experience wonder for wonder, and deliver it to the community in a new perception.

Among the means used to creating in nanoart, we define:

First - The use of images generated by research lab microscopes, on which artist and scientist work together. Several artistic techniques are used. Cris Orfescu was the first artist to create a group to work under these conditions: NanoArt 21.

Second - Artworks that use a metaphor to translate the perceptive conditions themselves into a nano environment. Some outstanding artists: Christa Sommerer and Laurent Mignonneau, and Victoria Vesna who worked together with scientist James Gimsewski.

Christa Sommerer and Laurent Mignonneau, *Nano-Scape*, 2003, is an artwork with little visual information, where the sensing perception prevails. According to the artist, it is an invisible sculpture, like the nano world. She wants to reach this world throughout intuition; she uses a wireless magnetic force interface so that the visitor can create an invisible sculpture by touching with a ring, a table prepared to this experience.

Victoria Vesna's and James Giimzewski lead us to the experimentation of philosophy issues on the impact of this emerging science over culture in general, in interactive installations.

Maybe Blue Morph is the most paradigmatic artwork of these two; it uses images and sounds obtained by an Atomic Force Microscope from different phases of the metamorphosis of a caterpillar into a blue butterfly in a sound process called sonocytology. The poetics of the artwork is built to generate a poetic and mysterious environment where the scientific information is invested with a sense of magic.

There is the suggestion to transform the visitor and here Vesna meets Ascott's ambition of a codependency between the observer and the observed object in "technoetic systems (digital, somatic, pharmaceutical) designed to enable us to traverse further states of consciousness, to access psychic states, and extend our spiritual awareness." [8]

200 MILLION YEARS - DURÉE, 2010

As an active artist, my research is always combining theory and creative practice and ponder over it. This installation is part of a trilogy: *200 Million years – Petrified tree,*2010*, 200 Million years - DURÉE,* 2010 *and DURÉE,* 2011*.* For its accomplishment, I faced lacunas in the traditional art education, where there is no priority development of the sensorial systems, tactile and haptic; I sought for perceptive experiences arising from body contact, during my training in Laban movement for enhancing my sensibility; in the extension of conscious while penetrating the unconsciousness, in active imaginations in Jungian analysis, where the boundaries of reality are broken similarly to the experience in nanotechnology and nanoscience.

In *Petrified Tree*, only the imaginary information of the petrified tree was activated. For the first animations, images derived from the Scanning Tunneling Microscope were used, seeking to give movement to geometric forms suggested by those images. There are archetypal forms found in drawings since the beginning of time, and also in nature formations: in the Ypê tree bark images, an hexagon; in the petrified tree, a sphere. A dominant color to each instance was assigned to those images.

The installation has a little box, with mirrored sides, containing a digital picture frame that displays images of the first JPG animations, combining in sequence the sound created by Wilson Sukorski, a musician and special sounds and instruments inventor who has helped me in my research. By the side of the box, in a large scale, two animations are projected: one is the same in the box, in which the viewer is also included; and next to it, another one in 3D displaying poetic images scanned by the Scanning Tunneling Microscope.

The project for the installation *200 Million years* - DURÉE was presented at FILE 2010, São Paulo; 9º International Meeting of Art and Technology, UnB Brasília, 2010 and the art work exhibited at the international exhibition EmMeio#2, in the National Museum of the Republic, Brasília, November 2010. It features a digital animation and a vibrating chair. Sound was created by Sukorski and is presented in a hybrid form with the image in order to emphasize the tactile and haptic perception, generating a vibration that is felt by the body.

The scientific images derive from samples of a petrified tree that grew 200 million years ago in a paleontological reserve of Mata, in Rio Grande do Sul; seeds of Ypê and Reseda trees; a branch of a Reseda tree and the bark of an Ypê tree scanned by the Scanning Electron Microscope and the Scanning Force Microscope (Instituto de Física da Universidade de São Paulo, São Carlos; Laboratório de Filmes Finos, Instituto de Física, Universidade de São Paulo, São Paulo; Centro de Nanociência e Nanobiotecnologia, Universidade de Brasília).

Animations of poetic nature were created from these topographic images in 3D computer programs. The still images generated by the computer program connected with the microscope are in tiff format, and even if they are seen in the third dimension with topographic quality, they do not show the necessary technical characteristics to create 3D animations. An independent object that can be animated is required. To this purpose, I worked with the program, Blender, in order to obtain a bitmap of the image, which was then transferred in sequence to 3D format, where I created the animations.

While science and media try to capture images from these tiny particles to understand their properties, DURÉE tries to make them accessible, poetically and intuitively, according to the felicitous space of Bachelard, a space that "... has been lived with all the partiality of the imagination." [9]

My digital animations, despite being usually abstract, have their origin in tales and mythologies, as seen in Saci, Tiamati, Mahamaha. This magical atmosphere beyond the daily reality, was activated in the poetic narrative of DURÉE, where 200 million years are placed in that same quantum of the nano scale.

THE CREATIVE PROCESS

My body is connected to the universe through nature in a growing complexity; in a process of bottom-up as scientists call the path that arise from the possibility to rearrange one by one the molecules position. Not only the biological body, but my whole being.

While walking in a nanoart installation, we carry the experimental and conceptual burden of culture, and we have to acquire new perceptive experiences to fully enjoy the experience in nanotechnology and nanoscience.

In *200 million years – DURÈE*, imagination irrupts and uses intuition to find something that can unveil the invisible in a nano scale during all this period of time; a possibility arises: to think life as a duration – Bergsonian durée. Bergson establishes that "the essence of duration is to flow … the flow is the continuance of transition, is the change itself;" [10] to the work under examination, its updating vehicle is the digital animation, what integrates the idea of flow, of a continuous happening, of an event, not matter but energy.

Since the world of nanoscience and nanotechnology floats between matter and energy, all microscopes offer to our eyes can be seen as magic representing something that can not be represented and that constitutes simultaneously the basic stuff of the universe.

The memory, the durée, has to promote changes for new associations that exceed the boundaries of the time spent and include the future. "The real duration means simultaneously indivisible continuity and creation." [11]

THE VIBRATING CHAIR

In order to experience the dominant condition of the nano environment, that of the energy in the boundaries of matter, using a perception relating to the tactile sense, a chair equipped with a vibration engine modified by a device that operates according to the rhythm of the sound of the animation was created. Since the beginning of my research, I considered the effect of vibration as a possibility to include the haptic system in the artwork. When seated, the visitor experiences the matter, seen as compact and still by Newtonian physics, in its energetic quality of atoms and molecules, and experiences the animation in a sensorial perceptive set that spreads throughout the body. I looked for generating a dramatic tension on the visitor that exceeds the daily experience of reality. The intention is to be a participant not a voyeur. One must seat to watch the video.

The images perception is altered when we sit on the chair because the vibration leads to a state of half trance, while liberating the ego to new perceptive apprehensions (when one remains seated for a long time). The sound, the music, is intended to open the soul to new sensitive experiences.

The installation includes the vibrating chair and a video projection on the front wall.

DURÉE

It is the second version of the approached installation. There is a modification including three projections of the same animation, which circle the chair activating all vision fields and creating an immersive environment that emphasizes the ambience magic.

The artwork is not the vibrating chair, but the concept of vibration as an haptic perception which drives to the origin of energy in a field where the connectedness is both macro and nano. The experience includes an inner space and an outer space.

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DIGITAL MEDITERRANEAN AND NEW MEDIA DIALOGUE

Herman Bashiron Mendolicchio

Is it possible to realize a new social and cultural Mediterranean dialogue through media technologies? How does it change the practice of conversation, exchange and dialogue in the digital era? How do art and creativity operate, interact and influence in the "Digital Mediterranean"?

A new media landscape – transformed also by art and creativity - is defining and challenging the social relationships and interactions within the Mediterranean area.

The convergence between art, creativity and new media in the contemporary global framework offers a different way to think about the community with its local connections and intercultural relations. In the Mediterranean context this new way of thinking is currently developing a renewed awareness of concepts like "mobility," "representation," "mutual understanding," "connection," "dialogue," "exchange," "network" and "flux" that help to foster an increasing production of ideas, artworks, seminars, researches and new forms of encounter.

The fields of study and research, the practical applications of creativity, and the cultural production within collaborative spaces are all becoming more and more transversal, hybrid and ambitious. The opening of platforms to share projects and visibility where participants can meet, learn and discuss about the intersections between art, new media and socio-political changes are essential experiences that are seeing an impressive and constant growth.

Intercultural communication is extending and developing itself through multiple mechanisms: we seek, we find ourselves and we interact more regularly through technological tools and social networks that act as platforms for gathering, disseminating and sharing knowledge. Online participation experiences, festivals, exhibitions and virtual galleries, research and dissemination of free information, platforms of social and political criticism, etc., are just some examples of the stages where art, creativity and new information and communication technology meet and converge. Thus the Internet becomes the continent where *multiple cultures, one humanity* coexist (Bauman, 2008), where the in-between element of the border disappears.

As stated by Biserka Cvjetičanin:

"Cultures develop through complex dialogues with other cultures. They cannot develop "next to each other", but through dialogue and interaction. In today's digitalized, competitive and conflicting world, no country or region, no society or group can subsist by itself." [1]

Communication without borders and the encounters between different cultures create new models of plurality and new forms of sociability. The social value of technology and the potential of transcultural networks are generating a new way of intercultural relations and exchange, a new flow of ideas and information, a new sensitivity about global challenges and a better understanding of different cultures. According to Cvjetičanin:

"Today, the entire field of international relations involves the activities of transnational and transcultural networks. They have an important position in redefining global communication and cooperation. (…) Through their non-hierarchical, heterogeneous and horizontal character, and their flexibility, networks foster the exchange of different cultural values and facilitate intercultural dialogue." [2]

A global transformation in terms of communication and exchange is taking place. The territory of the Mediterranean is now experiencing a deep social change and a new form of interaction between people, places and cultures. The raising use of digital tools and Internet in the Southern Mediterranean and the Middle East is an evidence of these changing realities:

"There are even studies that affirm that the Middle East has the second fastest Internet traffic growth in the world with a growth rate of 97% a year since 2005, below that of South Asia (…) The growing use of the Internet was initially shaped by the demographic structure of the region, intimately linked to youthful protagonists of the region who have perceived the net as a window to the world." [3]

Equally contemporary art practices have been deeply influenced by the evolution of communication tools and processes and, therefore, have experienced a transformation of their way of perceiving and representing the world. In the universe linked to artistic practices, collaborative models have emerged, and new spaces have been built to meet and to create relational platforms. The current changes, especially in the hybrid territories between art and communication, are many and complex and that is why it is necessary to study and analyse these phenomena from different perspectives.

Thanks to the complexity of the Internet and the enormous popularity of the participatory tools of new media - which belong to the 2.0 generation and model – more and more artistic and creative festivals, exhibitions and events are organized online. Within the 2.0 model we need to mention the "Online Arts Festival" organized by EMYAN (Euro-Med Young Artists Network), whose main objectives are to promote information and communication technology (ICT) tools in relation to arts and creativity. The EMYAN Network proposes a virtual meeting among young artists and researchers in the Euro-Mediterranean area, thereby challenging current problems of borders and mobility. As its organizers explain and highlight:

"The idea of the Online Arts Festival is to nourish the values of social and cultural coexistence of the cultures of the Mediterranean via new media technologies. One of the fundamental aspects of enabling a platform where young artists can participate with their creativity within the Mediterranean arena is the fostering of knowledge, values and perceptions of each other in the region." [4]

Other exhibition projects, virtual galleries, and e-conferences like the Web Biennial, organized by the Istanbul Contemporary Art Museum, or the Padiglione Internet, linked to the Venice Biennale, are changing the panorama of the art production and its dissemination.

In this new landscape, if we focus on the Mediterranean area, we can find other activities like the online dialogues on art and science in the Mediterranean that take place through the YASMIN list: a "network of artists, scientists, engineers, theoreticians and institutions promoting communication and collaboration in art, science and technology around the Mediterranean Rim." The need to create new spaces to debate, to share ideas and projects between art, science, communication and technology is also manifest in the mission of IMèRA centre in Marseille, a place where the Mediterranean became a research space without disciplinary or cultural borders.

Multiple projects coming from the Southern Mediterranean – like the Arab Media Lab or the Arab Platform for Art and Technology (APAT) – contribute to draw a new map and a new language that will challenge and transform the picture of the entire Mediterranean.

There are many questions that arise around this topic:

Is it possible to promote a new social and cultural Mediterranean dialogue through media technologies? How the new media dialogue changes the mutual understanding and knowledge? Is Information and Communication Technology (ICT) a new stand and tool for intercultural education and understanding? How does it change the practice of conversation, exchange and dialogue in the digital era? How do art and creativity operate and interact and what kind of influence do they have in the "Digital Mediterranean"? How have artistic practices, curatorial exercises and cultural production in the Mediterranean changed thanks to new media, digital tools, ICT? What kind of social and political impact have they introduced?

As the Italian artist Michelangelo Pistoletto said:

"Art does not become a policy to express sympathy with an ideology or a system or a party control but rather develops the mission of creating a space that does not yet exist, because we still have to discover how to exist together without conflicts. For this to happen a new way of thinking is necessary, which does not have its origin in a defined system, but in creativity, capable of creating a new fabric of relations between the many beliefs, religions and powers." [5]

There are several projects that combine real presence and virtual communication between "relational aesthetics" and the tools of Web 2.0. The ambition of these projects concentrates in finding different ways to create connecting points where different Mediterranean cultures and people can meet and share their visions, and their creative expressions and thoughts.

A new media landscape, transformed by art and creativity, is currently defining and challenging the social relationships and interactions within the Mediterranean area.

Digital bridges are converging into a new "Mediterranean Agora" where thought processes, language structures and relational dynamics are involved in a deep structural transition.

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WHAT WOULD WE MEAN BY REALISM?

AMANDA BEECH

This paper asks how speculative realisms may be in fact proposed by the image and explores what conception of the social this operation of the image produces now. If the causal ties between artwork and world are no longer connected or guaranteed, then what conception of the artwork and the social is now drawn? What is this world of images without us?

Technological power as the work of reason, its aestheticization and conceptualization in art and philosophy has been the site of an exploration of what it means to think past the human condition, to face the unknown and to reason out the unfathomable world, cosmos and universe that we inhabit – to avoid the problems of subjective perception and to think the science of objectivity. However, the consequence of this is that any attempt to speak of this non-human orientated world has problematically found itself as the primary correlate to human finitude, unable to surpass the binary formulation of human/nonhuman, subject/object that it claimed did not exist in the first place. By now we know and understand this dualism as a well-worn cliché, especially if we read or watch any sci-fi. The image of 'technology beyond our control' has situated our self-understanding of our power, our potentiality *and* our finitude. But what this tells us is that ironically, discussion on anything that we seem unable to control instead becomes quickly refigured as the ideal description of the human in crisis. Therefore, it is human life and human death that are primed as the thing that matters, despite these claims to think past the human condition towards matter itself.

Ernst Jünger's work in particular plays out the paradox of untying the human from both the image and power and could be said to prefigure these problems. Jünger's, antimodern fantasies from the 1930's focus on images of industrial technology as the ultimately non-human. Jünger's work pictures a totalitarian nightmare or sci–fi horror of an absolute techno-culture, where faceless mechanistic power controls right the way down from the alarm clock that wakes us to the camera lens whose ability to replace and produce reality brings violence ever closer. He writes: "In our technical era the individual appears to be evermore dependent, 'unfree' and endangered but the nature of these bonds are less visible than those of the feudal era. Hence they are even more absolute than the absolute monarchies." [1] For Jünger, the only way to live with this metaphysical force is to embrace it in the form of a romantic nihilistic self-sacrifice. Here the body must become technological so as to "unravel the logic of violence." [2]

Jünger's theory seeks to overcome the problems of a representationalist metaphysics as well as the problems of Marxian dialectics by refusing to revolt against techno-Capital as a form of bad dominance. Jünger seeks to think past a tragic definition of human life in the face of a Big Other, but paradoxically does so *for the human* where the image of techno violence becomes site and condition for, and therefore is directly correlative to gauging the success of human power. The formalism encountered here now appears as a form of kitsch and likewise we can say the same for a variety of artistic practices and in particular those most familiar to the body art and performance arts generation around the 1960's onwards. Here we see that both the body and psyche act as a prime site for a testing of 'the beyond' through technology. These practices take an easy place within the history of the subject, a history that often settles in the same schlock mysticism that we see in Jünger's work. As such, despite its many

claims to be speaking of a world beyond human control, we refer back to a binary formula of that mingles biology and techno-power in an aesthetics of mechanistic cool and abundant excess. Both the body and individual identity remain as the site for this figuration.

What we see emerging here is a central problem; the de-ontologised real of our reality, namely a conception of a post-metaphysical world, is correlated to the forces in our lives that we identify as dominant and pervasive, and beyond our mastery – effectively a matching up of empiricism with transcendence. In other arts practices, and in particular those that share the dialectical methods of Critical Theory, we have seen the identification with language itself as the place of the non-human, where language as our essential technology is understood as alienating and beyond our control, despite it being made by us. This paradox lays the heart of Adorno and Horkheimer's *Dialectic of Enlightenment*, where we see core connections between the image, its ability to manifest power and its (albeit) negatively construed correlation to reality. Adorno and Horkheimer's work looks to how this dimension of language-power figures a crude, barbaric and miasmic nature in a kind of post political reality that desublimates individual identities to the equivalence of an animalistic totality. The base of the operation is Hollywood, and as we know this highlights a deeper irony where these the two sides have shared a mutual popularization. Crucially, for Adorno and Horkheimer, a knowledge that knows the dialectic is capable of transcending the horrors of similitude, but it is here where this knowledge is expressed where we encounter a key problem. This is centrally because this knowledge is married to a form of mysticism, and significantly this is most evident when it comes to an understanding of art. Here arts re-politicized form is correlated to what is considered to be its essential nature, that is, arts politics is conditioned upon the natural ambiguity of the image.

Furthermore, it is important to dwell for a moment on the contradiction that this twofold status of the image produces. On the one hand the image is considered as the site of a constructed reality that takes the form of nature, and on the other hand it is considered as the means to transcending it. It is the prime symbolic referent to dominance and it has the ability to access a deeper unconditioned reality. To achieve this double operation the image is compelled to become the primary figure for a politics that it claimed it had no access to in the first place. It is asked to be both the guarantee and cause for political transformation. In thinking these asymmetrical demands together the image is mystified further towards a concept of a deeper concept –less nature. Problematically such a conception of the image can only serve to set of the limitations both for itself and politics.

But this problem of how an antihumanist realism can be thought in terms of the image can be does not end here. We see it in the problems of manufacturing the relativity of chaos in the world of the given where reality is represented to us very often in an aesthetics of dissonance, arrhythmic atonal music, base materialism, punk and other visions of excess. These images are first problematic because they are understood easily as genres, their dialectic form simultaneously figures the object of our constraint whilst being the key to our freedom: a nexus that figures the image as the space of torsion. This is opposite to the freedom its authors had hoped to access. But in addition to this, the image becomes an illustration of our relation to it. In aspiring to point to an unmeasured nature beyond us, a world that we cannot master, this image ends up as a weird reflection; the mirror of our nature. It finds its form in a Kantian-style psychosis of mimetic compulsive gestures that resides in the pleasure of a twisted and masochistic anthropocentricism. This image of world beyond us, in fact is a story that narrates our relationship to ourselves. The image can only be for us and by us. Here the big error is easy to spot: an ontological relativity is produced despite claiming its empirical impossibility.

To make some early conclusions:

1) These approaches to meaning is that they assume too quickly that the work of producing meaning is tied to a theory of causation.

2) At the same time and in direct contradiction to this, they assume that the image is naturally free.

If we take these two points together, the image can only be understood as mutually weak and special or evil and banal, a tool for power, but at the same time the figure for freedom. In this schema the last stop for the image is unreason. Ironically it is such a statement that has defined the conditions of arts politics for generations.

3) What is common and also worth focusing on when we look across these materialisms that try to think through the conditions of the world without us, is that they all are subtended by an impoverished theory of meaning. Here we begin to see in much sharper distinction between an image of knowledge that illustrates our relation to language as a form of knowledge and the intended but failed aim to think contingent reality.

Therefore, crucial to this paper is that we think past this problem and more urgently that we re-think the operations of the image that can get past this poor mode of illustration.

Our task therefore is neither to annihilate the image in the name of a true reality nor to assume the image has privileged access to it. To do this I want to draw upon some of the work of Quentin Meillassoux with attention to his arguments in the book, *After Finitude.* Of course if we mention the term politics, then a question of how we comprehend reality has at its center the question of causation, namely, how an understanding of reality might condition and refigure the world that we act within. Having established the landscape of representationalist and causal problems in the past few examples I have discussed, my central aim is to understand how meaning takes place, how words and language can be taken seriously without mapping a version of reality back onto the political or by mapping empirical claims to a transcendental reality. Rather, my aim is to understand how this has consequence for the political and to do this is to commit to a thinking of action through the unbinding of the relations of image, power, and reality.

Meillassoux's work describes a world of super-contingency where any concept of the world being 'for us' is denied and any conception of practical reason is undone. This is a world without guarantees; it means that we have a radical denial of perspective, relations, and consistency. It becomes impossible to subordinate means to ends and therefore threatens any investment in practical means. Instead Meillassoux proposes a truth that is correspondent with our reality, in as much as it guarantees the inability to produce a theory of meaning. "There is nothing beneath or beyond the manifest gratuitousness of the given – nothing but the limitless and lawless power of its destruction, emergence or persistence." [3] Here we enter the realm of hyper chaos where disorder no longer stands as the prime reality of existence, instead contingency is so radical that disorder can be destroyed by order in an equal contingency of order and disorder.

Meillassoux's work refuses to condition another form of access or connectivity, for he asks to us to remember that contingency is banal, since not only does knowing contingency not transcend contingency but for chaos "...to remain chaos, [it] cannot actually bring forth the unthinkable." [4]

So how does this mind independent reality, this description of a contingency that is absolute, have any connection to or place within the formation of politics? The question here then is how this thought of a time without us can be understood without handing back the statement itself to the primacy of the thought that thinks that time without us? On the other hand, what form of knowledge can recognize the primacy of contingency as a fact, without reducing absolute contingency to an object of knowledge? [5] The task now is to understand how Meillassoux's work has consequences for understanding both reason and the image.

Language without correlationalism

A question of the politics of absolute contingency demands that we untie the question about what absolute contingency bears out in the political, from the question of what absolute contingency means 'for us'. We must then take this question from an antihumanist perspective. Reviewing Meillassoux's approach to language it is clear that whilst the representational faculty of the image is understood as inadequate to its object, the work of reason is capable of this adequation. Meillassoux contends, "a reality separate from the subject can be thought by the subject." [6]

Here Meillassoux takes us to the limits of meaning that are proven by scientific reason.

"The fact that I can't imagine the non-existence of subjectivity, since to imagine is to exist as a subject, does not prove it is impossible: I can't imagine what it is like to be dead, since to imagine it means we are still alive, but, unfortunately, this fact does not prove that death is impossible. The limits of my imagination are not the index of my immortality." [7]

These limits are not defined in tragic terms. This 'death as a fact' statement is not reflective of a mortality, or finitude, instead it situates a new potentiality for the work of reason. However, Meillassoux's dedication to scientific thought over a thinking of the image demonstrated in his clear distinction between reason and the imagination sets up a problem since it describes a return to the kind of idealism that he seeks to escape. This is where the thought of the fact of death acts as the fact of non-relationality – a transposition to the primacy of thought it. This idealism is underscored by his rejection of any analysis of how 'the world of the given' is conditioned through such statements, or how such statements emerge within it. Duly, this work creates urgency for a renewed attention to language, specifically this form of rational language and its operations, as well as how this connects to the manifest image. By looking to how meaning works in relation to facticity I hope to overcome the problems of idealism of a particular form of scientific thought as well as the censorship of the imagination that seems core to Meillassoux's argument. I'm not going to go into this in any great detail but in this final section, I'll sketch out a few points that move towards this. The first ties reason to cause, the second looks to absolute contingency as metaphor and the third identifies a heteronomy of reason and imagination.

First of all, the methods that Meillassoux's puts into practice point us to a divergent reading of the operations of reason. Meillassoux's logic is built on a literal approach to language, where facts are facts. Facts are taken seriously to the point that they exceed the subject who claims it. This literalism allows us to identify another form of adequation where reason operates as a form of action and force. Here, language succeeds in transcending the limits of the human and is not refigured back onto it. The work of Donald Davidson lubricates this observation, specifically his assertion that "reasons are as much causes of, as they are explanations for action." [8] Therefore, the make-up of this factual claim is action and reason, and these now appear unbound from a general principle of cause, because cause is simply the non-linguistic physical relation of these objects.

Secondly, it is here where we could say that the work of Meillassoux's absolutism resides within the world of metaphor. According to Davidson, "metaphors mean what the words, in their most literal interpretation, mean, and nothing more." [9] And I think the same goes for Meillassoux – whether he likes it or not – since the thought of the absolute in Meillassoux relies upon the referential qualities of language, both to justify the fact of absolute contingency and equally to cause the unbinding that speculation requires. The reason that thinks the absolute nature of contingency makes absolute contingency the metaphor par excellence, and this metaphor in its absolute nature has to be understood literally. Therefore, whilst representationalism as a mode of producing meaning is limited in Meillassoux's argument, the meaning in its metaphoric operation is alive and well. This opens a vista of new possibilities, just as for Davidson, taking metaphors literally allows for new practices, understandings and meanings to be produced. It is through this metaphoric condition where I'd identify another kind of realism; a realism that produces a mix of the speculative (the might be) and the specific (the matter that is that speculation itself). "This is indeed a speculative thesis, (says Meillassoux) since we are not thinking an absolute, but it is not metaphysical, since we are not thinking any thing (entity) would be absolute." [10]

Thirdly, we must also remember that by Meillassoux's lights we would have to split reason and the imagination as categories that do not and will not meet. However, in thinking reason as cause, or the force of naming facticity we must not only consider the language operations of scientific statements in empirical terms but we must also how the site of the imagination names and produces these facts. Here we can think through how the thought that thinks fact operates in a new heteronomy that complicates any distinction between reason and the imagination, where this force has no will or essential direction, no referent or map, only terminus.

Any reconnection between reason and cause, and reason and the imagination might seem to replicate all of the problems I reviewed at the beginning of this paper. The former might fall back into a some form of instrumentalism and the latter might suggest a renewed focus on the subject, moving us from the problem of idealism of thought in Meillassoux, to another idealism: the subject that thinks thought. However, since there is no principle of cause at work here, there is also no ontology or objectifying concept that would ground these relations, and because we cannot tie this indistinction between reason and the imagination back to a coherent subjectivity that thinks it, since facts are unrelated to human will, we do not idealize either the subject as a thinking being, nor the thinking that is thought by it. There is no longer an image of reason that would operate as the delineation of our knowledge or our finitude and we can avoid the mistake that is to graft some image of our knowledge, as technological reason, at the center of our internal psychological fears or towards some externalizing force of secret dominance that this image may hold.

Taking this to artistic culture, we now can think about a radical untying of what we understand to be the necessary and the instrumental. Whilst Meillassoux's speculative materialism guarantees the unbinding of instrumental reason, the understanding of the condition of meaning and in particular not just what the image can mean but also what a conception of our reality without us means within the reality that we reside. This is a question of meaning without us, and the reconditioning of an understanding of language interpretation as being always already tied to our mind and body – this is an escape fro the circle of referents where art is understood as a personal message to us and a general message about us.

Rethinking art as a factually non-relational entity that is also capable of meaning shatters these habits and sets out to evacuate the genres that confuse themselves for a deeper and meaningful experience of a truth. It overcomes the kinds of banal mythologies and nostalgic horrors that recount that which exceeds us, and returns us to a face a different and truly alien world.

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REMOTELY CONNECTED, REMOTELY CREATIVE: LEAPFROGGING THE DIGITAL DIVIDE

Tracey Meziane Benson

What does locative media from remote Australian Indigenous communities look like? How does access to 3G mobile phones impact communications? What media is being created on these devices?

This paper discusses some of the strategies being used in remote Australia to leapfrog the digital divide; scoping the potential to introduce tools that encourage creative development and collaborative cultural engagement focused on skill sharing.

Remotely online, image credit Andrew Taylor

It is often said that Australians pick up on new technologies early, in particular those that assist with communications across distances. However, there is limited Internet access depending on where you live, with many remote communities having no access via phone line modem, broadband cable, satellite or Next G mobile phones. Distance is a great challenge in remote areas as there may be hundreds of kilometres to the next town, making the provision of essential infrastructure and services difficult.

This paper scopes some of the strategies being used in remote Australia to leapfrog the digital divide; and explores some key findings of recent research focused on a number of remote Indigenous communities and access to the Internet and mobile phone networks. The scoping exercise is aimed at developing a best practice approach to collaborating with remote Indigenous communities to develop effective information communications technology (ICT) literacy skills and improved access to communications technology.

Background

My interest in mobile phone Internet delivery evolved from a larger interest in new technology especially accessible and usable web design. I work in a government organisation on a sustainability behaviour change program, which uses a website as the delivery mechanism. There has been significant research undertaken for this project, which includes testing with audiences, using appropriate levels of language, ease of navigation and compliance with web standards.

The decision to research online access for remote Indigenous communities came about after I read an article discussing the high uptake of mobile phones in remote communities, particularly 'smart' phones with 3G Internet access. This was shortly after attending 'Web Directions South 2010' in Sydney where I was switched on to flexible device delivery with a web standards approach (which encompasses accessible and usable design). The developments in HTML and CSS have added increased flexibility and functionality to web design, making websites more elegant and streamlined. Cleaner code can potentially have a big impact on fast online delivery, especially if supporting images, video and documents are compressed.

As a means to build cultural understanding and working collaboratively with Indigenous communities, I became a volunteer for the Indigenous Community Volunteers (ICV) program. This non-government organisation works collaboratively with communities and volunteers to realise projects that foster sustainable community development. So far I have started work on one project that is based in Canberra, *Billabong Aboriginal Development Corporation*, where I am leading a web design project.

The Australian federal government have started the process of implementing a National Broadband Network (NBN), which would not only provide much needed broadband Internet access in the remote locations of Australia, but would also speed up Internet connections in urban areas. But is this the best method for the majority of remote Indigenous communities? Other countries have leapfrogged optic fibre for satellite broadband access to the Internet and this would appear more practical for remote areas.

Identifying a potential need

As mentioned earlier, there are still significant limitations to broadband access in regional and remote locations. In recent studies, it is noted that Indigenous social policy is trending towards the centralisation of services into larger settlements

There is much talk of 'closing the gap' between Indigenous and non-Indigenous Australians and this initiative has implications on a range of issues, most significantly access to health and education services, also other basic services like reliable access to power and communications channels.

"Closing the Gap" is an Australian Government social policy framework that is aimed at addressing Indigenous social disadvantage. In June 2009 an agreement was made between the states and territories of Australia (COAG) and the Australian Government to improve remote Indigenous public Internet access. A 2009 report titled *Closing the Gap: National Partnership Agreement on Remote Indigenous Public Internet Access* committed to investing in a number of priority locations around Australia.

Some facts and figures

The Australian Bureau of Statistics (ABS) reported that at December 2010 there were 10.4 million active Internet subscribers in Australia, compared to 9.6 million in June 2010. What was revealing in one of the tables of this report was that the volume of users accessing the Internet with wireless and mobile devices has been significantly increasing since 2006. According to the data published on the ABS website in December 2010, the use of broadband and wireless/mobile access is almost on par, whereas satellite access has remained static.

The 2006 Australian census of the population revealed that there was 108,143 Indigenous people (0.54% of the total Australian population) living in remote or very remote parts of Australia (ABS2006a). There are 1187 discrete Indigenous communities across Australia. Of these 865 (73%) have a population below 50 and 987 (83%) have a population below 100. The average size of those communities with populations under 100 is 20 people. The majority of the communities identified as remote or very remote are located in the Northern Territory, Queensland and Western Australia. Most of the governments 29 growth towns have a population of more than 300 people.

Cultural need for appropriate engagement

Since white settlement, there has been a plethora of laws and interventions for and about Indigenous Australians. For example, people are often surprised to know that Aboriginal people in Australia did not get the right to vote in elections until 1967. The landmark Referendum of 27 May 1967 approved two amendments to the Australian constitution relating to Indigenous Australians. Technically it was a vote on the *Constitution Alteration (Aboriginal People) 1967* which became law on 10 August 1967 following the results of the referendum. Of the Australian voting public who turned up and voted, 90.77 per cent voted in favour of the changes, which was an overwhelming response to the Referendum questions.

Just to give an example of the dire legal status of Aboriginal people prior to the 1967 Referendum, Western Australian Aboriginal people were controlled by the 1905 Aborigines Act. This Act gave the Chief Protector of Aborigines the powers of legal guardianship over all Aboriginal people to the age of 16 years. This power over-rode any parental legal rights as normally exists between child and parent. Many children, particularly children of mixed descent, were forcibly removed from their parents in droves and placed in white foster homes, missions, orphanages, and hostels. This era in Australian history is often referred to as the 'Stolen Generations'. Aboriginal parents were often not told where their children were, names were changed or the children told that their parents were dead.

In order to move from under the burden of the 1905 Aborigines Act, Aboriginal people had to gain Australian citizenship. Aboriginal people, under the Australian Constitution, were not considered to be Australian citizens and therefore, Australian citizenship was not automatic. If an Aboriginal person gained Australian citizenship, the 1905 Aborigines Act could no longer control them.

To gain Australian citizenship, Aboriginal people had to complete an application for citizenship in which their 'caste' and the 'caste' of their parents was stated, they had to prove disassociation from Aboriginal people and culture, provide a photo and references as to their good character. This went before a board who decided if citizenship was approved. Once it was gained, the Chief Protector of Aborigines could remove it at any time.

If you did not have citizenship, as an Aboriginal person, you were classified under the Flora and Fauna Act.

In 2008, Labor Prime Minister Kevin Rudd gave a formal apology to Aboriginal people who suffered under this regime. The event was initially seen as significant step towards acknowledging the many mistakes of past government policy. This gesture has been somewhat undermined by the continuation of the previous Liberal (Conservative) governments Northern Territory Emergency Response (NTER), which has seen the implementation of measures that appear extreme, include quarantining of welfare payments, bans on alcohol and pornography and a weakening of native title rights over homelands.

There have been many implications for Indigenous Australian as a result of policy decisions. The NTER, (re-branded and expanded after a change in government and after the formal apology as 'Closing the Gap') has seen many children removed from families. In 2009 it has been reported that 4300 Aboriginal children taken from their parents in New South Wales alone.The reference point that launched the intervention was a report of the Northern Territory Board of Inquiry into the Protection of Aboriginal Children from Sexual Abuse, *Ampe Akelyernemane Meke Mekarle, Little Children Are Sacred*, which found child sexual assault to be widespread throughout Aboriginal communities. These measures are highly contentious and there are a range of views both for and against approaches to managing social issues in remote Indigenous communities.

The problem with past and present government policy implementation is that there has been very little consultation with Aboriginal people about issues that affect them directly and significantly. This very short chronology highlights that there has been a continuing lack of respect and understanding of Aboriginal peoples and their cultures despite some successes.

In contrast, some organisations are making legitimate and serious efforts to engage with Aboriginal people respectfully and sensitively. For example, when I attended the two day training to be a volunteer with ICV, there was a lot of emphasis on how to collaborate with Indigenous communities in a culturally appropriate way. What was also emphasised was that volunteers work on projects that are owned by the community, and of which are focused on sustainable community development. This approach empowers the community to drive the project and build skills and resources for their community and its people.

Relevant research projects

To date there has been limited research undertaken in the area of Internet and communications technology access for remote Indigenous communities and the research that has been undertaken has varied results. For example, in the 2009 research titled *Report to Wujal Wujal Aboriginal shire Council on Mobile Technology in the Bloomfield River Valley*, it was documented that 55% of Indigenous residents interviewed in a survey had owned at least one mobile phone compared to non-Indigenous residents who had 71% ownership. This report also evidenced that there was reliable reception in some areas,

around 50% of the region identified. What was surprising in this report was the relatively low percentage of home based Internet, which was 9.5% and only 7% of private dwellings had a fixed phone line. Another point of interest was that many respondents had the perception that there was widespread use of mobile phones. This may be attributed to many families sharing phones, creating an impression that 'just about everyone has them'.

By contrast, the 2011 report *Home Internet for Remote Indigenous Communities*, focused on three communities Kwale Kwale, Mungalawurru and Imangara which all currently have no mobile phone coverage despite 30% of people owning a mobile phone. The people owning mobile phone, purchased the phone to use in town, there was a number Around 30% of this group used mobile phones to access the Internet for music downloads and or chat. Of these three communities only 6% of total residents had a laptop or a home computer, although 58% of people have used a computer at some time. Only two thirds of this group had ever been online and 75% of Internet users were under 30 years of age. This report also documented that the 2006 census revealed that only 20% of Indigenous households in remote and very remote Australia have an Internet connection, compared with 60% of non-Indigenous people in the same statistical area.

Both of these reports signal the importance of providing other alternatives to the NBN. The *Home Internet for Remote Communities* report recommends that a broadband assistance program be established to assist in the implementation of satellite broadband access and Wi-Fi networks. The Wi-Fi network would be available community wide, providing access to any dwelling as a shared resource. The Bloomfield River Valley report recommends to extend coverage in the area, reliable access to computers, train local people in managing mobile phones and the provision of an equitable Universal Service Obligation.

These examples also highlight that there is still a long way to address the digital divide for remote residents. One of the biggest challenges is that because mobile phone uptake is much higher than individual home access to the Internets, people are currently vulnerable to mobile phone companies installing transmitters so they have reliable access to mobile networks.

It has also been mentioned in the media and via word of mouth reports about how mobile phone companies are exploiting customers in remote areas because of limited literacy and awareness of the contracts being entered into.

An excellent video titled *Mobile Moola Matters* by students in Alice Springs High School, was a winner in the 2008 Australian Securities and Investment commission *Moola Matters* competition. The film discusses the dangers of high mobile phone bills. This humorous short film talks about how you can financially manage having a mobile phone with tips like using pre-paid and talking face-to-face instead.

Despite the fact that there is uneven access to communications channels there has been significant investment in media production and broadcasting by Aboriginal people in remote Australia.

Indigenous owned media production

Yuendumu is a community in Central Australia that had relatively early take up of communications technology. Early experimentation with video production, preceded the establishment of a 'pirate' radio station in 1985. Early video production activities at Yuendumu were associated with the Warlpiri Literature Centre.

Warlpiri Media's establishment coincided with the federal government's plans to launch the first Australian owned satellite - AUSSAT. The AUSSAT satellite brought national television to much of remote Australia for the first time. The deployment of AUSSAT involved the establishment of a Remote Commercial Television Service, the management of which was put out to tender. Alice Springs based Aboriginal media organisation Central Australian Aboriginal Media Association (CAAMA) was successful in its tender application launching Imparja Television in 1988.

Imparja is a private, fully commercial television company registered in the Northern Territory. It is globally unique, being totally owned and controlled by Northern Territory and South Australian Aboriginal shareholders, who do not receive dividends, investing all profits back into the development of the company. Imparja also provides the satellite access for National Indigenous Television (NITV).

By 1995, Yuendumu had access to email, video conferencing network, two television stations two radio stations and telephone and facsimile. Walpiri Media (now known as PAW Media) continues to have a strong interest in media and creative media production.

About RIPIA (Remote Indigenous Public Internet Access)

In 2009 the Northern Territory Government entered into an Agreement with the Australian Government to provide or improve public Internet access facilities and training services in computer and Internet use to 19 Indigenous communities across the Northern Territory.

The Project is jointly run by the Department of Business and Employment and the Department Natural Resources, Environment, Art and Sports through Northern Territory Library.

RIPIA aims to deliver the following outcomes:

- Increased public access to online resources and services, for financial, educational, health, economic and social purposes;
- Increased awareness of the benefits and uses of online resources and services;
- Increased computer literacy
- Increased information literacy enabling the search for, evaluation and use of online information; and
- Increased Internet use that facilitates transactions and communication with government agencies, businesses, communities and families.

In 2010 the Project was delivered to 19 Indigenous communities. In 2011 the Project will be delivered to 40 Indigenous communities which includes the 19 communities from 2010.

It is also clear from the many conversations I have had with people who have recently spent time in remote communities, that if there is Internet access, then there is a lot of participation on social media channels, mainly Facebook and YouTube. For example, at 1 August 2011 there was well over 1.9 million views of "Zorba the Greek Yolngu style" by the Chooky Dancers www.chookydancers.com, from north-eastern Arnhem Land in Northern Australia. The Chooky Dancers has used the Internet very effectively to promote their work and they have performed in film and on music videos.

Conclusion

At such an early point in the research project there are no significant conclusions as yet, except to state that there is still a significant digital divide for many people living in Australia which will not be sufficiently rectified with the rollout of the NBN. This paper highlights the need for a multi-pronged approach to providing Internet access to remote communities, including 3G mobile Internet and Satellite broadband.

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T/ACT - SOCIAL EMPOWERMENT THROUGH INTERACTION WITH MEDIA ARTWORKS

Andy Best

This paper presents results from research made through a collaborative design process with selected individuals with severe physical disabilities. The work encourages and enables creative expression by the participants beyond everyday norms. Can a disruption of institutionalized conditioning according to class, education, gender and physical abilities be orchestrated by careful design and presentation of interactive artworks?
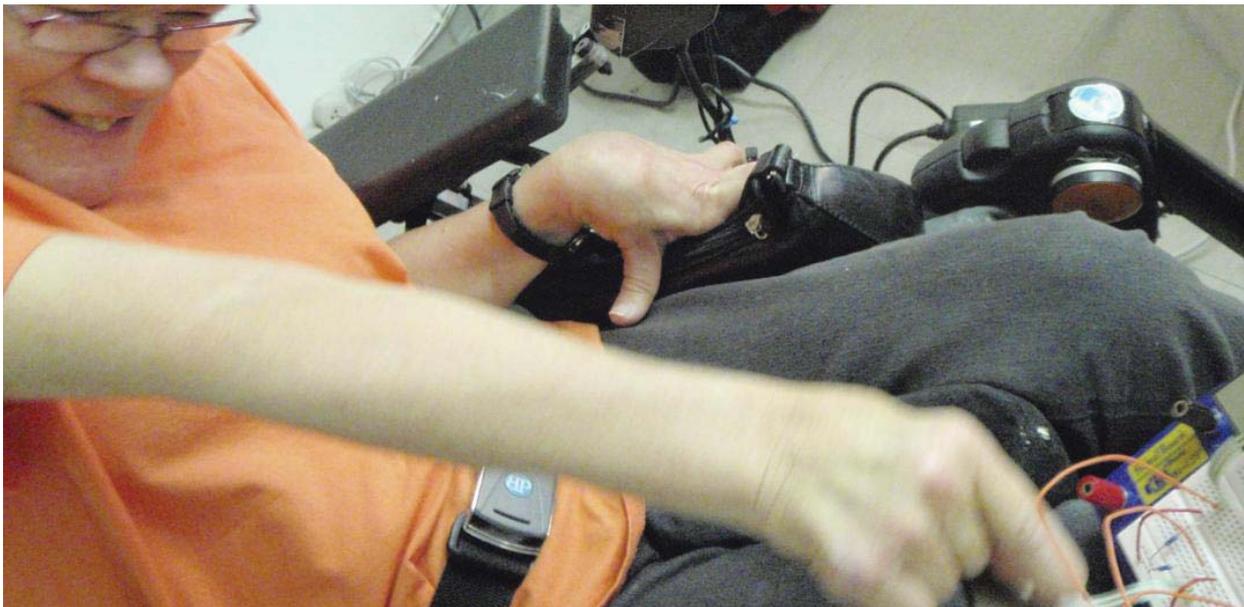
Fig.1. Eeva testing potential interfaces. Taika-tanssi, 2011. Photo copyright the author.

Fig.2. A community of presence evolves within the physically interactive art work. Empty Stomach, 2009, Andy Best & Merja Puustinen, at Eurocultured Festival, Manchester, UK. Photo copyright the author.
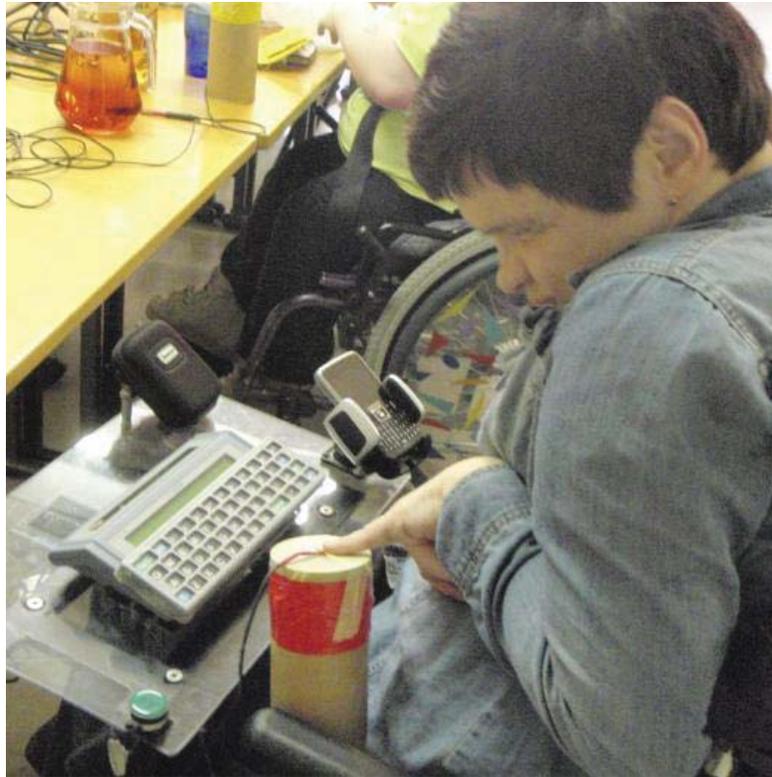
Fig.3. Sirpa testing a small drum and sensor. Taika-tanssi, 2011. Photo copyright the author.

Our current lifestyle is focused and reliant upon media technologies. Our lives are organised through and by technology, such that we can easily forget the importance of physical social interaction rather than which are mediated by online social networks. Instead of being empowered by technology, humans are enslaved to its seductive powers. Is it possible to move away from this focus on the technological and rather discuss the act of using the interface and the product of that action and the content? Does access to media technology in itself empower the participant, particularly if that person is herself on the margins of society? The Eye Writer project is a superb example of open source media technologies being used to empower a specific individual (Tempt One) and others with a similar disabilitating disease (ALS). [1] As Tempt One himself states:

"Art is a tool of empowerment and social change, and I consider myself blessed to be able to create and use my work to promote health reform, bring awareness about ALS and help others."

It is clear that the act of empowerment for Tempt One comes through a combination of access to the technology, the ability to once again create graffiti art, and his possibility to have a presence in the public city environment through the large scale urban projections of his tags. Each element is very specific to the individual in question. In the research described in this paper the author attempts a broader area of investigation. Can the use of media technologies enhance the possibilities for people with disabilities to express themselves creatively on equal terms with able bodied people?

This paper presents ongoing research into the effects of physical interaction with audiovisual systems through a discussion of the results and observations from collaborative design workshops organised for

a group of people with disabilities. The author, as a media artist, had not considered working with people with disabilities until a visit by a group of students from Beaumont special school to the Lanternhouse International arts centre in the north of England where he was undertaking a residency. As these students with severe cerebral palsy were encouraged to touch and interact with the installation which was on display for them, it became apparent that the colour, form, sound and overall interactive environment they were confronted with provided a powerful and provocative stimulus, causing emotional reactions which surprised their carers. A follow-up visit to the college showed that although well equipped with musical instruments, media and audio software, most solutions were generalized rather than individually tailored to each student's needs. This approach may work for the able-bodied person where we all have approximately the same physical abilities, but for a person with disabilities this can be totally inappropriate and very frustrating for all involved. Together with musician Alan Fitzgerald the author proposed to develop bespoke electronic interfaces for a small group of students. In particular it was hoped to examine the following question: If a unique interface is created specifically for a particular individual, can an examination of the use of this interface lead us to answer questions regarding interface design in general? Unfortunately at the time it was not possible to carry out this project in England, but since the beginning of 2011 the author has been investigating similar themes through participatory design workshops with people with disabilities belonging to the Taika Dance group in Turku, Finland. The majority of the participants are electric wheelchair users and have severely limited use and control of their physical bodies, while some have more mobility. They have their own social networks, yet as a whole they can be regarded as on the margins of society with little voice or visibility. Does access to media technology and the ability to create visual and audio performance lead to a wider social empowerment in society for people like these with disabilities? Does the same effect happen for the wider public at large when they are able to interact deeply with a media art work?

Through a participatory design process, the aim of the workshop sessions has been to develop personal interfaces which might be thought of as bespoke electronic musical instruments made for each individual. Due to the practical difficulties involved with all aspects of the collaboration – logistics, communication, and basic bodily needs – progress has been slow, but fruitful. As this group of people have had no prior possibility to make sound or music, the process started with getting to know each other via "off the shelf" solutions. A midi keyboard and controller were used to provide an immediate experience of actually creating different sounds. Using Max/MSP and Reason software, samples and sound parameters could easily be modified. Sounds were also recorded from the participants own voices and mobile phones to use as samples. Even at this simple level, the experience of hearing one's own voice played back and modified to create interesting or weird sounds was stimulating for the group. Participants soon felt confident to contribute their own ideas and suggestions for the sounds.

The next level of interaction involved gradually introducing different types of electronic sensors and interfaces, allowing the participants to experiment and play with sound in ways that were totally new for them. The author is familiar with using analogue sensors for data collection, interfacing through the Arduino microcontroller to PCs. Now it was necessary to develop methods of using the electronics so that they would not restrict the users' limited physical movements. Fortunately there are many small footprint solutions readily available on the market. The selected solution was to use short range radios to send the data to remote PCs. The X-Bee radio together with an Arduino Fio has so far proven to be the best solution, as radios can be networked to send data simultaneously to one PC. The type of sensors used range from simple flex and pressure sensors, accelerometers, and compass modules, to perhaps the most useful, the 9 DOF Razor IMU which provides angle of orientation data in all directions. [2] The emphasis on hardware development had been on the novel use of existing electronic components and not the actual development of new technology per se, although this does include the creation of custom

sensors and switches using soft circuitry for example. The exploitation of small wireless devices means that the usual restrictions caused by signal wires are removed, and any impediments to the physical body are minimized. The approach used is to concentrate on the movements that the participants are able to make, rather than design an interface that they would have to adapt to.

The focus is on ABILITY rather than DIS-ability. They play according to their own abilities, and can focus on developing that skill. The aim is to discover appropriate forms of interface and sound according to each person's physical abilities and musical interest. The dynamics of social interaction between the members of the group is also mediated by the technology. It can be observed that there is an eagerness to be the one performing. At the current stage of the project only one or two people have been able to use the interfaces simultaneously. Now that the physical abilities of each of the members have been understood, appropriate personalised interfaces are under development.

As much as possible the motivation for the design of these interfaces comes from the participants themselves as they experiment with the prototypes. One example is a control interface made as a cushion for a wheelchair user – she can control media and play sounds by shifting her weight on the chair. Made with Arduino and Open Frameworks, the interface is very sensitive, intuitive and fun to use. It can be thought of as a dance mat for wheelchair users, yet it is equally useable by the able-bodied. This is at the core of the research: through the development of new media interfaces for a small group of very particular people, gain insight into empowerment through human interaction with audio visual systems in general. Even though the participants have sensory systems different to the regular population, the goal is to make this difference invisible through the medium of the art performance. With the Taika Dance group the aim is to perform publically at the end of 2011.

The use of computer mediated technologies opens up further possibilities for social interaction. Networked technologies, such as video, audio and telematic control of devices allow these physically challenged participants to interact with others over large distances (such as Finland-UK). There is the potential to enable people with disabilities to collaborate remotely and perform highly advanced works to a geographically dispersed public audience. The use of telematic and virtual spaces allows flexibility in developing personal navigable space for each participant – finding the comfort zone for each individual is extremely important when they may not feel comfortable exposing their physical self to a live audience, but a tele-mediated performance maybe an exciting and liberating alternative. The author can foresee other groups of users/participants such as older people making use of these same systems to create their own networked performative works, mixing the security of their personal space with the empowerment of performing to a virtual audience online.

Collaborative performance shifts interaction and participatory behaviour onto a social level. The research aims to develop a methodology for observing the changing role of creator-interactor-viewer and the effects on the social interaction of the participants. How does narrative structure and a shared sense of social space lead towards development of temporary community? In the case of the Taika Dance group, the participants are already known to each other, but through the performative act they are able to transform their own self-image and their perceived role in society. They become activators of their own destiny for that moment in time – they are no-longer abject objects on the margins of society but proud performers in their own right. These works enable investigation of enactive engagement in collaborative activity with playful, participatory artworks, environments and performances. These include accessible and easy use – easy control interfaces that give inexperienced users control over creative acts and allow them to explore artistic experience through their natural body movements and perceptually guided actions.

The dialectical method facilitates the benchmarking of the generalist approach with that of the highly defined individually focused approach. By focusing on people with special needs (brain damage, physical handicap) in this case, the research adds to the discussion of reactions to interaction stimuli and control in the average adult human. Just as the blind person's sense of hearing is amplified, so it may be that someone with severely limited movement can actually have an acute sense of control over a range far too limited for the normal person to perceive. Work by Saranjit Birdi with special needs patients in the UK supports this proposition. [3] The bespoke device or environment designed for the individual also acts as a window into their world, as we are able to experience the physical or virtual world through their interface, their experience. In particular Merleau-Ponty's discussion of the body schema illustrates how examination of a unique individual helps us to understand the wider landscape. [4]

As is alluded to in the title of this paper, the motivation for the research is to understand if and how social empowerment can be orchestrated through interaction with media artworks. Can a disruption or disturbance of institutionalized conditioning according to class, education, gender and physical abilities be affected by careful design and presentation of the interactive artwork? It is vital that the interactive experience invites and encourages social interaction between the participants themselves, as it is only through social activity that the self-image can be positively developed. Can the artwork create a community of presence, an opportunity for living in the moment leading to unpredictable (inter)activity within the social group? The artistic TAZ (Temporary Autonomous Zone) acts as a revealing agent within society using the tools of poetic terrorism to disrupt the status quo. [5] Hakim Bey's concept of the Temporary Autonomous Zone has been proposed by Geert Lovink as a model for network based communities of interest. [6] Having worked extensively with 3D virtual communities in the past, the author can say that the behaviours observed in physically interactive environments can be identical to those seen in the TAZ of virtual communities. The physical artwork (environment, installation) becomes a point of focus for social interaction AND empowerment, as the normal rules of engagement within the public (museum) space are temporarily ignored in favour of those created by the participants themselves. We are forced to reappraise the traditional models for spectator vs. artist, as new tools and technologies allow the barriers to interaction to become transparent. The role of the artist or designer changes to become that of a facilitator or producer for a larger group of participants. In fact, the artist creates the situation, and the possibilities for others to bring to life, and accordingly the role of the artist as the author becomes less significant. Curator and theorist Nicolas Bourriaud regards that we have passed into a new "altermodern" era where artistic production is concerned with the weaving of "relationships" between people and things, where the artist "viatorises" objects to build narratives through "post production" techniques – the re-use of artefacts, sampling, a mixing of cultures and signs. [7] The discourse, the social activity, becomes the work itself.

By contrasting the generic with the specific, this research has set out to uncover new information about the benefits, desire and motivation to interact with complex technologically driven systems, as well as proposals for rules and methods for the creation of artistic communities of presence. The work together with Taika Dance encourages and enables creative expression by the participants beyond their everyday norms. The eventual goal is to have an understanding of how to enable deep audience participation in live performative events and interactive environments through their interaction and control of audiovisual and robotic systems.

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CO-CREATIVE USE OF DIGITAL TECHNOLOGIES IN A POSTCOLONIAL CONTEXT

Joëlle Bitton & Atau Tanaka

We present a series of artist-led interventions with the Festival de l'Eau in Burkina Faso, that span the decade, 2000-2010. Its long term nature offers rare insight into sustained relationships with rural, hard to reach communities. We reflect on the ways the collaborative creative situations we established can draw upon similar processes as participatory design and whether they are relevant in a context of North-South cultural exchange.

Camel Zecri, co-organiser of Festival de l'Eau, in discussion with village elders in Léri.

INTRODUCTION

The Festival de l'Eau went to Burkina Faso in 2000 and came back in 2010. This particular context allowed for a sustained relationship with rural, hard to reach communities. By bringing electronic media technologies to destinations off the grid from main information and utilities infrastructures situates these means of creative production in contexts that reveal their potential to facilitate cross cultural communication and actualization of local identity in global contexts.

We describe in this paper the approach of the Festival de l'Eau and some of the activities that involved both the artists and the local population in an often spontaneous, collaborative way. "Postcolonial computing," as coined by Irani in the domain of human-computer interaction (HCI), offers an "alternative sensibility to the process of design" that acknowledges the cultural specificity of a location and the questions of power at stake with the use of digital technologies. [5] Here we apply Irani's analytical framework exposing the "culturally located and power laden" aspects of design practice, to the creative arts. We consider whether the collaborative creative situations we established in Burkina Faso draw upon similar processes from bottom-up methods of participatory design and whether they are relevant in a context of North-South cultural exchange.

FESTIVAL DE L'EAU

The Festival de l'Eau is an artist-led initiative of musicians Camel Zekri and Dominique Chevaucher, founded in the late 1990's with a series of artist exchanges between Europe and Africa that took place in the form of concert tours by boat to remote villages in Niger, the Central African Republic, and Burkina Faso. This was followed by concerts on alternate years in Europe with the African musicians met on location. While the project uses the word, "festival" in its title, it is not a regular artistic event in the classic sense of the word. It was, instead, a series of itinerant activities focusing on improvised music as a conduit to cultural exchange. In this sense, the word festival is used in its definition as celebration – festival de l'eau as "celebration of water."

In 2000, a group of 15 European musicians toured six rural villages along the Mouhoun River in Burkina Faso. The tour took place by boat, allowing the artists to reach villages that were inaccessible by road and entirely off the utilities and power grid. A gasoline driven electric generator powered a sound system, laptop computers, and synthesizers to enable performances of electronic music alongside traditional African music. In 2001, 2003, and 2009, the same group of musicians from Europe and Burkina Faso met again for concerts in European venues such as the Fondation Cartier in Paris.

In 2010, four of the original European musicians regrouped to revisit some of the same villages. While in 2000, the tour by pirogue (a canoe-like river boat) took 3 weeks and toured six villages, the 2010 tour was abbreviated – taking place by van in just one week, and revisiting 3 of the 6 villages. While there had been advances in infrastructure over the decade since the original journey, two of the three villages remained without electricity, and access to one of them by van was arduous.

Chevaucher and Zekri had worked with video archives from the 2000 tour to produce four short films: one presenting the Festival de l'Eau in an impressionistic documentary, and one film for each of the 3 villages revisited in 2010 specifically documenting the arrival, meeting, encampment, and concert in 2000. At the beginning of the evening event and concert, the film corresponding to that village was screened for the inhabitants of the village outdoors in public space. We sought to identify villagers who might have been present at the original 2000 tour, perhaps appeared in the film, for interview.

For the 2010 return, the Festival de l'Eau invited researchers from the Social Inclusion through the Digital Economy (SiDE) project at Culture Lab Newcastle. [10] With this involvement, one additional field researcher and a battery of portable media capture equipment was deployed to document the encounter and to deliver additional activities beyond music concerts. The availability of video projection equipment locally to supplement this added a visual component not present in the 2000 edition of the festival.

DIGITAL PHOTOGRAPHY WORKSHOP

In addition to the film screening and concerts, at one village, in Léri, we conducted a half-day digital photography workshop in the village school. The group was comprised of twelve school children aged between 11 and 13.

The workshop began with mutual oral introductions, with each student writing their name on sheets of paper that were later used as chapter marks in the final slide show of photographs. We next distributed 3 low cost, minimally featured digital cameras, and introduced their basic operation, and practiced with them in the classroom. We formed three groups of four children (each group comprised of two girls and

two boys) and sent on a photographic journey of the village, each accompanied by one of the researchers or musicians. In each group, the four children took their turn with one digital camera, snapping photos of their village and their surroundings.

After an initial tour of the village, the children went back to the classroom and downloaded the pictures onto a laptop computer. As a group, we looked at them together and commented on them. One of the groups went out on a second tour, this time without an accompanying adult. The workshop facilitators compiled a slide show of all the photographs, and used images of the paper sheets with handwritten names to identify which group had taken which photos. In the evening, after the film screening and before the concert, the slide show was projected using the video projector for all in the village.

OBSERVATIONS

The Festival de l'Eau was organised in an artist-led, grassroots manner. This enabled it to be agile, and access remote villages that had not attracted the attention of larger scale cultural initiatives, humanitarian or industrial initiatives. The villages were chosen in part by the festival organisers for these reasons. While this gave us a rare glimpse into daily life in rural Burkina Faso at a human proximity that might otherwise be difficult to achieve, the outcomes of the work, and the impact of cultural exchange are difficult to quantify. Here we offer empirical reflection on the effect we observed, and the interaction we engaged in, that touches on the effects of memory of a decade-long re-encounter, and question of identity, and the potential of a culturally, politically neutral use of digital technologies as facilitator of cultural exchange.

The most compelling opportunity presented by the project was the ten year time span over which it took place. This offered a unique chance to conduct a longitudinal study, all within the constraints and limits of improvised encounters. To have remained in contact, or to have re-contacted three of the same villages a decade apart means that a long term relationship had been established, lending a real form of legacy to the original 2000 trip. According to the organisers, Chevaucher and Zekri, the ephemeral and transitory nature of cultural exchange is often an element that can undermine deeper ties. Here we can argue that a form of sustained relationship had been established, cultivating trust that enabled rich interaction on the return despite its more rapid nature, and facilitated the increased types of activity conducted on the second trip.

The ten year span of images created a unique situation for reflexivity and memory. We documented the reaction of villagers as they viewed the film of the 2000 trip with video cameras. Individual moments of recognition, surprise, and collective reactions of glee were characteristic. Children saw their parents at a younger age. Some revered village elders had since passed away and were remembered. That there was a clear joy and enthusiasm upon our return, and a real memory of the 2000 event. Our return was a total surprise, and the resulting happiness was the clearest emotion that was expressed in conversation.

We attempted, with limited success, to organise interviews with and ask casual questions of those who may have been at the concert in 2000. In one extended interview, conducted through an non-professional interpreter, of a villager Zante Kolé in the village of Walo, we were able to make the following observations. The interviewee took the opportunity of the interview to articulate a need for development and infrastructural improvements to take place in order to enhance the quality of life and socio-economic viability of the village. This was corroborated in two other interviews in the city of Dedougou and

town of Ouessa, where discussion of the need of infrastructural improvements touched on Internet access. The question remains whether articulation of this need was opportunistic or whether it is tied in a more profound way to the form of cultural exchange we put in place. Tempering expectation to the bounds of the original (in this case artistic) mission is instrumental here.

In the digital photography workshop, we gave very few directions as to what the children were to capture with the cameras. In one of the group, a certain girl, Odette decided to take pictures of her household and courtyard, the other one, Asséta, took pictures of the cotton exchange market, one of the boy, Souleymane, reported on a family courtyard and the other one, Drissa, took pictures of people in the back alleys of the village. After they were able to see the pictures when they came back to their classroom, we invited them to do another round of documentation, this time on their own. From the pictures they brought back the second time, we noticed that they were more focused on the subjects and attentive at details: they reported on a funeral that was happening that morning, by the village mosque. Looking at the first batch of pictures and being able to reflect back at them may have guided them to choose to report on a unique event.

Mutual trust that had been developed over the course of the decade-long relationship created a situation where rights to image and to video and photographic representation were not issues.

The Festival de l'Eau not only offered a context of transcultural musical collaboration but also invited the local population to attend a video screening and to look back at a ten-year old event to which their village participated. Involving the new generation into a digital photography workshop as they documented the life of their village for one morning and conducting spontaneous interviews throughout the journey enabled the festival to pursue an informal cultural exchange with the local population, initiated years before and in another form than musical.

With these creative means - music, digital photography, video interview, we aimed to establish a relationship with the people we would interact with, that would be driven by a collaborative approach and not be based on power. We draw upon fields of participatory design and apply a bottom up design ethos to the creative use of digital technologies.

Co-creation (co-design, co-created creative expression) allows users of a particular product, system or service to actively participate to and to share responsibilities in the design process and its outcomes. The expansion of participatory design methods have influenced a shift in design practice, [7] particularly where digital technology, interaction design, creative practice and interdisciplinary research are involved - an environment that the researchers involved in this project are coming from.

The participatory approach in co-creative use of digital technologies allows us to introduce these technologies to the local population in a non-prescriptive way. This offers an alternative to power-based, hierarchical and top-down decision-making processes that impose technology on new users, and may in certain circumstances overlook needs that can variate according to cultural or practical contexts. [5]

Because the project was undertaken in a West African country, we address the potential heightened relevance of participatory design in a non-Western context and its possible role in bridging the "digital divide." [3] Indeed, we can relate these ambitions of non-power driven relationships to the aspirations at play in postcolonialism : that of contesting colonialism's power structures and remaining hierarchical heritage. [1] And we notice that other projects seem to have certain similarities in term of context,

methodology and tools, thus possibly constituting a wider acceptation of co-creative processes among researchers, and practitioners. [6]

Our approach builds upon those of similar creative projects that place an emphasis on digital technologies, cultural exchange and participatory design in non-Western contexts and in African countries.

There are a number of projects initiated by research laboratories and institutes. *RAW* is an audiophotography project developed at the Media Lab Europe Human Connectedness group and took place in Mali. It deployed audio and still-image recording technologies configured in such a way as to afford capturing accounts of everyday life with minimal mediation by third parties. [2] By shifting the attention to the ordinary (as opposed to extra-ordinary events), the project aimed to enable accounts less pervious to stereotypes and clichés that might blur the understanding of a different culture than one's own. Furthermore, the content remained unedited throughout the process ("raw"), implementing what was called a "minimal mediation" from the researchers involved (or third-parties). And as it integrated a non-selection process in its design, the authors of the accounts were spontaneous and direct in their approach of the content recorded. Yet, it assumes that it's not entirely a bottom-up approach as the concept was originally driven by an artist's perspective.

Mobile Learning for Development, of London Knowledge Lab, looks at international development, mobile technologies and learning in Nigeria, Kenya, and Zambia. It establishes a dynamic of co-design in the creation of knowledge exchange platforms through a series of workshops and open online resources.

Made in Burkina is a project developed by the Madeira Interactive Technologies Institute which leveraged support of media companies, European local government, and World Bank funded African NGO's to put in place broadband infrastructure in provincial Burkina Faso. In the researcher's report of his work, it's relevant to note that as he came to install an infrastructure and teach local population uses of Internet tools for communication and even micro-businesses (such as Google tools, YouTube, online publisher Lulu, etc), he also drew design lessons from his observations of local uses of services and from the projects elaborated by the participants of his workshops. These design lessons are shaping his current work. [4]

Events such as conferences and festivals in cultural and other sectors promote local initiatives through participation in international networks. Forum InnovAfrica presented innovative initiatives in communication and information technologies in francophone West Africa and was organised as a collaboration of Fondation Internet Nouvelle Génération (FING), a French technology innovation NGO and ANPE Mali, the Malian employment agency.

Kër Thiossane is a Dakar-based organization and place that promotes creativity and cultural expression, in particular with new media technologies. They have established Rose des vents numériques, a knowledge sharing network and program between Senegal, Mali, South Africa and the Caribbeans, within which have been organized festivals such as AfroPixel, artist residencies and workshops. International grassroots meetings in "Do It Yourself" (DIY) movements have had local chapters in Africa, with *Upgrade!Dakar* promoting local digital artists and practitioners as part of the international Upgrade! Network.

CONCLUSIONS

Based on the observations made in our field work and the different studies cited above, we argue for a collaborative approach and co-design processes that support the case for non-power driven relationships. Furthermore, we consider that elements at stake in participatory design - user-centred design, empowerment, responsibility, democratisation of process - can be relevant in post-colonialism contexts where the local population may not have been involved in decision-making processes and bear the consequences of non-adapted solutions, such as digital technologies, brought on by Western interests. [9]

Because digital technologies are the tools that form the basis of the collaboration we propose, be they through our own design, or simply through creatively use (re-use or misuse), we should address the values that they carry in a post-colonial context. Studies surrounding the "digital divide" [8] address issues of unequal access to technology and policy centered on access may be criticized on the basis that digital technology enforces a gap. Could it be that within its design and uses, digital technology could enable an equal type of relationship? The argument could be made that with technology that is developed in a Western country, that power still lies in with the owner of the technology. While it would be simplistic to consider that this is not an issue, recent world events do point to cases where, for example, knowledge sharing with social networking, can enable forms of empowerment. A collaborative arts-based approach, as we document here, makes possible ways of introducing digital technology in co-creative ways, ways in which all parties involved define, subvert or reinvent its uses and outcomes.

ACKNOWLEDGEMENTS

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THE AESTHETICS OF DISAPPEARANCE: CLIMATE CHANGE, ANTARCTICA AND THE CONTEMPORARY SUBLIME IN THE WORK OF ANNE NOBLE, CONNIE SAMARAS AND JUDIT HERSKO

Lisa E. Bloom

This paper discusses a shift in representation of the Polar Regions from the older aesthetic tradition of the sublime as pure heroic wilderness to the aesthetic of the contemporary sublime wherein categories of both nature and civilization are undone because extreme nature is disappearing. By focusing on the work of three artists this paper asks: What new stories and images are being produced through recent attempts to re-visualize the Antarctic.

Fig 1. With Scott at the South Pole, 2010, Judit Hersko, collage, Copyright Judit Hersko.

Fig 2. Barne Glacier, Antarctic Center, 2001, Anne Noble, photograph, Copyright Anne Noble.

In the last ten years, global warming has brought renewed attention to the Antarctic, as scientists and the media report almost daily on shrinking ice masses. Recently, there has been a shift in the representation of the Polar Regions from the older aesthetic tradition of the sublime as pure heroic wilderness to a contemporary sublime that visualizes Antarctica as a place of fascinating terror and beauty not because of its remoteness or severe climate but rather as a result of man-made climate change and neoliberal economics. [1]

If the traditional sublime introduced danger to the act of viewing extreme nature as thought by both Burke and Kant in the 18th century, [2] the contemporary sublime is about the undoing of the categories of both nature and civilization because extreme nature is disappearing. [3] The Polar Regions have shifted from being the last space of heroic exploration to the first place of global decline. As the ground zero of catastrophic climate change, the Antarctic is no longer seen as simply the continent most extreme and inhospitable to humans.

How we see Antarctica now is in marked contrast to most of its short history, a space that was radically uninhabited and afterwards conceived as a place where only the presence of men was deemed appropriate. Just who belongs in Antarctica has now become an especially vexed issue for contemporary women artists because only in the last few decades have women been permitted to work on scientific bases, as researchers and as maintenance workers and more recently as artists and writers. [4] By focusing on the work of three women artists that traveled to Antarctica--Judit Hersko, Anne Noble and Connie Samaras-- I ask, what do these women artists see in a place where their history has been so brief? [Fig.1-2] This is not to beg the essentialist question but to ask how their work has changed our ways of seeing this region as a primary site of the contemporary experience of the sublime and climate change.

As I wrote in my first book Gender on Ice (1993), polar exploration narratives in the late 19th and early 20th centuries redefined the legacy of the Heroic Age of Arctic and Antarctic exploration (1895-1914) in explicitly gendered terms as spaces of male bonding, conquest and suffering. In the early 20th century both the North and South Poles represented one of the few remaining masculine testing grounds where "adventure and hardship could still be faced." [5]

As climate change melts the ice we are seeing a re-emergence of interest in polar narratives marketing an imperial masculinity that were the subject of this earlier critique. The surge of interest since the late 1990s is exemplified by recent reprintings of original exploration accounts, new biographies of 19th and early 20th century explorers, and even reality TV simulated re-enactments of their journeys.

Almost one hundred years later, the Antarctic is no longer the site of a privileged white masculinity and these regions are no longer understood as just remote or forbidden areas, but rather as spaces closely if complexly connected to globalized and political forces that also impact the rest of the world. In what follows I will examine how artists Judit Hersko, Anne Noble and Connie Samaras are playing off or in dialogue with issues raised in my book about the Heroic Age of exploration, science, and photography and how these discourses are reworked in the context of twenty-first century artistic practices. In what follow I present their work as a dialogic set of texts that move in new artistic directions beyond the bounds of my original inquiry, contemplating new forms of critical awareness about climate change and the paradox of human belonging in Antarctica now. The title, The Aesthetics of Disappearance, is meant to underscore this link between art, aesthetics, new media, science, global warming and culture. It brings back the issue of aesthetics and feminism to discussions within new media, and questions how much older narratives of male heroic exploration and colonialism are still part of the discourse.

Amelia Jones, the contemporary art historian, in her 2006 book Self/Image: Technology, Representation and the Contemporary Subject, argues that the most important legacy of feminism is its politics of positionality across the visual. By that she means the importance of emphasizing the situatedness of positionality, of visuality, and of spectatorship. Noble and Samaras are interested in the social space of taking photographs and their performances behind the camera are committed to recording their embodied relationship to Antarctica. For Samaras and Noble, that means highlighting the sense of dislocation and anxiety involved in living in such an extreme environment. In Gender on Ice, I pointed out how this is negotiated in the British early 20th century Scott narrative in which the gendered, physical body is replaced by moral character, which provided the foundation on which masculinity becomes heroicized and the exterior world loses its concreteness. Samaras' and Noble's work is not about heroic masculinity but something much more displaced, related to both their positionality as well as the placelessness of the site that they both photograph. Their detailed focus on the everyday moves us away from narratives that erase or ignore the real life suffering and counters the romanticism and fantasies of transcendence of the body through moral character that characterizes so much of the British discourse in Antarctica. At the same time, fantasy as evoked by science fiction is key to understanding Samaras' work. Samaras evokes how alien the landscape is in Antarctica, when she, for example, foregrounds how uncontrollable the ice is as it swallows up buildings and signs of life in photographs of the Buckminster Fuller Dome in *Domes and Tunnels*, in *Night Divide and Contrails* and in *Buried Fifties Station.*

If Hersko brings us back to the earlier days of polar explorers and the epic by inserting her unknown Jewish woman explorer in her fantasized re-enactment of the Scott expedition, [Fig.1] Samaras pulls us away, bringing us into another fantasy space where she plays with the abstract even inhuman aspect of Antarctica to make us imagine how climate change and globalization have transformed these spaces in ways we otherwise would not have imagined. By refusing the aesthetics of the sublime from the heroic age, Samaras highlights the unreality, as well as the drab ordinariness of this landscape and built environment. By virtue of her photographs that situate banal architecture in a sublime landscape, she draws our attention to the surreal contrast between the everyday and the heroic.

This is also an important concern for Noble especially in her *Whiteout Series*, but her use of color in the Antarctic displays, the *Piss Poles*, and the *Machine Series* tends to be more visceral than Samaras' to capture the sheer physical attraction and presence of what she photographs. Noble's method is to use beauty in her work in an unexpected and even jarring way to get us to retrieve the Antarctic that implicitly questions the framing of the Antarctic landscape as heroic and sublime. [Fig.2] In her work titled *Aurina* that is comprised of six large photographs of "piss poles" taken at various US research locations. Her documentation of the everyday use of flags as identity markers for peeing outdoors at many remote field camps in Antarctica is a deadpan twist to narratives of early 20th century nationalisms in which flags enjoyed an exalted status in the context of British colonialism. Not only has the heroic national banner been reduced to piss poles in her work, but she further banalizes them by shooting them in such a way to make them resemble golf course flags. To underscore the contrast between the piss poles and the flags of conquest connected with older narratives of colonialism and polar exploration that they inadvertently seem to mimic she refuses certain typical conventions of discovery, the horizon, the high vantage point, the gaze of acquisitional ownership. Instead, some of these images seek flatness by cutting out the landscape altogether or including a small portion not of a pristine landscape but of a more industrial one. The title *Aurina* refers to "aura," "aurinia" and "urine" and her images like her play on words also brings together visually dissimilar things such as the heroic dawn, a purse of gold, and male urine. What stands out is her jarring use of the color of gold that brings all three together, a color she then uses effectively to set the aesthetic quality of the image at odds with the content. Like in the *Barne Glacier* (2001), [Fig.2] she turns the most impossible and mundane evidence of human presence, the

stain of urine in a pristine landscape into an object of beauty rather than revulsion to make us aware of how the reverential attitude toward the heroic age can also extend to scientists who often see their pursuit of scientific research in Antarctica as following in the footsteps of the earlier explorers from the Heroic Age.

Noble's use of color is in contrast to Hersko whose aesthetic is drawn from the early history of photography, cinema, and photo-collage. Her photo-collages, transparent sculptures, and cinematic projections work more with shadow, light and transparency rather than color. Hersko downplays the heroic by having most of her images gradually disappear or having her characters fade in or out, whereas Samaras plays with disappearance by representing the older built environment of Antarctica sinking into the permafrost. By challenging documentary conventions in critical ways, such as her unsettling blurring of the boundaries between the artificial and the natural, she draws on the genres of science fiction and horror to give artistic expression to her experience of Antarctica, both in its routine everyday aspects and in its surreal extremes. This aesthetic strategy enables Samaras to visualize a neo-liberal sublime in which Antarctica on one level becomes like the rest of the world in terms of its built environment, but at the same time remains an exception and outside of nature as when she gives us something on a human scale we get either coffins or a ghostly presence of a man fast asleep on a transport plane. [6]

Hersko's use of science fiction, by contrast, is less about the paranormal but of feminist time-travel as evoked by Ursula Le Guin's Sur. She situates us in the past to reimagine the present through the embodied positionality of her female characters and their ability to reinvent themselves or escape themselves through writing, science and photography. Moreover, she critiques the scientific ideal that calls for professional detachment and scientific proofs, and the way scientific authority resides in the effacement of the speaking and experiencing subject. Despite the dreamlike quality of her images and narrative, the viewer or audience is included in the experience of her work as a participant, not a distanced observer. This is done through our fascination with her sensuous images and the compelling narrative point of view she offers in her performance to make us contemplate how this landscape is forever colored by its destruction through catastrophic climate change.

Irony is critical to Samaras' aesthetic as it is to Noble's, though Hersko's use of irony is similar to that of the surrealists. She returns to the heroic registers of the early twentieth century to perversely restage a masculinist imperial past within a neo-liberal present, whereas Noble's use of irony recalls that of the postmodernists that intervene in a discourse that confidently explores, maps and visualizes a space, thus turning it into a place we now claim to consume. Noble reworks contemporary images of Antarctica to examine the visual tropes that contribute to the maintenance of the perception that Antarctica is still an all-male continent or a living memorial to the good old days when only men could populate the continent. The creative challenges of Noble's work is her examination of how gender is implicated in her questioning of how we should see Antarctica in a context in which we can no longer distinguish between its everyday facticity and its cultural representation, as a place that is still very much constituted by male heroic narratives and imagery of the Heroic Age.

Her work explores what the formerly heroic age of exploration means through work such as *The Barne Glacier* (2001) [Fig.2] where Noble presents two tourists in survival coats before a panoramic painting of the Barne Glacier in an Antarctic-themed indoor entertainment center. Critical to the photographic history of Antarctica are the canonical photographic works of Ponting and Hurley that become synonymous with the heroic and sublime visual tropes of stoic heroism in the face of deadly conditions. Her work references Ponting's image of the Barne Glacier that emphasizes the magnitude of this uninhabitable landscape. In Ponting's photograph the epic scale of the glacier dominates the image to such an extent that

the figure in the landscape is dwarfed by comparison. In many ways this image provides an ideal image of sublime wilderness since it shows the inhospitable male space of the Antarctic as a testing ground in which isolation and physical danger combine with overwhelming beauty. Noble's photographs however reverse Ponting's use of beauty and space. Her images are much more tightly framed and almost claustrophobic robbing the setting of its epic character. While the photographic beauty of her images is central to the meaning, she is also asking us to rethink the way we currently understand the sublime in the present.

In her image T*he Barne Glacier* (2001) [Fig.2] she draws out the beauty of the sublime in her use of color and light in an artificial simulated landscape environment to make an uncanny commentary about the continuing cultural investment in Hurley's and Barne's work and the contradictions between the Antarctica visualized in Ponting's and Hurley's photographs and the kitsch aesthetic of sublime wilderness now produced in indoor settings like the Antarctic Center where she took this photograph.

Samaras, Noble and Hersko are also telling stories about an absent subjectivity, but while Hersko uses this as an occasion to make a statement on the belatedness of woman's place in polar narratives and a lost or obscured perception, [Fig.1] Samaras's interest is more in creating a new aesthetics about daily life and survival in these unearthly neo-liberal institutional settings. Thus, her aesthetics, compared to both Noble's exuberant conceptualism and Hersko's sensuousness is extremely spare and pared down, though she does employ an emotionality to convey an informational richness in her work that differentiates it from more reserved dead-pan photographic practices. Neither of the artists' works can be simply folded back into a conventional discussion of the sublime or politics. All three are engaging these regions in new ways by searching for alternative narratives and aesthetics in the very dramatic contemporary situation of climate change without falling into the old heroic/melodramatic tropes of the sublime.

Herkso does this specifically by drawing comparisons between two holocausts to move us away from the purely visualizable as the basis for knowledge. Consequently, none of these artists offer the unimaginable scale that we associate with the sublime, and instead each plays off the epic quality of these male heroic narratives and images. Hersko's, Noble's and Samaras' viewpoints suggest some important new directions in contemporary art, and in the process, their work makes us think about how feminist perspectives have contributed to making us think critically about the conservative apocalyptic versions of the contemporary sublime and a kind of neo-liberal aesthetics that is at the heart of current discussion in climate change, art history as well as Arctic and Antarctic discourses. Viewers' aesthetic experience of their work is not just about landscape, the masculinist heroic subjectivity but also subjectivity itself, be it male or female since their narratives are about rethinking a landscape that is on the verge of disappearance due to anthropogenic pollution. One can only imagine what could happen if they, or other artists in their wake, bring this transformed aesthetic sensibility to other contemporary sites undergoing environmental degradation to examine how it is often in the spaces that we cannot see or know where history, aesthetics and climate politics intersect and collide in the most compelling of ways.

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CONTEXT MACHINES: A SERIES OF AUTONOMOUS SELF-ORGANIZING SITE-SPECIFIC ARTWORKS.

Benjamin Bogart & Philippe Pasquier

'Context Machines' are a family of site-specific, conceptual and generative artworks that capture photographic images from their environment in the construction of creative compositions. They are produced in an art-as-research practise at the intersection of generative arts, and cognitive theories of creativity and dreaming. They invite us to reconsider what is essentially human, and reflect on our constructed conceptions of ourselves.
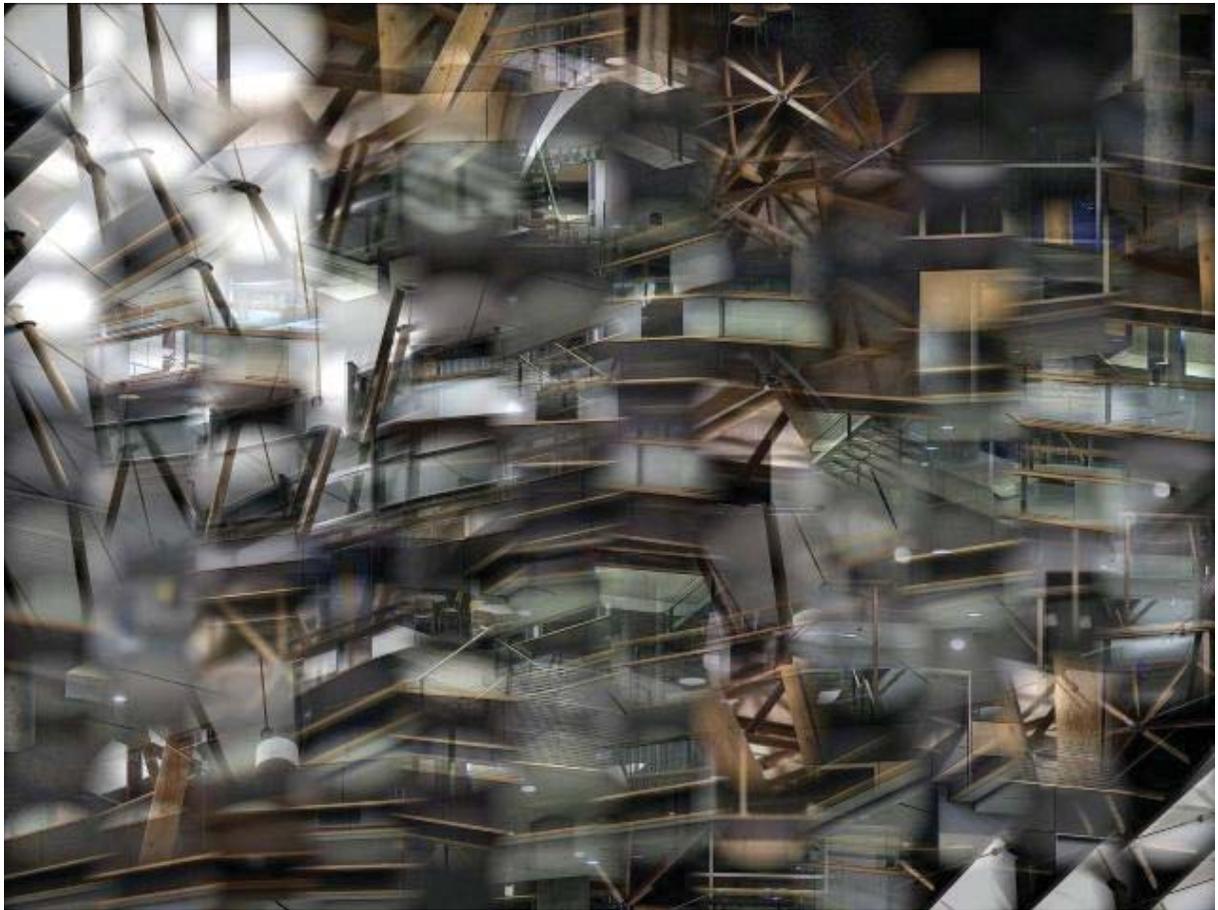
Figure 1: Sample of a memory field resulting from MAM's integration of sense patterns.
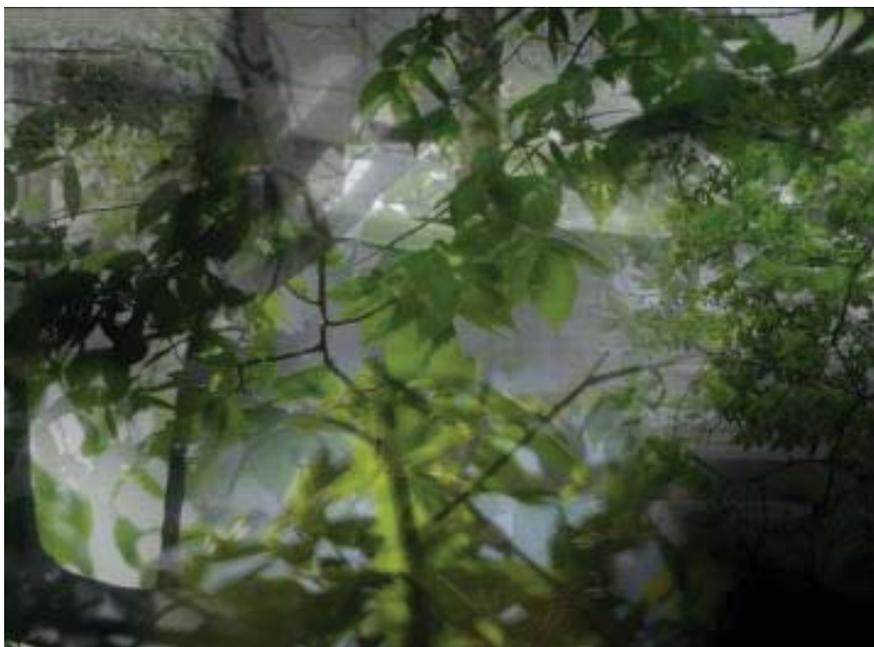
Figure 2 : Frame from an associative sequence occurring during the Elektra exhibition.
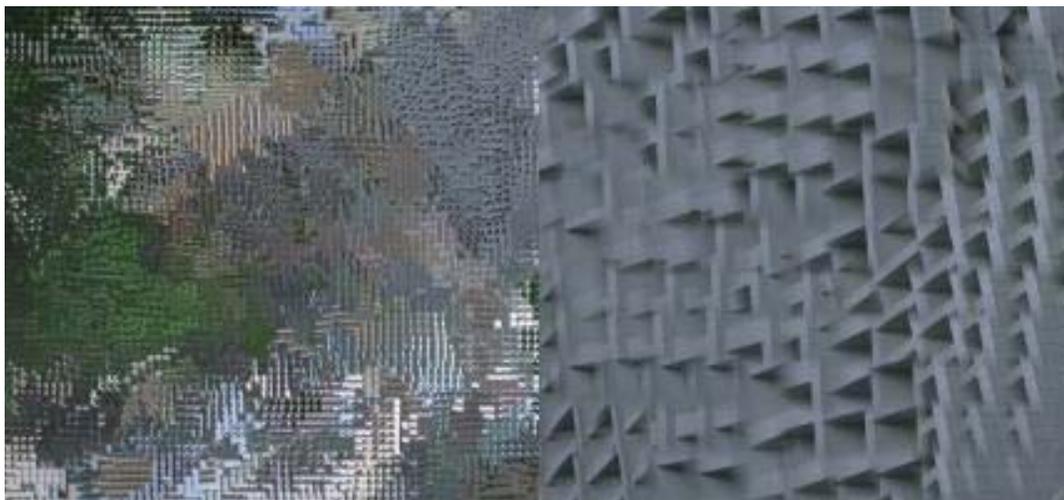
Figure 3: 'Self-Organized Landscape #12' (Hong Kong), 2009 (View from Overpass: Study from Video)

1 INTRODUCTION

Context Machines (CMs) are generative artworks (GAs) inspired by models of memory and creativity drawn from cognitive sciences. A central motivation is the creation of systems whose output is, to some degree, surprising to the artist. The CMs' creative behaviour is manifest in the generative representation presented to the audience. CMs are image-makers, and the process by which they generate images is of

equal or greater significance than the images themselves. Cohen [1] describes the relevance of cognitive processes in image-making:

An image is a reference to some aspect of the world which contains within its own structure and in terms of its own structure a reference to the act of cognition which generated it. It must say, not that the world is like this, but that it was
recognized to have been like this by the image-maker, who leaves behind this record: not of the world, but of the act.

The CMs share a number of core features: they all involve a computer controlled camera, used to collect images of their visual context, and use computational methods to generate novel representations. 'Resurfacing' [2] is a precursor to the cognitively inspired CMs, and is discussed to illustrate the transition between the overtly interactive artworks produced before 2006 – where the viewer's behaviour is integral to the work – and the emphasis on autonomy that informs the cognitively oriented CMs. 'Memory Association Machine' (MAM) [3] is an explicit application of the Self-Organizing Map (SOM) [4] and Gabora's theory of creativity [5]. The integration of these processes results in associative sequences of images captured from the immediate environment. This is the central contribution of this work and is further developed in the 'Dreaming Machines': 'Dreaming Machine #1' (DM1) and 'Dreaming Machine #2' (DM2) refine the method that generates associative sequences and frames them as machine dreams. During the day, associations are initiated by images in the world, while at night they are randomly activated and implicitly reference Hobson's [6] conception of dreaming. 'Self-Organized Landscapes' (SOLs) are high resolution print collages that reflect the SOM organization of thousands of pre-recorded images.

2 BACKGROUND

CMs are characterized by features consistent with conceptual, site-specific and generative art practises. In conceptual art, the idea is of equal or greater importance than the object. Both conceptual art and GA have a strong emphasis on process over object. Conceptual art includes 'instruction' works where the artist provides a recipe for the construction of an artwork. These works are highly analogous to GAs, where the artistic concept is encoded in software instructions and executed by the computer. Site-specific art locates the meaning of an artwork in a specific social, historical or physical environment. For Kwon, a site-specific artwork gives "…itself up to its environmental context, being formally determined or directed by it" [7]. The CMs automate this task by literally capturing images of the environment, and using them as raw material from which to generate their own representations. GA is a niche within the broader context of electronic media art, a contemporary art practise at the intersection of technology and cultural production. For Whitelaw [8], "[n]ew media art self-consciously reworks technology into culture, and rereads technology as culture."

Gabora's conception of human creativity [5] enables 'Memory Association Machine' and 'Dreaming Machines'. The theory focuses on the generation of creative ideas rather than their evaluation. Gabora considers creative thinking a form of highly controlled association between memory components. A chain of many small, and perhaps obvious, associations can lead to surprising and creative results. The CMs' ability to organize diverse visual images is enabled by the SOM Kohonen (2001), which models a topological and content-addressable memory field analogous to the 'conceptual space' in which Gabora's creative associations occur. The SOM is an unsupervised AI technique where many simple units organize input patterns by similarity. The details of the SOM, as it is implemented in MAM, is discussed by Bogart [3].

3 RESURFACING

'Resurfacing' [2] integrates generative and interactive components. The artwork autonomously explores its visual context and collects images that are stored in a navigable structure. The installation is composed of two screens housed in an architectural facade, and a computer-controllable video camera mounted to collect images from outside the gallery. The system is initiated with twenty manually selected camera positions. The frames resulting from these positions are 'moments' indexed by the pan, tilt and zoom of the camera. Over the course of the installation, the camera continuously captures images as it cycles through these moments. The right screen shows a live video feed from the camera, while the left screen presents a collage of moments. The camera position (pan/tilt/zoom) is mapped to on-screen parameters (x/y/scale), resulting in an image that approximates, due to lens distortion and a lack of precision, the spatial relations between moments in the physical context. As the camera position changes, the collage translates and scales to match.

Sustained touch on the right screen results in a hole opening, at the contact point, that reveals corresponding images from earlier in time. As the viewer runs her fingers over the display, up to five layers of images, from the increasing past, are shown. Each moment is annotated with a 'value', calculated during each touch event, that reflects the relative number of contact events that occur while the moment is on screen. Each time a moment appears, its value is compared with a threshold. If the value is below the threshold, then a new random camera position will take its place during the next cycle. The value system ranks moments in order to replace low value moments with new and potentially interesting ones.

'Resurfacing' aims to facilitate the viewer's examination of aspects of the world to which she may be habituated. The machine's gaze is strikingly different than a human's. It tends to focus on visual items that are often ignored, providing a representational surface through which to encourage curiosity and exploration of the world.

4 MEMORY ASSOCIATION MACHINE

'Memory Association Machine' [9] (MAM) consists of three screens and a computer-controllable video camera. The left screen is a live video feed from the camera, and corresponds to the current stimulus. The middle screen (Figure 1) presents the system's memory field – the memory field that results from the SOM. The right screen presents MAM's associative sequence through collected images. Each screen presents one of the three processes that define MAM's behaviour:

(1) 'Perception' captures images from the visual context. The camera's gaze is driven by random pan/tilt values. For each associative sequence, the camera moves to a random position and one image is captured. Each image is sub-sampled to 40×30 pixels and fed to the 'integration' process as a vector of RGB values.

(2) 'Integration' organizes captured images into the memory field, as enabled by the SOM. The middle screen shows the memory field where each node is represented by its corresponding image (Figure 1). To emphasize the content of the images – and de-emphasize their arrangement – Gaussianoid alpha channels are used. The SOM is continuously training in its attempt to learn the structure of the world. Due to the finite number of memory locations, and the complexity of the world, the SOM will never converge at a stable topological representation that perfectly reflects the structure of the world.

(3) 'Association' sequences images from memory and is enabled by an independent network of units that mirror the arrangement of units in the SOM, such that each unit is linked to a corresponding image in the memory field. When a new input stimulus is presented to the SOM, the most similar image from memory is activated (presented on the right screen) and becomes the basis of a new associative sequence. The activation of an association unit results in the propagation of that activation to its neighbours to a lesser degree and after a random delay.

Each image is presented on screen with an opacity, and for a duration, proportional to the degree of activation. The sequence is complete when the degree of activation falls below a threshold. The camera chooses a new random direction and a new image initiates another associative sequence. The length of these sequences is an emergent result of the interaction between the current image and the memory field. Reactivation is restricted by an inhibitory model that prevents already activated memories from being selected. At night, MAM ceases to capture images, and association units are randomly activated. This corresponds to the random PGO activation of brain regions that result in dream imagery, according to Hobson's AIM model [6].

'Memory Association Machine' uses a novel combination of a SOM and Gabora's theory of creativity to generate associative sequences of images. These images are collected from the visual context and represent the sum of the system's experience. MAM's random night-time associations inspire 'Dreaming Machines', in which sequences are framed as machine dreams.

5 DREAMING MACHINES #1 AND #2

'Dreaming Machine #1' (DM1) and 'Dreaming Machine #2' (DM2) (Figure 2) refine the associative process initiated in MAM. DM1 is a prototype and uses the same video camera as in MAM installations. In DM2, the video camera is replaced with a digital still camera on a computer-controllable pan/tilt mount. Both 'Dreaming Machines' use a single screen that presents a fusion of the memory field and the associative sequence. DM1 and DM2 manifest the same process and only differ in hardware and installation details.

In one installation of DM2, for the Elektra festival, the camera is mounted on the second floor and looks over the street below. The associative sequence is projected on a large display in the lobby. The display shows the current activated memory in the centre, surrounded by its eight immediate neighbours, all masked with a Gaussianoid alpha-channels and overlapping fifty percent.

Whereas the camera in MAM was driven by random pan/tilt positions, the DMs use a random walk to trace the camera over the visual field. In the DMs, images are not sub-sampled and fed directly to the SOM, but are abstracted into RGB histograms. As demonstrated in the 'Self-Organizing Landscapes' (Section 6) the histogram is sufficient when used on unconstrained real-world images.

In MAM, memory activation is similar to dropping a pebble in a pond – energy is propagated in every direction. This results in an extremely dense and complex network of associations. In the DMs, an activated memory propagates only to its most similar neighbour. The strength of the activation decays proportionally to the degree of similarity between memories. Similar memories are visible for shorter periods, while dissimilar memories are shown for longer periods. The temporal inhibition, used in MAM, is replaced with memory specific inhibition where a memory will only be activated if its reference is not in

a ring-buffer that stores previously activated memories. These refinements result in sequences that progress smoothly through individual associations [10].

An aesthetic weakness in MAM, DM1 and DM2 is that the SOMs never achieve a topological representation of the world. In 'Self-Organized Landscapes' the SOM is applied to a finite number of images where memory fields properly reflect the topology of the input images.

6 SELF-ORGANIZED LANDSCAPES

Due to their topological arrangements, the 'Self-Organized Landscapes' (SOLs) are the most faithful application of the SOM among the CMs. The bulk of SOLs are constructed from video frames captured on a hand-held HDV camera. Figure 3 shows an example SOL comprised of approximately 10,000 video frames, arranged in a euclidean lattice, overlapping fifty percent, where each is masked with a Gaussianoid. The SOLs directly apply knowledge attained through the development of previous installations.

7 FUTURE WORK AND CONCLUSION

Current research is focused on 'Dreaming Machine #3' where production will move away from notions of creativity in order to explore implications and qualities of explicitly implemented cognitive models of perception, memory and dreaming. SOLs are large, and topologically correct, representations and are ideal 'memory fields' for the associative process used in DM2, resulting in 'Dreams of Self-Organized Landscapes'. Another project would construct a SOL from images collected live from the context of installation.

CMs are artworks whose generative representational processes are inspired by images captured from their contexts of installation. Little research explicitly implements cognitive models of memory and creativity in artworks that learn from the world. These works encourage us to see the world anew through a reconsideration of art, perception, memory, creativity and dreams. The artwork is meant to be a public discursive interface for questions such as: What are crucial aspects of creativity and dreaming and can they extend to animals and machines? What aspects of humanity are not represented in AI systems and cognitive models? What is lost if we accept strict scientific conceptions of mind? A machine that creates and dreams is a reflection of our, perhaps misguided, conceptions of ourselves.

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JOURNEYS IN TRAVEL – AN INFINITE DIGITAL DATABASE FILM PROJECT

Christin Bolewski

This is a report on a practice-based research project that investigates contemporary modes of non-linear and recombinant digital storytelling based on algorithmic computer-controlled systems. The video installation 'Journeys in Travel' is a story of traveland investigates relationships between travelogue, cinematic essay and digital database narrative.

Decades after its original promotion, the development of nonlinear narratives remains still an intractable topic, because there is often a gap between artists' radicalizing innovation and audiences' quite different expectations. The database video installation *Journeys in Travel* aims to establish its own unique setting amongst the multiple approaches towards nonlinear narratives by addressing this issue. Lev Manovich suggests that "one of the challenges in creating database films is to come up with narratives that have a structural relationship to database aesthetics." [1]

"Journeys in Travel" suggests that:

1. The episodic structure of cinematic essay is a suitable adoption for database aesthetics, which can be called accordingly a "database essay."
2. It is also important to consider film rhythm and the viewers' cognitive and emotional engagement in the narrative construction. Watching a film can be an absorbing emotional experience, but how can this be achieved in database film?

"DATABASE ESSAY"

Cinematic essay is an experimental film form characterized by a collage of associative and subjective reflections on a set theme intertwining different streams of episodic narratives in a mixed genre of narrative, documentary and experimental filmmaking. It emphasizes theme over plot and the discovery of narrative through a flexible, reflexive and self-critical approach.

Paul Arthur writes in *Essay Questions*: "Essays are distinctly process-oriented: they are rhetorical journeys in which neither an exact route nor final destination are completely spelled out. The essay assumes that what it tells us, and the order in which it is communicated could have taken an entirely different route, that it is one of several possible versions of the same concept." [2]

Likewise, the travelogue is an open, episodic narrative; it often brings together scenes without regard for plot or narrative progression. Travel itself can be understood as the reading of an audio-visual narrative, a sequence of images and sounds of unfolding events, captured while we are moving through time and space.

Hence both cinematic essay and travelogue emerge at closer examination as suitable forms to be connected with database narrative. The viewers' expectations are directed towards a film genre that does not offer cause-and-effect structure of classical Hollywood cinema or the problem-solution approach of Griersonian documentary. They are attuned towards a complex episodic narrative, which affords intellectual engagement by following a discursive argument.

Journeys in Travel is a temporary, open-ended arrangement, which sets in motion a seemingly endless chain of references to related topics: Travel, foreign places, tourism, ethnography, movement, pace, rhythm and the relationship of film (structure), narrative and travel. The Open Source Software *Pure Data* (PD), a real-time music and multimedia environment mainly used to create live-algorithmic musical improvisation and (interactive) music composition, controls here an infinite audiovisual narrative.

DATABASE FILM AND FILM RHYTHM

What makes a film finally successful in moving the spectator is film rhythm; how everything comes together and puts the viewer into a ride and flow through different emotional stages. Film rhythm is an essential feature of film, but very complex to analyze, since it is achieved through the final balance of all elements of a film. One rare example of recent research in film rhythm drawing onto cognitive and neuroscience is Karen Pearlman's *Cutting Rhythms: Shaping the Film Edit*.

"The functions of rhythm are to create cycles of tension and release and to synchronize the spectator's physical, emotional, and cognitive fluctuations with the rhythms of the film. By modulation of somatic tension and release, rhythm impacts on the spectators as a generative aspect of their acceptance and comprehension of a film." [3] Later Pearlman continues: "It doesn't matter if the film is a thriller or a romance, narrative or abstract or a film, which might rely on a more directly visual, aural, or kinesthetic mode of tension and release; the editor works with the "life of the object visibly recorded in the frame" to determine the timing, pacing, and trajectory phrasing of its movement, and spectators' bodies respond to this rhythm." [4]

But how can this response be achieved in a database film, where a custom software edits movies in real time by choosing elements from the database using a set of rules given by the author?

NARRATIVE STRUCTURE OF "JOURNEYS IN TRAVEL"

One of the major challenges of *Journeys in Travel* is to set the computer algorithm in such a way as to create a stimulating intellectual and emotionally challenging experience for the viewer without causing boredom or frustration. The algorithm shall keep a balance between well-directed narrative and randomness, and also adjust rhythm and pace to the condition of the human perception so that the timing of the narrative units and the frequency of alternations stimulate the attentive and emotional potential of the viewer.

Journeys in Travel suggests using "micro" and "macro" narrative structures. "Micro structure" refers here to the structure of pre-edited narrative sequences, which offer different perceptive qualities, and "macro structure" to the computer algorithm, which alternates these pre-edited clips into a stimulating audiovisual flow. The term "macro narrative" structure is – in this case – derived from "macro-aleatoric" chance-based music composition. Aleatoric music composition supports structure but also variation within structure, it is determined by elements of chance or unpredictability. "Macro-aleatoric" is a principle in European composition of the 1960s, which uses a "modular structure of musical units that can be combined using a set of rules given by the composer." [5]

Within the "micro structure" of the separate narrative units traditional methods of film montage such as continuity editing are applied to create miniature narrative structures and subplots, for example, a documentary observation, an anecdotal travel report, a philosophical quote, or an experimental audiovisual stream, which can then be flexibly arranged in the "macro structure." Therefore each narrative unit within the database provides a type of conclusion and rhythmic structure that can be read against the content of the following or previous units. The computer algorithm controls the pacing and timing within the "macro structure". Pacing and timing within the individual sequences is set through the prior editing process of the separate sequences and typical narrative devices such as commentary voices and musical leitmotifs establish reoccurring subplots and themes to support the episodic and rhythmic structure of the ongoing narrative.

The experimental mixed genre form of cinematic essay allows the creation of narrative, documentary and experimental film sequences of different aesthetic, intellectual and emotional capacity. Each sequence is then classified into one of five different genre categories, which are organized within the structure of PD as five separate video and sound players. These players alternate according to a pre-programmed script to generate a rhythmic flow of associative narrative chains with an alternation of different perceptive qualities and varying intellectual, visual and auditory stimulus for the viewer. The five narrative groups offer:

1. Philosophical and sociological reflections for the intellectual stimulation of the viewer. These clips are aligned by audio commentary providing a discursive argument.
2. Intertitles, which interrupt the cinematic flow and provide additional text information and intellectual stimulation.
3. Visual travel narrations and observations. These clips frequently use a camera in motion gliding through foreign landscapes creating an effect similar to early "phantom rides" and are often aligned by an anecdotic commentary and musical leitmotifs.
4. Experimental clips with experimental manipulation of image and sound, which are often accompanied by musical leitmotifs. These clips provide a high visual and auditory stimulus for the viewer.
5. Documentary observations with slow paced or static camera, which provide the opportunity for the viewer to observe people, places and action more independently by avoiding additional commentary and interpretation.

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ALTERNATIVE APPROACHES TO REPRESENTING KNOWLEDGE IN THE HUMAN ENVIRONMENT

Lee Boot, David Gurzick & Stacy Arnold

How is knowledge represented in the environments that surround us? What messages are best promoted, most compelling, or most sophisticated? The impact of our knowledge environments is becoming more apparent as economies become increasingly information-driven and facing our global challenges relies on reliable knowledge. On the scale of the individual, knowledge environments influence the thoughts and feelings that we act upon.

Fig 1. Still from the film, Euphoria. A neuron chandelier is hung from bridge in Baltimore. Copyright 2008, Making Euphoria, LLC

Fig 2. Screen shot from Fieldtrip showing access to films, filmmakers and discussion. Copyright 2007, InfoCulture, LLC and UMBC
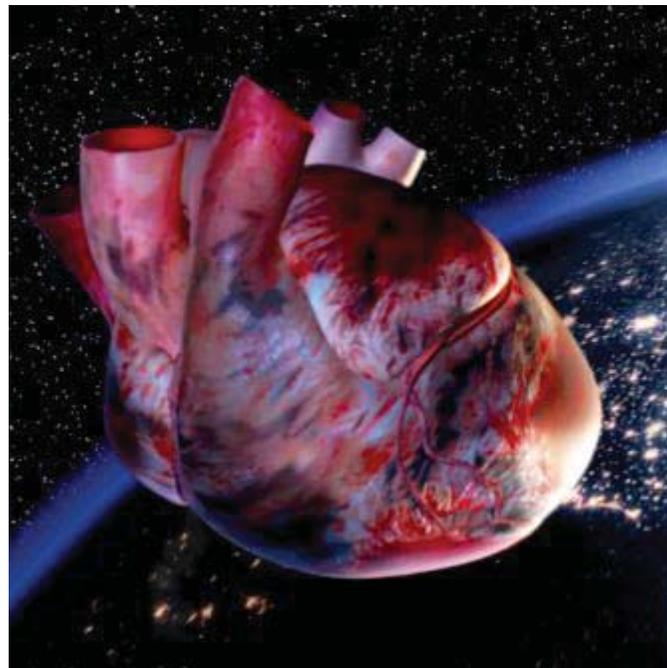
Fig 3. Screen shot from SpeakHeath showing a film about community and cardiovascular health. Copyright 2009, Lee Boot and UMBC

So much of what a civilization does, internally and externally, is defined by how it handles information: the degree to which it is controlled, the emphasis placed on discovering new knowledge, and ultimately how knowledge becomes embedded cultural wisdom.

Historically, civilizations have produced special artifacts to contribute to building culture from key knowledge they (usually, their leaders) believed was essential. The ideas of the Catholic Church were famously promulgated by the art and architecture in Florence, and the sand paintings of the Navajo people of North America express spiritual ideas that form core beliefs of their culture. In the present-day United States, however, the two best funded, most visually arresting and ubiquitous informational artifacts are not intended to increase cultural wisdom. Instead, commercial advertising and entertainment share the purpose of producing revenue. Social psychologist Albert Bandura's social learning theory advanced our understanding of how signals embedded in people's environments impact individuals' beliefs, attitudes and, ultimately, behaviors. [1] With their ability to dominate the public messaging environment, commercially motivated interests purchase determinant influence on social norms. Advertising in the US is a $400 billion a year industry. For over one hundred years it has employed not only highly skilled message and image-makers, but psychologists, anthropologists and more recently, neuroscientists, to produce highly sophisticated persuasion schemes. [2] These have had a cummulative, synergistic effect on socially normal beliefs and attitudes that many believe is out of line with wisdom. [3] In contrast, media that could contribute to valuable cultural knowledge is severely under-resourced. Hollywood films routinely cost 1,000 times as much to produce as educational programming ($100 million, versus $100 thousand per product). Broadcast venues have been commercially controlled, leaving negligible room for social concerns. Even when educational or prosocial programming proves to be commercially successful (as was the case with the well-known 1977 television series Roots, or producer Norman Lear's series All in the Family) the industry eschews socially motivated endeavors. [4] Such commercial control of the airwaves sets the US apart from other developed countries from Britain to South Africa to Nepal, where governments reserve significant parts of the broadcast spectrum for prosocial and educational programming.

The proliferation of inexpensive, high quality production tools and the open venues of the Internet and mobile networks now allow alternative and valuable information artifacts to be created and to enter the cultural discourse. Evading both state and commercial attempts to control or bury them, such artifacts can ignite political change and also serve the quieter mechanisms of cultural evolution such as the slow growth of common wisdom.

For over ten years, transdisciplinary collaboration between the Imaging Research Center at the University of Maryland, Baltimore County, the media research and development firm, InfoCulture, LLC and other researchers from the US and Canada has led to experimentation with new forms of knowledge to test how contemporary media tools and venues might best be used for social goals. Each of the three projects described below is aimed at learning how to engage a population in knowledge that might help them improve their health, education and wellbeing.

Euphoria

Like nearly everyone, young people want to feel as good as they can for as long as they can. They want to know how to survive and thrive emotionally. In the US, despite that the pursuit of happiness is a founding ideal, young people are typically provided little knowledge of what helps the brain sustainably

produce chemical rewards. Neuroscience and psychology literature as well as the experience of psychiatric clinicians support that when a person commits to the pursuit of meaning and engagement as a way to achieve the most positive emotional states, the euphoric effect meets or surpasses that produced by mood altering drugs or adrenalin-producing high-risk behaviors, but also is sustainable. However, for lack of that wisdom prevailing in socially normal thinking people engage in more destructive pursuits - a problem that has increased human suffering and plagued societies around the world for decades or longer.

To find a way to engage young people in considering the pursuit of meaning and engagement, the US's National Institutes of Health funded *The Euphoria Project*. Artists and filmmakers worked with neuroscientists to develop content. It became clear that profound discoveries that had been made about the brain had not entered mainstream thought from which young people were taking cues. Specifically, in addition to the neurochemical rewards of pursuing meaning and engagement, such a pursuit and the rewards it supplies feed off each another in a feedback loop - suggesting to young people that the effort they might expend will be multiplied when returned. Further, the sheer power, complexity and beauty of even a single neuron firing, combined with the astronomical number of connections in the brain is impressive knowledge that could build self-efficacy (one's belief in one's own ability to accomplish and objective). Especially when combined with information about neural plasticity - the concept that a brain grows and changes to increase its ability to face new challenges.

The story seemed strong, but to learn more about how to tell it in a way that might cause young people to engaged with it, researchers chose to represent the knowledge in a feature film, but to abandon the structural conventions of educational and informational media designed to be clearly understood in real time on the first screening. Instead, the new experimental design would be informed by structural concepts found in celebrated works in all the arts - works that have historically engaged audiences and become culturally significant. It would use aesthetics, analogy, ambiguity and authenticity - what the team came to call the 4 As, to compel audiences to reflect and discuss the work to understand it - thus facilitating more personal connection to the ideas in the film. The experimental structure would juxtapose a stream of visual metaphors - three-dimensional sculptures and tableaus built on urban and rural landscapes, against a narrative that wove together some of the neurobiology, social psychology, anthropology and history related to the pursuit of happiness. In one scene, we see a man standing on one leg, constrained by a big box he is wearing and surrounded by the outline of a head drawn in metal pipe. At the same time we hear dialog about the neural basis of depression. In another scene, multicolored clay feet are dropped, one at a time, into a pool of clear blue water where each releases dye which all combine into polychrome clouds that form abstract designs. All the while, the narration discusses the negative impact cross-cultural traumatic conflict can have on an individual's ability to pursue happiness. The narrator himself, rather than appropriating conventional host's garb, wears copper colored, bejeweled shoes and often appears in only his underwear. The incongruity of these juxtapositions plays out for viewers, mostly unexplained. Researchers gambled that it would be better for the film to confuse the audience than be didactic, unimaginative or condescending. The objective was to give the audience something they could not dismiss with easy categorization or predictability, and thus good engage in open-mindedly.

A randomized, controlled study of the film's effect on 500 high school students found that students who saw Euphoria were able to make the connections necessary to understand the content, and reported liking the film more than those who saw the sham film, Storm Chasers reported liking that film. Perhaps most interesting was data from a follow-up survey that showed that the beliefs and attitudes of students who only saw the sham film had shifted toward the ideas in the presented in the Euphoria film,

suggesting as the only plausible explanation that the film initiated a social discourse. Though an experiment, Euphoria was accepted into several national film festivals, winning a gold award at the Houston International Film Festival and garnering a substantial amount of praise in the press. Most important, the film showed that the conventions of informational and educational media could be replaced by a more artistic approach and be more effective as a result.

Fieldtrip

Online and mobile technologies don't just change the ways we do things; they change what things we can do. Fieldtrip is a research project that explores how to best leverage today's portals and venues of communication to provide a specialized social network where teenagers can engage one another in discussions about their thoughts about and feelings toward education. Developing such a discourse on the contemporary technologies that are woven into students' lives outside school, in environments where attitudes about education often form, is something that was previously unaffordable for educators and school systems. In the past, motivational issues had to be addressed by parents, or in school. Of course, young people use these technologies to connect with one another, not with adults. Accordingly, Fieldtrip is based on literature supporting the promise of peer mentoring and peer support to deal with a range of issues.

Researchers used $20 iTunes gift certificates as incentives to recruit a population of 14-19 year-olds to join an online community. Members supplied assent and parental consent forms and filled out an online survey about their attitudes toward, and achievement in, school in order to establish baseline data from which to measure potential changes. One another's real identities were unknown to recruited members. Instead, new online identities were begun as members created screen names by combining three words from a large list (resulting in names such as *FreeSushiCasserole* and *TheWildRose*). To prompt dialog on the site, 2-3 short films were posted each day. They were personal video journals made by high school-aged filmmakers. They documented the impact that family, peer and internal struggles were having on the filmmakers' orientations toward school. Through members' written comments, a dialog emerged among community members that would be analyzed to assess the project's potential for shifting members' educational motivations. (Members were not required to watch the films or comment in order to get their iTunes voucher).

The project posed two key challenges: First, to integrate the expertise of adults in order to make the films compelling enough for teenagers to elect to watch, without losing the fact that these were authentic teenage voices. Second was the problem of moderating and facilitating the discussion without distorting it. These questions lie far beneath the veneer of the technologies that made the project possible and reflect the larger, historic question: What is the most constructive relationship between young people and adults in situations where adults are trying to encourage growth?

Professionals mentored the young filmmakers and edited their footage to increase production value, but this expertise was invisible to most people because the faces and voices viewers saw remained those of teenagers. [5] Near-peer-aged, college students of psychology moderated the discussion, chosen with the hope that they could be sensitive to the need to preserve the adolescent-owned character of the discussion but move them forward in constructive directions. [6] Thus, the perception that teenagers controlled the site was maintained.

During the month-long pilot, hundreds of comments by community members accumulated. Analysis showed that the content of comments mapped well onto motivational literature: These were the kinds

of discussions that could affect teens' ability to succeed at school. Modifications to the interface of the site and moderation practices were made for a second pilot, and helped further orient community members to the messages in the films, increasing the adolescent engagement in discussions, suggesting self-reflection and the development of beneficial self-perception had occurred. The next step in the research is to scale the online community to reach a wider teenage public and keep it open indefinitely.

SpeakHealth

The US spends more on healthcare per capita than any other nation and is home to some of the greatest advances in medicine and medical technologies, yet the health of US citizens is ranked 37th in the world. [7] The primary cause of this problem is destructive behaviors such as eating habits and a sedentary lifestyle, rather than a lack of available care. It is clear that people are acting in ways they know will hurt them. Further, commercial messaging aimed at selling potentially harmful consumption is unlikely to be significantly countered by more helpful messages. Could an online public discourse infuse common attitudes with new ways to think about health and tilt the balance back toward more constructive social norms?

That was the research question driving the *Speakhealth* project. Like the Fieldtrip project, the effort would build discourse with media. This time, however, experts would be a very visible be a part of the mix. To develop content, a transdisciplinary team of medical practitioners, artists and social media producers created three extensive graphic information maps: the first of constructive health ideas, the second of US cultural traits that might facilitate or undermine the adoption of those ideas, and the third of potential co-mission groups. Content emerged when lines were drawn across the three maps, linking ideas with cultural traits and potentially supportive groups. It was decided that the most supportive initial group was likely to be health professionals themselves. The hope was that they would then spread the ideas through and beyond their own networks. Given the modest budget of the project, media that was edgy and improbable would be used to draw attention. A similar strategy had worked in the Euphoria film, and in the Truth anti-smoking campaign sponsored by the Legacy Foundation (thetruth.com). That effort also used unusual, extremely sarcastic and imaginative online films and is credited with 22 percent of the decline in young adult smoking from 25.3 to 18.0 percent between 1999 and 2002. [8]

The website was launched with a talk at a major integrative health conference in front of doctors and other healthcare practitioners. Reaction was extreme and mixed. While some in the audience were enticed, many found the films disturbing. One film presented an enormous computer-generated, though very real-looking human heart orbiting the earth, which then entered the atmosphere and slammed into a suburban cul-de-sac, bouncing nearby residents out of bed and leaving their traffic circle in flames. The short film was intended to introduce the site's visitors to research findings indicating that a sense of community, something US suburbs often struggle to establish, is significantly correlated with improved cardiovascular health. [9] The audience did not expect to see such departures from the norm. Over the following six months, the *Speakhealth* project built an active online community. It was clear that the most controversial and/or imaginative media created the biggest draw. However, the project's research sponsor, an independent integrative medicine organization, became fearful that this media would harm their funding support and alienate some colleagues. Rather than allow the sponsor's organizational needs to redirect the project in ways not supported by literature and experience, the research team chose to end the project.

As the projects described above indicate, the opportunities for social progress offered by unprecedented access to mass audiences provided by new media and communication technologies are only beginning to be understood. A great deal seems possible, but research is necessary to test new approaches.

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A RESPONSE TO LIFE'S EMERGENCIES: BIOARTCAMP AS TECHNIQUE OF ATTACHMENT TO LIFE

Marie-Pier Boucher

This paper addresses the contemporary 'biologization' of life generated by recent acceleration of technical performances. Drawing upon *BioARTCAMP*, I reflect upon a method for thinking about the possibility of attaching ourselves to life. By referring to the notion of camp as an architectural concept, I offer a critical analysis of the biotech future in terms of a spatial technology.

Jennifer Willet, BioARTCAMP: A Rocky Mountain Adventure in Art and Biology, hosted by INCUBATOR Lab at The University of Windsor, and The Banff Centre, Banff National Park, 2011.
Participants: Ain Baxter, Marie-Pier Boucher, Zoot Derks, Tagny Duff, Jeanette Groenendaal, Kurt Illerbrun, Angus Leech, Marta De Menezes, Bulent Mutus, Jennifer Willet, Paul Vanouse, Tokio Webster, Grant Yocom, Britt Wray, David Dowhaniuk, Kacie Auffret, and Jamie L. Ferguson.

The war against war will be no camping party. [1]

Hosted by Jennifer Willet from INCUBATOR: Hybrid Laboratory at the Intersection of Art, Science and Ecology in collaboration with the Banff Centre for the Arts, *BioARTCAMP* is an art/science collaboration that took place in July 2011 in the Canadian Rocky Mountains. Bringing together artists, scientists, theorists, filmmakers, and students, *BioARTCAMP* is best described as a camping expedition in the Rocky Mountains where the Rockies served as a camping site for building a portable biological laboratory. *BioARTCAMP*'s aim was to reinvent the ecology of biological laboratories. As Willet claims, biological laboratories are often represented as highly sophisticated and clean environments in addition to being perceived as sacred and esoteric spaces reserved for experts and specialists. However, in reality, they are often messy and dirty. As a consequence, their misleading representations generate misunderstandings about the conditions in which science is being done, and prevent public debate surrounding the biotech future. In order to resist these false assumptions, Willet pursued the objective to produce

alternative representations of biological laboratories by connecting their closed ecology to larger ecologies. In the present paper, I will refer to the notion of camp as a spatial concept in order to ask how the opening up of a milieu of interiority, of a closed -or sterile- environment (a traditional laboratory), to an open -potentially infectious- space (a camp-based laboratory), to a milieu of exteriority, a space of indeterminacy, a futurity, a changing potential, affected -or infected- the capacity of *BioARTCAMP*'s participants to attach themselves to life.

Recent acceleration of technical performances has indeed brought life to the fore. Bio-fuels, bio-weapons, bio-materials, bio-diversity, bio-morphism, bio-mimesis, bio-art or bio-architecture – name your own "bio" preference. Circulating transversally, life is today everywhere and nowhere. Seen and said. Smelled, touched, eaten. Addressing the concept of life requires a fine tuning and risky choices, making it both an adventure and a risk. In addition, the proliferation of biotechnology has reconfigured our relationship to it: life is no longer a phenomenon to observe and understand, but a series of mechanisms to reconfigure and transform. According to Henri Atlan, physician, biologist and Professor Emeritus of biophysics, biology passed from a science of observation to a biotechnology: it is now able, like physics and chemistry, to produce artificial living objects, machines of all kinds, and synthetic products. [2] That is to say biology is for him found in the reality of artefacts, in the art of making life.

The integration of the art of making life in contemporary practices implicitly resonates with the possibility to enliven the world. The claim is simple: by making things biological, life will proliferate. Engrained in the cracks of this claim is the idea that, biological materiality carries life's operational form. In other words, contemporary biotechnology generates a "biologization" of life. Literal insertion of biological materials into contemporary practices foregrounds an understanding of these materials as carriers of their own capacity to enliven the world. Often entangled in an engineering paradigm -which finds its point of culmination in the field of synthetic biology whose aim is to engineer life- biological life revives a substantialist conception of life, one based on the assumption that life is found in the physical corporeality of matter. In order to resist the phantasmatic view of a biological, all too biological world, I will proceed to articulate a kind of *a-biological* identity - without albeit negating life's biological mode of existence. I wish to ask how it is possible to resist and criticize the proliferation of biotechnology, its misleading representations as well as the biologization of life it generates, and at the same time facilitate the emergence of new modes of living. I will draw upon *BioARTCAMP* to reflect upon the construction of a method -"less a theory than an account of the conditions of the production of knowledge" [3] for thinking about the possibility of attaching ourselves to the whole of life. Biotechnology has not only brought a biologization of life, the specialization of biology has facilitated a division of biological life: molecular biology, tissue culture, genetics, etc. Thus, attaching ourselves to life implies the 'discovery' of life as a whole. In the form of a debriefing after a camping trip, I wish to question how *BioARTCAMP* has succeeded at filling the void left by contemporary biologization of life.

In order to grasp the potential for BioARTCAMP to facilitate an attachment to life as a whole, I suggest to understand it in terms of a speculative and experimental project. Speculative in the sense that it does not bring about solutions, but raises problems [4] and experimental in the sense that it presents these problems in the form of alternative futures. In other words, by speculating and experimenting on/with modes of vividness *BioARTCAMP* can be defined as a technique of attachment to the whole of life. While Willet's project concentrates on the technological apparatus proper to the manipulation of life (i.e. the laboratory), I wish to foreground bioart's potential to go beyond the mere subversion of technology and to address life both as a biological and a-biological mode of existence.

ATTACHMENT AS EMERGENCY: CAMPING AS STRATEGY

In *Puissances du temps: Variations de Bergson*, French philosopher David Lapoujade explains the distinction Bergson draws between attention and attachment to life. Attention to life is the mechanism through which we adapt ourselves to the necessities of the world we live in. Attention to life, he adds, is biological: it is both anticipation and adaptation to the external world, a point of tension, which characterizes life's equilibrium, one that maintains a solidarity between psychological life and motor activity. For Bergson, says Lapoujade, intelligence is one of the main forms of inattention to life. Intelligence, he says, is when life becomes external to itself. [5] He adds that even if intelligence allows a greater adaptation to the material world, it is nevertheless a form of vital depression. In response to the negative effects generated by intelligence, Bergson invites us to detach ourselves from representation, which is a product of intelligence, and to attach ourselves to life. In fact, for Bergson, we do not only live by adapting ourselves to the world, but also, and maybe most importantly, by attaching ourselves to life. According to him, attachment to life may take three forms: (1) obedience; commitment to a social group; (2) belief; attachment to a group of supernatural beings, and finally; (3) creation or liberation, both derived from a commitment to the movement of life itself. [6] While the first two qualify closed societies and the creation of worlds reserved to humans, the third form of attachment qualifies open systems and creates a universe, a universe open to a plurality of worlds. For Bergson, the first two are tendencies that circumscribe the circles where human's deploy their humanity and result from the same vital imperative: "to conjure the depressing strength of intelligence, which slows down life's movement." [7] The first two modes of attachment are therefore, like intelligence and representation, forms of vital depression.

The proliferation of biotechnology has brought a fourth form of attachment, a biological form of attachment. A form of attachment situated at the intersection of closed and open systems, of creation and depression. While a biological attachment to life might result in the production of closed systems reserved to biological entities, it also holds the potential to create universes that are opened to a plurality of worlds. The distinction between these two modes of attachments (i.e. triggering creation or depression) is based on the understanding of biotech life; namely the difference between an attachment to the movement of life itself as opposed to an attachment to the forms through which it passes. That is to say, the difference between an immanence of spirit and a transcendence of intelligence. While the Western world has worked towards reducing the capacity for religion to act as its transcendental force of becoming -bringing back a virtual force of immanent appropriation- we ought to be careful at not making biotechnology a new transcendental form ready to govern our attachment to life. The issue at stake is therefore to develop a concept of attachment to life based on an immanent and spiritual processual relationality; a concept of life that recognizes the various beings (biological or not) that compose the universe. The issue at stake is also not to interpret Willet's goal of generating new representations in terms of an intelligible understanding of biological laboratories (adaptation), but rather in terms of a sensuous relation, namely an attachment to the movements triggered and deployed by her project. Up to now, I have laid the conceptual foundations for understanding the possibility of resisting the biologization of life by attaching ourselves to the movement of life itself, to life as a whole. Let me now explore how the notion of camp can trigger such an attachment.

Camp as an architectural concept commonly refers to a state of emergency. *BioARTCAMP* is no exception to that. For Willet, the emergency is based on the necessity to transform, alter and subvert biological laboratories' representations as well as to connect their closed ecology to external ecologies. In other words, Willet invited her guests to create techniques of ecological attachment. For me the emergency lies on the necessity to attach ourselves to the whole of life, meaning the possibility to resist the

biologization of life. From the Latin "campus," the notion of camp refers to an open field. However building a camp-based lab nevertheless contradicts the idea of an open space proper to scientists who do field research. For instance, Kurt Illerbrun, one of the *BioARTCAMP*'s scientists explained that the spatial delimitations proper to the camp were for him constraints to his normal field of research, which does not rely on specific boundaries. Also borrowed from Old English, the etymology of camp refers to "contest," to a "place where an army lodges temporarily." [8] Even though the use of camp as contest became obsolete by the mid of the 15th century. it nevertheless speaks to *BioARTCAMP*. Bioartcampers could indeed be characterized as a soft army, one that aims at fighting against common assumptions about biotechnological development.

In *Camps: A Guide to 21st Century Space*, Charlie Hailey states that "defining the camp is a central problem of our contemporary moment." Camps, he adds, "result from the exceptional circumstances of conflict, natural disaster, displacement and marginality." [9] Historically speaking camps are for him no longer regarded as recreational and strategic spatial techniques. Today's camps, he argues, cover a much wider range of areas: experience, trauma, strategy, liberation, creativity amongst other things. For him, contemporary camps can be divided in three -albeit not mutually exclusive- categories: (1) autonomy, which he links to choice and autonomous organization; (2) control, which he explains in relationship with strategic camping areas regulated by systems of control and; (3) necessity, which qualifies spaces of relief and assistance, spaces that are constructed in response to perceived threats, expected hazards or immediate pressure. Following his categorization, *BioARTCAMP* would be situated at the intersection of autonomy and control. Even if *BioARTCAMP* acts as a response to various kinds of threats generated by the proliferation of biotechnology, it cannot be compared to the atrocities that forced people to build camps to ensure their survival – either political, economical, social, etc. (for instance, refugee, homeless and mass shelter camps to only name a few). *BioARTCAMP* was autonomous in its capacity to act simultaneously as a protest camp (protesting against the hegemonic understanding of biotech), an open camp for DIY practices, a hacker camp for hacking dominant representations, a tran-scamp, which brought together the "two camps" (art and science), and a public camp/open fair that brought the general public to share our experience.

In *What is Camp?* Giorgio Agamben asserts that camp is "the most absolute biopolitical space that has ever been realized" it is "a space in which power confronts nothing other than pure biological life without any mediation." [10] In so doing, he foregrounds a notion of camp that also generates a biological understanding of life. For him, camps are spaces where states of exception become the rule. *BioART-CAMP,* however, did not function according to the permanence of a suspended rule of law. Quite the contrary all the ethical limitations, which are however best described as moral judgments, have not been suspended during the camping event. *BioARTCAMP* is therefore, unlike other forms of camps (here I cannot not refer to concentration camps), a place where juridictions were transgressed and even eliminated. Conversely, BioARTCAMP was engrained in juridical limitations that prevented the emergence of an attachment to life. In fact, the biotech-model relies on a juridical conceptualization of power, one rooted in politics of identities, categories, ambiguities and transgressions. A juridicial conceptualization that recognizes concrete couplings between livings and livings -in the biological sense (for example humans and cells)- in the light of juridicial scales that emerge from the formulation of categories, which in turn reproduce models of power described in terms of hierarchies, domination, exploitation, and transgression. For instance, in the context of BioARTCAMP work on vertebrates required ethics approvals while investigations on plants did not; a moral assumption that generated hierarchies and that broke

down the relationship between -or undo the intertwinment of- plants and animals. Conducting inter-views with human subjects who did not run any "risks" also required humans ethics approvals while Paul Vanouse's extraction of his own DNA from his own saliva has been considered a banal action. The latter is engrained in a moral assumption based on a scientific division of life that lands on politics of identities and categories. The point of tension here is the fact that the abstract linkage between life and life condi-tions, and sometimes determines, their concrete couplings. Thus, by (1) negating the possibility of an ontological equality, and (2) asserting an ontological privilege to an already known -or pre-given- term of the relation, it feels like biotechnology's juridicial reality may prevent an attachment to life as a whole. The choice of Banff's National Park as a camping site -a highly regulated area in Canada- there-fore presented itself as both a productive and non-productive way of addressing the dominant juridicial paradigm within which biotechnology is apprehended. On the one hand, it prevented the suspension of the law and negated the possibility for BioARTCAMP to be associated or compared to the horror inher-ent to certain camps of contemporary human history (for instance, concentration camps). However, it also prevented the possibility to speculate and experiment with the possibility of reconfiguring the moral norms that are established in Canada (and elsewhere).

 Even if *BioARTCAMP*'s spatial reality prevented us as participants to reinvent the biotech's regulations, it allowed us to engage differently with the normal course of actions regulated by traditional laborato-ries. The singularity of *BioARTCAMP* as a space-event was in fact its temporality. The main form of at-tachment that was foregrounded at *BioARTCAMP* is a temporal form of attachment. By asking partici-pants to commit to two whole weeks, the experimental methodology initiated by Willet was literally an experiment on the mental state of every partiticipant. We indeed not only committed to a social group and to supernatural forces (the stunning landscape, mountains, fresh air, rivers, etc.), we also commit-ted to Paul Vanouse's PCR campfire, DNA and green racoon, to Marta de Menezes's petri dishes, agar and tetrahymena, to Iain Baxter& and Louise Chance Baxter&'s wood mannequin, to Augus Leech music instruments and lyrics, to Jennifer Willet's multiple samples, to Tagny Duff's microbes, to Kurt Illeburn's caterpillars, to Bulent Mutus's chemical drawings, to the hostel's bunk beds, to our orange vests... We have experienced life as a whole by bringing together the various entities (biological or not) that to-gether composed the camp. Unfortunately, the final detachment was a form of depression for many of us. Nonetheless, *BioARTCAMP* succeeded at demonstrating that biotech is a spatio-temporal technol-ogy, one that holds the potential to trigger the experience of new forms of durations by transform-ing/breaking up the spatial coherence of our usual working places.

 By relating biotechnology with architecture my aim was not to avoid the ethical implications raised by contemporary manipulation of life. Conversely, it was a strategy to foreground (1) importance of spatial conditions in conducting research on living entities (sterility, air temperature, filtration, pluming, etc.) and (2) the fact architecture is a technology that captures and conditions life's motion and that it shall in fact be considered as the oldest form of biotechnology. Accordingly, it was a method for understanding life in terms of a spatio-temporal relationality instead of a bio-physical entity. Hence, relating biotech-nology to architecture ought to be interpreted as a technique of attachment to life.

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CROSSING JUNGLE : AN ANALYTICAL AND EXPERIMENTAL APPROACH OF ACTIVATION PROFILES FOR AUDIO-GRAPHIC NAVIGATION IN CLUSTERS OF LEAVES

Marie-Julie Bourgeois & Roland Cahen

This paper presents the work of designers and sound designers. It is an experimental approach, where we have tried to analyse the audio-graphic characteristics of foliage through video and simple 2D and 3D simulation models. Within the project we are working on the concept of activation profile. An activation profile is a simple way to represent active and shaped event triggers.

Fig. 1. Video shots of wind, camera and human body crossing various species of foliages. Marie-Julie Bourgeois, 2010.
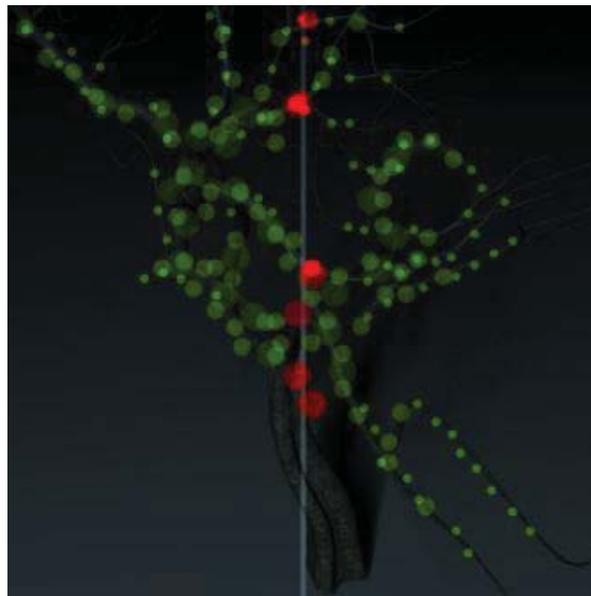
Fig. 2. 2D Interactive scene with a linear activation profile Marie-Julie Bourgeois, 2010.

Fig. 3. 3D Interactive scene with a cluster of points as an activation profile. Marie-Julie Bourgeois, Romain Gora, Roland Cahen, 2011.

Topophonies are virtual navigable sound spaces, composed of sounding or audio-graphic objects. Graphic and sounding shapes or objects are audio-graphic when visual and audio modalities are synchronized. In virtual reality and video games, we know how to make scenes composed of point-shaped elements: graphic and sound (i.e. a spot representing an object). However, there is no tool enabling navigation to make scenes consisting of particularly great numbers of interactive visual and sound elements, nor dispersed elements such as in a crowd, a flow of traffic, foliage or rain. The research project *Topophonie* proposes lines of research and innovative developments for sound and visual navigation in spaces composed of multiple and disseminated sound and visual elements (audio-graphic clusters). By working in a scientific multidisciplinary group (digital audio, visualization, sound design) with enterprises specialized in the domain of interactive multimedia activities, the project *Topophonie* works on models, interfaces and audio-graphic renderings of audio-graphic clusters. The project team is composed of researchers specialized in granular sound renderings and advanced interactive graphic renderings, as well as digital designers and enterprises specialized in the relevant fields of application. The first task of the project was to analyze and formalize several representation models. Foliage is one of them.

This paper is part of the *Topophonie* research project, the aim of which is to navigate within audio-graphic clusters. Clusters are wide ranges of objects of the same class. By Audio-graphic, we mean synchronized audio and graphic object behavior: both modalities have been implemented in a single action. Among the various examples of these kinds of objects, such as rain, flocks, grains etc.

This paper focuses on foliage as clusters of leaves. We have selected two main audio and visual behavior in order to find a good and costless way to simulate: the wind and a first person character crossing the foliage. This paper presents the work of graphic and sound designers. It is an experimental approach, where we have tried to analyze the audio-graphic characteristics of foliage through video, 2D and 3D simulation models with popular softwares. Within the project, we are working on the concept of activation profile. An activation profile is a simple way to represent active and shaped event triggers.

We can illustrate the concept of "activation profile in clusters of leaves" with the body of Tarzan crossing the jungle hanging from a vine.
We needed to be sure that this concept was perceptible. Therefore, we have compared the user experience relative to two different symbolic activation profiles: a point symbolizes the hand of a player and a line symbolizes the wind path in the user experiment.

We concluded with a 3D interactive scene which simulates the audio-graphic navigation in clusters of foliage with different activation profiles.

VIDEO MODELS

Fig. 1. Video shots of wind, camera and human body crossing various species of foliage

These video captures show some audio-graphic characteristics: the vegetal sound due to the collisions between leaves, the plastic sound of the camera, the clothes and flesh sound of the human body, and the graphic behavior of the different species of plants during and after the crossing movement.

It is difficult to be in conditions where the wind blows strongly on the foliage and where the microphone is not affected by the storm. For the passage of the camera object through the foliage, the microphone itself and the plastic case of the camera interferes when colliding with leaves and branches and creates some mechanical and metal noise which appear out of context. A completely soundproof cage was rather complex to realize.

Nevertheless, the use of a body organ (hand, arm, torso or foot) is natural and produces more convincing sound when crossing foliage. For others, activation profiles such as small insects or big monsters, we thought it would be easier to simulate them in the studio afterwards. Certain sound sequences seem fake due to the fact that the sound produced by the body of the cameraman is added. Carrying the camera crossing foliage also activates leaves outside the camera's field. Therefore, the audio and the video images may not always be coherent. As a consequence, the coherence should be evaluated according to the precision of the physical interaction and the audio-graphic rendering in the camera's range.

Literature about audiovisual synchronization and cross modality perception show that the audio and the visual are complementary and synchronization can vary a lot and still be significant. (c. f. ventriloquism, Mc Gurk effect, works by Jean Vroomen and Beatrice de Guelder).

However to be effective, sound should, one way or another, stick to the visual events that appear in the field of the camera. In addition, it works better when sounds are related to visual events happening within the objective frame. A un-visualized event, outside the camera's field, often causes interference with the understanding of active events. As the colliding object: the camera or the first person character is not visible nor definite, we can be quite tolerant about its material or mental representation.

FOLIAGE SOUND LIBRARY

In order to benefit from our own foliage sound library with a variety of different aspects and species we recorded the manipulation of several branches and leaves in the studio. We also recorded some foliage sounds outdoor, but it was too difficult to avoid traffic sounds and to resolve the wind and activation problems. We manipulated them more or less violently to produce various sound movements and feign typical effects of crossings: the passage of the wind in foliage, the passage of a hand or an object on a leaf, or a group of leaves. Video shots are important to correlate the manipulation of the foliage and the sound produced by the leaves. Actions were carried out with a hand, another branch or leaves such as caressing, creasing, tearing away, shaking, crashing and hitting one or several leaves.

The remarkable sound differences we have noticed are related to the following criteria:

- The inflorescence: the numbers of leaves, their size and shape, the proximity of the leaves, their spatial distribution and the global architecture etc.
- The material: the texture of leaves and state of drought, and plasticity of the branch, deformation, elasticity, overlap and bruising etc.
- And the energy of manipulation, the kinds of gestures with the hand or other leaves: the speed and movements etc.

Manipulation of various foliage species:
http://vimeo.com/14824022
Sound sample classified by species:
http://vimeo.com/14862003

Doing this work, we have noticed that when listening to the sounds without the image of the movement, they all seem to sound more or less the same and do not have much significance, it is especially difficult to imagine their real movement. This may sound obvious, but the view adds very important information for understanding what we hear: spatial origin, causal action, physical reason for a specific sound particularity, activation mode and action.

Therefore, it seems that synchronization is more important for realism than sound timbre.
In *L'Audio vision* [1] Michel CHION analyze the perception of an extract of Ingmar Bergman's *Persona* (1966) in three times: sound and image, image alone and then sound alone.
Applying this method to videos of simple sound actions such as manipulating foliage appeared to be an extremely interesting experience. However, it became even more interesting for manipulating the simulation in real time. We thought that anyone should be able to tell how convincing and coherent an audio-graphic simulation of foliage navigation is. We then proposed to a small panel of students to manipulate the interactive simulation with sound only, image only and both sound and image.

USER EXPERIMENTS

The aim of the experiments was to determine the importance of audio-graphic synchronization in interactive manipulation and the relevance of the activation profile variation. All the tests concern the same scene of foliage, consisting of the image of a tree on which leaves can be touched by the rollover of the mouse cursor and emit a light noise of a leaf from our sound library. The test was realized with headphones.
Two kinds of activation profiles were tested:
(Fig. 2) A linear profile with a vertical line is a representation of the passage of the wind through the tree, triggering a larger quantity of leaves, and a punctual profile with a dot symbolizes the hand of the player

Exp. 1. First we proposed to navigate only with sound on a black screen, and we asked the user about this blind experiment.
(file A): http://vimeo.com/14824062
(file B): http://vimeo.com/14824074

Interpretation: All testers did heard a sound difference between profiles A and B. Non-specialized listeners often have difficulties to adopt a precise vocabulary without visual reference. A single person detected a larger quantity of sound elements in the A file.

Exp. 2. In the second experience, we proposed to navigate with the image and no sound in order to separated the perceptual analysis.
(Graphic 1): http://vimeo.com/14824087
(Graphic 2): http://vimeo.com/14824095
Interpretation: The majority of users successfully linked sound and image. We consider that finding the right answer demonstrates the audio-graphic coherence.

Exp. 3. Then we presented the audio-graphic version with the image and the associated sound. We asked users what the audio-graphic version adds to the experience and the relevance of using different activation profiles. i. e. punctual activation profile: http://vimeo.com/14824104
vs. linear activation profile: http://vimeo.com/14824110
Interpretation: According to the answers to this questionnaire, it seems that the audio-graphic version of the interactive profiles give more information about the navigation than both sound and image ones. It is also clear that the difference between the two profiles is perceived and understood much more easily in the audio-graphic version than in the single modality ones and therefore makes sense.

GEOMETRY AND NAVIGATION PROFILES

Using profiles enables inter-penetrability of clusters or complex objects to be simulated. For example, the collision of a hand with foliage or a collision between two foliage. In the case of manipulation of foliage, the number of collisions and the sound parameters would be too complex; inflorescence and parameters of materials, multiple triggers etc. Within the *Topohonie* project, we have developed methods to simplify the use of profiles.
In the following sections we will develop the generic term of profile, for example, triggers can be on/off or progressive. They can either have the function of source, activator or both source and activator. This paper focuses only on activation profiles. Clusters of triggers are one way to simulate complex profiles. They can have different shapes and sizes.

The sounds triggered by collisions of foliage are multiple. For example, a breeze of wind in a birch does not produce the same sound as a gust of wind in a palm tree.
We could use progressive profiles with variation of unit sizes in order to increase and decrease the activation within a profile. The activation variables can be volume, density, strength, quantity, speed, agitation, friction, scratching, sounds and visual effects produced by other sources etc.

We are now working on more elaborate activation profiles and their audio-graphic behavior and renderings.
(Fig. 3): http://vimeo.com/21154344

Crossing foliage seems an uncommon experiment. The player immerses himself in a 3D environment representing an impracticable jungle. In some cases the user may seek to circumvent the obstacles represented by trees rather than passing through them. But in order to evolve in the 3D space, the player needs to cross the foliage. When the player can see the First Person, we can assign a specific form to the activation profile. So we can illustrate crossing foliage like a breeze of wind, a hand or a stick. The display

of the activation profile seems necessary to justify collisions. The visual effects are not yet currently the expected ones. It seems clear that each collision triggers a coherent visual action. This model demonstrates the necessity of the consistency of the different activation profiles which match with the collision sound.

Sounds results classified by activation profiles shapes:

1. Plan: collisions are less frequent and seem unrealistic.
2. The cluster of points: We obtain distinguishable iterations. The multi-points of contact created more interaction in the game play.
3. The cluster of various size spheres: The progressive approach is more sensitive, sounds are depending on the size of the spheres.
4. Surface of a capsule: we get a collision at the entrance and exit of the surface, it does not seem coherent.

We can improve the collision by distinguishing two modes:

- Trigger mode (triggering the first collision)
- Continuous mode (continuous control during the contact with the shape).

We have also noticed that the visual shape of the profile influences the way the user interprets the audio-graphic behavior.

CONCLUSION

The relevance of using different activation profiles was demonstrated by the user experiments. In the 3D interactive scene, we have tested various kinds of activation profiles to control different sound behaviors. The shape of the activation profile and the sound behavior both determine the meaning and understanding of the interaction. The number of units in clusters and the synchronization of these numerous collisions must be precise enough to express these rich interactions.

Our experiments and analyses show that activation profiles can be visible in order to visualize the interaction. Players have a better feeling of navigation when they can anticipate collisions.

This experimental approach brings a new point of view to the visual and sound synchronized modeling. This approach allows us to imagine new forms of audio-graphic expression, by navigating across landscape and soundscapes. The user can play both sounds and graphics actors with his own movements crossing activations profiles, like Tarzan crossing the jungle.

Topophonie Project http://www.topophonie.fr

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'TOUCHED ECHO' – THE SENSE OF A GHOST

Morten Breinbjerg

In this article, I will discuss the urban art installation *Touched Echo*, by German artist Markus Kison, in order to reflect on the ghostly nature of sound, and how echoing sounds of the past – in this case, the sounds of the allied bombing of Dresden in February 1945 – interfere with both public and private life, with reality as history, that is, known, objective and factual, and as lived, that is, remembered and experienced.

Touched Echo, 2007-09, Markus Kison, Photo, Copyright Markus Kison.

Introduction

Sound unfolds in time, and disperses in space. It arrives from a distance, and resonates in the body of the listener. An ephemeral phenomenon, it disappears, but returns as an echo. Thus, sound represents what David Toop has described as the presence of an absence, [1] something that is and is not, something more than a spirit, but without a body; in short, a ghost.

In this article, I will discuss the urban art installation *Touched Echo*, by German artist Markus Kison, in order to reflect on the ghostly nature of sound, and how echoing sounds of the past – in this case, the sounds of the allied bombing of Dresden in February 1945 – interfere with both public and private life, with reality as history, that is, known, objective, and factual and as lived, that is, remembered and experienced.

The relationship between the remembered and the known, between the subjective experience and the historical fact upon which *Touched Echo*, touches and echoes today's political debate on this incident as either an act of war or an act of terror: a debate that concerns the city of Dresden as a haunted place, the land of ghosts. In order to qualify my discussion of *Touched Echo* and the ghostly nature of sound, I will draw upon Jacques Derrida's concept of 'hauntology', and Gaston Bachelard's poetic idea of the miniature.

The Spectre

In *Specters of Marx* (1993), the French philosopher Jacques Derrida criticizes the rather uncritical celebration of liberal democracy to which the end of the cold war, the fall of the Berlin Wall, and later, of the Soviet Union, led, particularly with regard to the 1989 article of Francis Fukuyama, *The end of history?*, where Fukuyama writes:

"What we may be witnessing is not just the end of the Cold War, or the passing of a particular period of post-war history, but the end of history as such: that is, the end point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government." [2]

Derrida's goal is not to criticize liberal democracy, but to critique the whole idea of an 'end of history,' that is, the modernist idea of a final stage in human development – a kind of Utopia, perhaps? Therefore, his critique is also directed at Karl Marx himself, and the idea of communism as the basis for the ultimate and perfect society.

As the father of deconstruction, Derrida bases his critique on a single metaphor: The spectre, taken from the opening line of Marx and Friedrich Engels', *Manifesto of the Communist party* of 1848, in which they state:

"A spectre is haunting Europe — the spectre of communism. All the Powers of old Europe have entered into a holy alliance to exorcise this spectre: Pope and Czar, Metternich and Guizot, French Radicals and German police-spies." [3]

Marx's and Engels' reference to communism as a spectre leads Derrida to examine the nature of this spectre, and the political power it wields.

For Derrida, it is evident that liberal democracy is not the answer to all the problems the world faces in the early 1990s, and to proclaim the end of history is merely a continuation of the historical ambition of exorcising the spectre of communism, to make the spectre disappear. But liberalism is not the only exorcist on stage, since communism also has the ambition to exorcise the spectre: not by making it disappear, but through the realization of a communist society, that is, to make the spectre present itself, to make it a living reality, something that is seen, and which occupies a place in history. Derrida believes that both strategies, the liberalist hope of making the spectre disappear, and the communist ambition of making it real, are totalitarian approaches, since both proclaim an end – an ultimate form of society.

However, Derrida holds that the spectre never dies, nor does it manifest itself. As the "visibility of the invisible," something which remains "beyond the phenomenon or beyond being," as Derrida describes it, [4] the spectre returns to visit us, and becomes what we, with a rather brute reduction might call a

'stone in the shoe' or a 'speck in the eye', somewhat as Wiki Leaks currently is to global power structures. Herein lies the spectre's political power, which, whether fearsome, mystifying, or alluring, enables or perhaps even forces us to reflect on the current state of society, and all powers' totalitarian potential.

In order to describe the nature of the spectre and its power, Derrida coins the term 'hauntology,' a neologism that, as an existing word in French, is inseparable from ontology. Hauntology represents a concept that describes the power of things that are present, but beyond being, and therefore nowhere to be seen: something that threatens to make visible what we forgot, or have tried to hide, something that leaves traces for us to see, and for others to follow.

The ghostly nature of sound

In *The Poetics of Space* (1958), the French philosopher Gaston Bachelard discusses the concept of 'miniatures,' a concept he uses to describe how poetic expressions unfold a larger, imagined world. For an immediate understanding of Bachelard's idea, the miniature is a condensation of a cosmos wherein the unspeakable is spoken, silence is heard, and the invisible is visualized. It is an opening into the world beyond perception, through the poetic imagination of the poet. To exemplify the miniature, Bachelard quotes, among others, the Polish writer Czeslaw Milosz, and his writing on silence: "Listen – now there's nothing – but complete silence – listen." [5] Silence is somewhere on the border of perception, perhaps between perception and imagination. It cannot be fully experienced, but is easily recognized, and its presence opens a door into a larger imagined world that is both alluring and frightening.

In *Sinister Resonance* (2010), David Toop writes of how we find the world uncanny when sound stops, when everything is silent (a well-known, and often used effect in movie production). One reason that we experience silence as both fascinating and frightening might be that silence is a condensation, a concentrated moment full of potential energy, or, to put it more poetically, a miniature of an unleashed cosmos – a withheld Big Bang.

In keeping with the writings of Toop and Bachelard, silence is like a ghost, and qualify as a miniature; a poetic imagination beyond perception, simultaneously appealing and terrifying, as are the auditory hallucinations of Edgar Allen Poe that find their way into his uncanny story, 'The Fall of the House of Usher,' a story that Bachelard discusses in 'The Poetics of Space.' Or, as Toop mentions in 'Sinister Resonance,' when, late at night we seem to discover a hidden world from the subtle noises that suddenly make themselves heard, when we become uncertain of what we are hearing, or whether we are hearing anything at all.

'Touched Echo'

Touched Echo by German artist Markus Kison, was a public sound installation at the*Brühlsche Terrasse*, in the city of Dresden in 2007. The installation presented the sounds of the allied bombing of Dresden on February 13th 1945, using original recordings of bombers flying over the city, and exploding bombs. The sounds were hidden as vibrations in the railing running the length of the terrace. The listener had to place his/her elbows on the railing, and rest the wrists on the skull, in order to hear the sound, which then resonated through the bones of the forearm, to the cranium. The posture of the listener resembled that normally taken in order to avoid listening. This is no coincidence, but, as Kison noted, a feature of

the artwork, since it is a posture one can imagine the victims of the actual bombing taking, in order to shield themselves from the horrifying sounds of the aircraft and the exploding bombs. See Fig. 1.

In the context of haunted places and spectres, it is interesting to notice how the sound in*Touched Echo* is not really 'on air', but only in the head of the listener, as is the case with schizophrenics or those experiencing auditory hallucinations. Murray Schafer, the soundscape theorist, has introduced the concept of 'schizophonia' [6] to denote the split between an original sound and its electronic, acoustic reproduction that, as a free-floating media object, is detached from its original time and space, but which may be reproduced at other times and places. As 'schizophonia,' the electronic, acoustic reproduction of the bombing of Dresden enters the present as an echo of WWII, and becomes a medium through which the historical and present time and space reach each other. It is truly the presence of an absence, something that is and is not, a spectre, as Derrida's constant reference to Hamlet, in *Specters of Marx* indicates: 'to be or not to be.'

Although the sound is only heard in the listener's head, the installation immediately enters the public sphere, in the sense that it also echoes today's political debate on the incident as an act of war, or an act of terror. As a spectre, it brings the historical act into political discussions of the present. Today, and most recently with regard to the 65th anniversary of the Bombing, in 2010, conflicts arose between neo-Nazi demonstrations and counter-demonstrations of local citizens and left wing activists, a conflict that showed how the city is a haunted place, and how the incident resonates in the memory of the people and the history of the city, as an echo or a voice from the past that will not die away, but keeps coming back.

In Greek mythology, Echo was a nymph who used her beautiful voice to distract Hera, the wife of Zeus, when he enjoyed the company of other beautiful nymphs. When Hera discovered this, she punished Echo, so that Echo from that day forth was only able to repeat the words of others. However, as we know from our own acoustic experiences, Echo does not only repeat the words spoken by others: Her voice is a distortion, and as such she manages to once more have a voice of her own, a voice that is not to be trusted, that exists between the real and the imagined, the truth and the lie.

Conclusion

Touched Echo exists on the border of the perceived and the imagined, the real and the staged, the private and the public. Although it is a sound installation, there is nothing to hear, since what is there is only in the head of the listener. But where does the actual recording stop, and the auditory hallucination start? What is the difference between, memories and historical facts? These are some of the questions *Touched Echo* asks, without answering, and in this uncertainty lies the poetic imagining of the work, and of the ghost and the miniature, an imagining beyond perception that is needed by both people and the places in which they live, but also, if we care to listen to Derrida, by the societies we build. If we are to avoid totalitarianism, the end of history, we must accept the poetics of the ghost, whether what we experience is a dream or a nightmare. That is, we have to find a way of living with the ghost (the good and bad of history, the fact and the lie, the sound and its echo) without making it disappear or become real.

 "Haunted places are the only ones people can live in" Michel de Certeau writes in *The Practice of Everyday life*, [7] but some places still need to be exorcised, in order to become habitable. How to do that, without being totalitarian, that is the question.

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'AITIAI' CONCERNING GENETIC ART

Andre Brodyk

This paper adapts an essential aspect of Aristotle's concept of 'aitiai' suggesting an analogous interpretation in new media 'Genetic art' theory called the 'Proto – animate Condition.' I argue that fundamentally, causal properties underlying the concept of aitiai are characteristically pending action requisites and that this property is somewhat analogous to the causal properties of proto – animation.

Fig 1. proto-animate20, 2011, Andre Brodyk, gmos, semi-readymade chalk, variable. ©Andre Brodyk, Photo : SymbioticA.

Fig 2. john doe 0324, 2011, Andre Brodyk, transgenic E.coli, recycled timber, Plexiglas Petri dish, variable, ©Andre Brodyk, Photo : Andre Brodyk.

Introduction

This paper adapts an essential aspect of Aristotle's concept of 'aitiai' suggesting an analogous interpretation in new media 'Genetic art' theory called the 'Proto – animate Condition.' [1] The idea is therefore to ruminate on one aspect of aitiai within a contemporary translation rather than suggest an equivalence to Aristotle's overall philosophy.

I argue that fundamentally, causal properties underlying the concept of aitiai are characteristically pending action requisites and that this property is somewhat analogous to the causal properties of proto – animation. The Proto – animate Condition, which I will now refer to in this paper simply as the 'proto – animate,' is a novel concept on Genetic art, which I developed and is concerned with the inner causal properties of specific types of molecular materials and processes. Generically, these are called non – coding materials and they include introns, ncRNAs and pseudo genes for example and I explain why they are referred to as non-coding molecular materials. In fact the non – coding quality of these are crucial to the argument of the pending condition advanced here.

So I draw upon my interpretation of this essential condition of the ancient philosopher's cause theory, which entail the operations of internal factors to advocate a novel pending condition of matter and form understanding at the internalized structures at a molecular level.

From this molecular perspective, the aitiai causal responsibilities are therefore perceived of as existing in a pending, proto – animated causal state. This is one, which approximates the recondite proto – animate condition operating inside the genomic matter / form matrix of living organisms.

 I begin with a brief interpretation of aspects extracted from the concept of aitiai that are relevant to this discussion. I then briefly connect this in a discussion of the basics behind the theory of the proto – animate to show a comparable condition between each as the main argument of the paper. Finally, I also suggest how this causal condition can be expressed tangibly in Genetic art materiality. That is, by the creation of synthetic novel genes comprised of non–coding molecules, which exist in a pending condition as the fundamental expressive elements in my Genetic art.

Aitiai

The Greek word aitia (or aition) does not have a precise contemporary literary equivalence in English. However, as a composite meaning it can refer to an explanation, a responsible agency or cause for example. "Essentially *aitia* derives from the adjective *aitios*, meaning 'responsible,' " so the causal conditions responsible for something may sum this up in the context of my argument. [2] Besides referring to physiological agents, what is also noteworthy is that aitiai (plural) also refers to non-sentient items or what causes i.e. "*aitiai* the inferred inner, structural facts causally responsible for the outcome." [3] In my artistic interpretation, the central condition found in aitiai can provide a parallel to the essential quality of causation i.e. proto – animation, in a biotechnical art context.

In terms of outcomes referred to above, this can be anything from a biological entity such as man, to an inanimate thing such as a sculpture of a man. Aristotle's thinking is therefore also inclusive of non–sentient aspects, which also expand into asomatous terms and pre-conditional causal constructs. So not only are these inanimate, importantly they are also corporeal things, which used here mean potential circumstances. So this is important in my analogy because as I will demonstrate, it also connects the

idea of causal responsibility to inert properties located within non-coding, molecular, biological conditions. Therefore the pending, (potential) property of causal responsibility is also the intrinsic agency responsible for the causally outcomes in proto–animate bio–matrices.

Because Aristotle advocated the view that the aitiai causes apply to and operate between the components of all generated compounds natural or artificial, such an atomistic or molecular disposition is therefore arguably an apt frame of reference for a molecular and genomic art context. That is, one involving what is both natural and artificial bio–molecular compounds considered in a contemporary genetic technology mediated environment. This includes the molecular spaces between these compounds. I explain what I mean by this shortly after illustrating what I consider to be relevant in aitiai.

Aristotle's concept of aitiai, advocates four factors being responsible to explain matter and form relationships more completely i.e. four types of cause*.

 "An aitia can be a reason or motive or explanation, as well as a cause (as we understand that term). The four types of cause Aristotle identified were the material, formal, efficient, and final." [4]

Because his four factors are explicatory causal types these are not passive by definition. As such each cause has a performative role as this abridged extract indicates.

"material: that from which something is generated and out of which it is made, *formal*: the structure, which the matter realizes and in terms of which the matter comes to be something determinate, *efficient*: the agent responsible for a quantity of matter's coming to be informed, *final:* the purpose or goal of the compound of form and matter," [5]

So while the four causes are designed primarily to account for substances, they also derivatively account for events and processes as the definitions above indicate. This is also important in a genetic, biotech context to explain regulatory processes involving non – coding materials. This is since molecular material processes are the root cause of organic expression involving matter (non–coding DNA) and form i.e. protein expression.

The composite of these four causes is collectively what can be considered as aitiai. Now beyond providing the above brief definition of these, I need to point out that I am not interested in the explicating the specifics of these causes per–se. Rather, I am explicitly interested in what amounts to the collective property of potentiality, which I see as the composite condition behind them, i.e. the potential.

Because this four–causal framework of explanation collectively represents potential as a performative explanation, it therefore represents the equivalence of a pending causal condition. This is something, which I advocate is characterized by its latent and temporal nature as well as recondite property. It is specifically antecedent to activity or animation as its potential is as yet realized; therefore it is in a pending state. That view is central to my argument.

For example, for Aristotle, "matter is *potentially* some *F* until it acquires an actualizing form, when it becomes actually *F*." [6]

While aitiai is this overarching causal frame of reference, Aristotle's account of matter and form interrelationships, which he referred to as 'Hylomorphism', is also integral to this pending context. This pending condition is illustrated succinctly as this following quote indicates.

"For Aristotle, matter, from the Greek *hyle,* is the common material stuff found in a variety of things; it has no distinct characteristics until some form is imparted to it or until the form inherent in a thing becomes actualized." [7]

So the interrelationship of form and matter or Hylomorph, is a potential condition and also therefore a pending one.

Aristotle view of aition shows organic development as a fundamental paradigm for explaining all material change and physiological processes. To continue, this involves the chemical processes going on inside living organisms being not dissimilar to those in the inert chemical world. So Aristotle's thinking is important because it provides an established early account involving a specifically organic model with associations to inert chemical materials. And as is indicated by Green and Groff, "parallels between organic and inorganic processes reinforced Aristotle's physiological model." [8]

So Aristotle's organic / inert association concept of aition is an account, which describes a pending condition "that because of which something comes to be" which is relevant to my idea of the pending nature of proto-animation involving a molecular paradigm.

The above account sketches the salient point of the potential condition inherent in aitiai. The pending condition intrinsic to the idea that is aitiai can translate here into a fundamental bio –molecular organic proposition. The following sketches the molecular equivalence.

Proto – animate

The central tenet in the concept of the proto – animate is the character of a pending condition, which I call proto – animation. It is used for explaining important material changes and physiological processes whereby "something comes to be", inside organisms specifically at the molecular level.

The pending condition explicated by art modelled on genetics involves so called non –coding molecular material in a predicament, which I argue is essentially a proto–animated material – form – space within genomes. A brief account of the science behind this helps to explain this.

According to eminent scientists such as Professor John Mattick Founding Director of the Institute for Molecular Bioscience in Queensland, non–coding materials such as ncRNAs and introns can be considered to exist within a particular molecular configuration inside genes. This is within an influential substrate layer under the coding layers of DNA. The coding DNA are called exons. Non–code molecules are considered to be inert because they were thought to be non – coding, that is being able to affect material changes in genotype output, as exons do. That is to effect physiological processes in organic form expression meaning protein expression. What is important about these latent molecular substrates is that while they are not directly responsible for coding proteins and as such are considered to be inactive, this position has been subject to conjecture in recent times.

It is now understood that the ostensible inert status of non–coding ncRNAs and introns is wrong and that they actually have a causal responsibility which is a regulatory role in orchestrating exons to effect coding through numerous intermediary stages. In other words the perfunctory coding capacity and ultimate affect of exons to code for proteins which manifest physiologically is co-dependent on so called non – code causation. The recondite nature of the functioning responsibility of such effects by these agencies of change is difficult to ascertain currently. Just like aition is, "that because of which something comes to be", this causal property and consequential affect, materialises essentially as a state of unfolding understanding. [9] This is a causal effect, which exists as a pending (and temporal) condition.

Furthermore this can be considered in that way because the causal responsibility of the recondite regulatory functions of non-coding molecular materials entails operations which involve an 'on' and 'off ' state. This pending on or off state is thought to be responsible for directing coding elements in genes in different circumstances inside the genome. I suggest that non–coding elements i.e. introns and ncRNAs are a kind of recondite substrate; something which appear to have no fundamental properties at all, yet have the potential to cause anything, depending on what properties can be assigned to it. By this I mean the directional property to organize coding DNAs to make any one of an infinite number of physiological outcomes i.e. the colour of an iris for example.

Therefore rather than considering these non – coding substrates to be either inactive or active, I consider that their causal and performative qualities to be latent. Therefore I consider them to exist in an in – between state of animation neither entirely active nor inert, but rather an anticipatory state of potential and pending action. This is a proto–animate condition which links inert chemical compounds i.e. DNA and organic affect i.e. coding through an anticipatory molecular space inside coding and non–coding layers within genomes. Essentially this is the concept of the proto–animate.

The importance of such a causal predicament in the genomic context can be estimated by virtue of the fact that this non – coding material has been preserved essentially un–mutated, over millennia. Furthermore its quantitative correspondence to organism complexity is such that the more complex organisms such as homo sapiens, have more of this regulatory, causal, non – coding material than less complex organisms such as bacteria have. So I suggest that in a similar way that Aristotle's matter needs some form imparted to it otherwise it remains un–actualized, so too the form of molecular non – coding materials needs to be actualized as a causal agent of protein expression.

"For Aristotle, matter, from the Greek *hyle,* is the common material stuff found in a variety of things; it has no distinct characteristics until some form is imparted to it or until the form inherent in a thing becomes actualized." [10]

Genetic art

The proto – animate condition can be expressed within Genetic art through the conscious use of such ostensibly inert molecular materials and processes, involving non – coding materials such as introns or ncRNAs. By using recombinant molecular processes involving these non –coding materials which have been reconfigured within novel gene sequences, their pending status is put into question. This is because the realignment of non – code molecular introns can be seen to potentially orchestrate a new and biologically viable reading, by altering the composition of a sequence. That means that the integration of

a reconfigured non – coding script inside a gene could cause and affect a changed reading by the internal chemistry mechanisms of an organism at a molecular level such that a coding exon could be created.

This Genetic art brings into question the veracity of the orthodoxy surrounding the status of non-coding elements as inert agencies when engineered creatively within such synthetic genomic trajectories created in the molecular biology lab.

Conclusion

In the biological molecular terms of reference being advocated here, I have suggested that the in – between or inter – genetic substrates of non – coding materials are molecular equivalences to matter not yet combined with form. This is because these are asomatous intercalating agents, which constitute a type of formless space within a chemical matrix occupying the space between two adjacent layers of coding DNA. Introns for example are circumscribed materiality, i.e. as strings of chemical bases, but they are considered formless matter here because they have not been comprehensively described in terms of activity causes. This is since such causation is known only in terms of regulatory transfers, which in most cases today are pending or unknown translations. This is why knowledge of causation, of how introns or ncRNAs affect coding outcomes as an exemplar or established paradigm is itself an intangible form.

So the crucial fundamental idea in my argument advanced in this paper concerns the pending nature of molecular non – coding materials, which I see connects with the composite potential condition inherent in Aristotle's four factor causal idea. This is a re-interpretation of the central composite pending property in Aristotle's *aition* translated into a contemporary frame of reference.

I have stated that essentially the claim that molecular biological is similarly, "matter is closely connected to potential or power; the potential or power to become some particular sort of thing". [11] Paraphrased, Only by giving it form can it be made actual (i.e., made into an actual object of a particular kind). (By this I mean a protein expression output). Most importantly, I have said that this causal position evident in aitiai is a pending condition of animation and is therefore comparable to a proto – animate state of existence inside a biotechnology mediated matrix.

Since the causal effects of non – coding materials such as introns are intangible, they have not yet been given form; they therefore entail asomatous spatial associations between introns and exons. In order to demonstrate this potential existence in a pending condition I have proposed expression of such pending form via Genetic art. This entails using recombinant genetically engineered scripts taken out of the latent substrate layer realm and into novel realignments of introns with other non – coding molecular materials as potential proto – animates.

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DATA VISUALIZATION AND ECO-MEDIA CONTENT. MEDIA ART PRODUCED AT DIGITAL NARRATIVES WORKSHOPS

KARLA BRUNET & JUAN FREIRE

This paper presents an analysis of the material produced during the "Digital Narratives for community participation on coastal ecosystem management" workshops held in Cairu, Brazil and Aguiño, Spain. It is a reflection on the themes and contents identified and collected by the teenagers. Alongside our analysis tries to facilitate the exploration and to identify topics and problems relevant to the participants, their communities and territories.

1. Introduction

Digital media has allowed the development of narratives by a diverse array of communities and collectives that previously were overlooked because they are marginalized. Instead of a well-defined and finished product, these digital narratives are a continuous process of documentation and reflection based on individual and collaborative contributions using different formats, channels and media (audio, video, photo, mapping). In this sense, narratives could be considered platforms for art experimentation, learning and debate.

The objective of these projects is to produce "other" narratives paying attention to subjectivities and explanations of the environmental, social, political and economic problems and idiosyncrasies differing from the narratives offered by mass media and/or political bodies. In this sense, these alternative narratives provide visibility of hidden realities making them explicit to other stakeholders that otherwise would prefer to ignore them, putting in some way problems and collectives in the agenda of the decision-makers. So, digital narratives are media and tools for negotiation both internal (inside communities with the goal of attaining consensus in objectives and strategies to solve common problems) and external (with powers that make policies and manage these communities and their territories).

The present paper is based on the experience carried out in the project "Digital Narratives for community participation on coastal ecosystem management" that was developed in two coastal rural communities dependent on fisheries: Garapuá (Cairu) and Aguiño, coastal places located in Brazil (Bahia) and in Spain (Galicia), respectively. Both communities are representative of the diversity of cultural and socioeconomic conditions that characterize coastal fishing communities in Spain and Brazil. Garapuá continues to be a small village mostly isolated from nearby human settlements and where a strong feeling of community continues to persist. Whereas, Aguiño has experienced an important urban development in the last years and now this village is part of a large diffuse coastal settlement mixing rural and urban characteristics. In this Spanish site, people are less tied to the place and participate in wider social networks. It's expected that these socio-cultural differences are reflected in the vision that each community has of itself and its territory.

In both communities, experimental workshops combining artistic practices, new media and science were carried out for the creation of digital narratives dealing with ecological, cultural and socioeconomic issues in two coastal communities is here illustrated. Our basic hypothesis was that digital media could allow coastal communities to develop their own narratives about their life and territory, and especially

their use of coastal ecosystems. This process can be essential to promote mechanisms of community cohesion and to empower user groups to participate more actively in the co-management of their territories, along with scientists, public officers, politicians and other stakeholders.

A previous paper (Brunet & Freire, 2010) explained the motivation of the project, the workshop development, and a preliminary description of the main materials produced and results.[1]The workshops were designed as a pilot project where methods and technologies for collaborative construction of digital narratives were assembled, tested and improved for the development of a collaborative framework. A toolbox of open methods and free software was brought together to facilitate future projects. The complete process is documented can be found on site of the project (http://narratives.ecoarte.info/).

In each place, exhibitions were carried out to present the results allowing people to know, discuss and compare their narratives with the ones from the other site. Both exhibitions and digital repositories can help to promote reflection and action about the identity and problems inside each community.

Here we present an analysis of the aesthetical and ecological content of the narratives produced during the workshops. We also present a description of the ongoing experimentation to visualize narratives (media, semantic content and geographic patterns).

2. Aesthetical analysis

Through creating these digital narratives, teenagers from both communities gained confidence and appreciation of their territories. In a brainstorm for the Aguiño photo workshop, we asked: "how do you see your future here, in this town?" The answer was "In the future, here it will became an abandoned town or a big city". This states their view of the place as two extreme directions: one is the disappearance of the town due to migration towards cities (teenagers visualize themselves as part of this diaspora), or Aguiño becomes a suburban part of a larger city due to the development of nearby urban areas. After the workshop they stated that they realized that their place had other opportunities that they haven't imagined before. And that yes, they could do things there in order to preserve their landscape and not having to leave town.

Allen Carlson (2000) defines the relevance of landscape appreciation on environmental aesthetics and its descriptions modes. Using literatures as example, he suggests that landscape appreciation is proposed by different sorts of descriptions such as: formal and ordinary description, factual description, and imaginative description. All of those are easily seen on the media produced on Digital Narratives workshops. Photos of beaches landscape from Aguiño and Garapuá are examples of ordinary description; they present the place as a postcard, very clean, distant and with no interference[2]. The video of a worker opening the coconuts[3] is an example of factual description since they present the action as an investigation about the man's work, it presents the functionality of his act. And an example of the imaginative description is the map of legends[4] created in Aguiño that display the location of the legends of their place, in there, they say that almost every rock in the sea has a legend.

The way we experience the environment as an art form can change from person to person, in our case, from community to community. In one community, for example, landscape appreciation can be the most important factor, while to the other, the contestation and memory can be more significant.

When comparing the results of the aesthetical experience of the two communities, some considerations stand out. For example, in Garapuá many of the teenagers had no previous knowledge on using the cameras, mp3 recorders and GPS, so their use and technological experimentation was more conventional than the use done in Aguiño, a place where the teenager were already used to the technology. This can be easily seen on the photos produced on both communities, the Garapuá's ones were more a documentation of their territory and community while in Aguiño, there was a graphical aesthetics concern to the photos. Meanwhile, the images produced in Brazil had a stronger narrative content and the ones done in Spain were more landscape contemplation.

In Aguiño, observing the photos produced we can see that landscape appreciation was mandatory for the teenagers to narrate about their territory. While in Garapuá, they focus the importance more on people than on places. Maybe that is related to the familiarity of the teenagers in Garapuá to other members of the community. When photographing they were interacting with their friends, uncles, grandmothers… In the Spanish community, frequently, they had no close relationship with the people photographed, not even knew their names.

The audio recording produced in both communities also had different approaches. In Garapuá, there was no experimentation with the audio, they recorded many storytelling, and many times, all recorded the same situation. We ended up with many audios of the same interview. On the other hand, in Aguiño they experimented a lot with the audio, they created and discovered unnoticed sounds of the place. An interesting example is an orchestra[5] that they created on a shipyard, just with the sounds of the machines. With the sounds produced we believe it was not a question of being comfortable with the recorder, the different results were more related to the effort and experience of the facilitators who could stimulate them to search for different perspectives. Here we can see clearly the importance of the role of the facilitator, in Garapuá, they only focused on the technical aspects of the sound and the editing software. Noticing that problem on the first workshop, we asked the facilitators of Aguiño to work more on the content of the audios than on the technical aspects.

The aesthetical appreciation in this project is a mixture of the senses perceptions and the cognitive effort. Angus McWilliam (2008:36), in "Developing an environmental aesthetic: aesthetics and the outdoor experience" says that:

…if aesthetic experience is … a matter of pleasure derived from perception involving both senses and intellect, then it is more than just a question of seeing – it takes time. Time to allow sensations to impinge on our time for reflection on the meaning and impact of what we have experienced.

We believe that in Digital Narratives project, the aesthetics was not only a question of seeing, it was a question of acting, the teenagers had to take part of the project. The aesthetics experienced involved action and reflection on their place and territory. It was based on the complexity of the engagement, on the way they were asked to sense their community, through the digital media.

3. Ecological analysis

The coastal ecosystem is the context where the lives of these communities and peoples occur. Ecosystems are characterized by a series of "tangible objects" (physical and biological components) and intan-

gible processes that connect the different objects (i.e., river runoff or coastal currents, coastal fertilization, trophic cascades…) (Mann & Lazier, 2005) and the human experience of objects and processes gives rise to the landscape (Turner et al., 2001).

The work of workshop participants and the comments of the people interviewed shows us how they perceive their ecosystems and landscapes, and specifically which objects and processes they are aware and/or consider relevant and which ones are hidden. In this sense, this kind of analysis could be of great utility to assess the ecological literacy of the community (Jordan et al., 2009); their ability to understand essential ecosystem processes that support the sustainability of their natural resources and ecological services.

Our analysis of the contents produced during workshops demonstrates that teenagers have only a basic knowledge of the ecosystems. Also, this fact precluded them from engaging in depth in ecological conversations with people. A global analysis of materials allowed us to identify 6 main themes relevant for Garapuá's teenagers: 1) tourism / leisure, 2) infrastructures, 3) economic activities (especially fishing), 4) life histories, 5) ecosystem and 6) land ownership. Teenagers showed a strong capacity for critical thinking about their own identities and the result of their work presented an accurate description and critical analysis of the community and the territory. However, they only identified the basic elements when working with the ecology of the area: habitats (mangroves, beaches, reefs), animals and plants (especially trees and commercial fished species as clams or some fishes) and physical elements (water, small rivers…).

In the case of Aguiño, teenagers had a more contemplative and aesthetical attitude towards their environment, although the workshop and posterior discussions helped them to start to develop a certain critical thinking. In this sense their materials were more descriptive documenting a static nature and landscapes and they identified three main topics: 1) landscape, 2) fishing, and 3) life histories and cultural identity. They were mainly focused in large landscape features as beaches and coastal geological formations, and they were only aware of commercial animals only when they accompanied fishers in their operations at sea and/or at markets. Some basic ecological processes that are conflictive in the community, as pollution by sewage or processing industries located in the seashore, were also registered. However, only a basic analysis was documented and no in depth discussion was provided by their work.

Jointly, the narratives of both working groups allow identifying that ecological literacies are basic. Only the more symbolic and evident "objects" are recognized. Also some relevant "objects" as habitats or vegetation types and almost all ecosystem processes are not identified showing a static view of the landscape. They lack a conceptual view of their territory as a entangled network of objects and processes where any action affecting one component produces changes in other components and locations, and in this sense, their ability to understand how to manage the ecosystem is restricted. Some basic ideas lacking from the narratives are related to: effects of nutrient discharge in coastal fertilization, trophic dynamics of the biological communities, effects of overfishing in the abundance of resources and cascading effects in other species, or habitat changes by human disturbances.

Developing a comprehensive ecological literacy arises as a key objective to empower the community and develop their ability to influence decision-making in environmental management (i.e., territory planning, pollution control, fishery management). These topics are especially important because the economy of both communities is dependent mainly of artisanal fisheries and, to a lesser extent, a growing tourist activity that uses ecosystem services and it is dependent of landscapes.

Effective participation of communities in environmental management needs both an ecological literacy and capabilities for collective action allowing them to negotiate with managers and politicians. Digital narratives arise as a tool to improve both topics. In a first phase, corresponding to the workshops described here that started with a rather general goal, the construction and analysis of narratives is a way to identify the baseline of the community about their ecological knowledge and their attitude about the environmental problems and risks.

Future workshops could be more focused. For instance, facilitators could work with teenagers to show and discuss ecological processes and landscape dynamics and sustainability, and narratives could be a way to document and visualize these processes and to investigate how they operate in their locations. Other workshops could be focused on organizative aspects of the community, the existence (and/or the development) of a consensus about their main problems and about the actions needed to solve them.

In this sense, in Garapuá, the concentration of land property in a few hands (external to the community) was identified as a basic problem. Actually it was the only problem and conflict related with the management of the territory and ecosystem that was identified in the workshops. Decisions occurring out of the community could modify land use, i.e. with the building of large touristic resorts, modifying habitats and probably basic ecosystem processes as coastal erosion or reef deterioration, and traditional uses of coastal locations as beaches used as landing and boat repairing places or residential houses occupying the shore. The workshop demonstrated that although the problem is recognized, there is not a basic consensus about how to approach collectively this risk and which could be the solutions. Something similar occurs in Aguiño with conflicts between fisheries and coastal pollution and between fishers' organization with the regional government. In this area fisheries management has not be able to solve overfishing and local fishers organization claims a change towards co-management and the use of territorial users' rights. This debate is a topic of considerable interest but surprisingly teenagers were not aware of it.

4. Visualization and some conclusions

Art, being here a subtle form of communication and protest, uses data visualization to empower community members allowing them to visualize, and realize, facts that were sometimes misplaced, or hidden, or forgotten. The cataloguing and careful handling of the media produced during and after the workshops has a key role in this visualization. We have tagged all photos, videos, maps and audios in relations to its content in order to find patterns of significance on the material produced. At the same time, we explored software and graphical possibilities of this visualizing process.

The exhibition we did in both communities was a form of presenting the visualization of the material they have produced. We created a parallel of video projection, mixed photos by themes, played audio as content title, and printed large maps showing their territorial choices. We also placed photos on topographical maps of both regions helped by the workshop partakers. Besides the physical exhibition in the communities, we presented online all the material produced, this way, giving a broader visibility to the work. In order to better understand the internal relationship of the content produced, we did tag visualization of all the photos produced[6]. We used *Impure* software to create*Datanet* (Klanten, Bourquin *et al.*, 2008), a visualization in which the links between the objects are more important than the nodes. This visualization gave us a better perspective of what was important to them, about their location, environment and identity.

After we have finished the workshops and exhibitions, we concluded that we needed more time in the community for collaboratively editing and tagging the material, and more important, for their assimilation of the work they have done. It would be necessary a longer and more continuous work with them in order to engage a deeper reflection and discussion on the material produced. We agree with Mark Dawes (2008: 65), in "Beyond Process: Art, Empowerment and Sustainability" when saying: "A process-based model can be a highly successful approach to working with people in the arts, but the short-term nature of most projects of this kind limits more profound possibilities for growth within communities." However, our problem the length of workshops was not a decision implied only by us, the teenagers did not much free time either, many of them studied and worked fulltime. Additionally, it could be hard to keep their attention and focus on a longer period. So we had to condense the most in a few days, otherwise we would not have public.

In parallel we identified the need for more experimentation in the visualization of media and their semantic and geographical content to refine and improve tools and results. Visual interfaces should be the basic tool allowing people in communities to explore materials produced. Therefore, allowing them to get insights and develop reflections about the topics narrated at workshops. The workshops and research presented in this paper show the opportunities that the concept and method of digital narratives represent to develop art and ecological literacies and to empower communities for participation in environmental management. However, to fully demonstrate the potential of this approach developments in tools, improvements in the logistics of the workshops and an extension of the time of direct collaboration between workshop participants and facilitators are needed.

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MICROSCOPIC TRANSFORMATIONS: SCIENTIFIC VISUALIZATION, BIOPOWER, AND THE ARTS

Roberta Buiani

This paper examines the practice of looking and the biopolitics manifested in microscopy and scientific visualization. By simultaneously appropriating and subverting conventional models and notions of seeing, artists and the industry dedicated to visualization often trigger molecular, yet gradual changes able to transform the way in which we see the object of visualization, the concepts and notions that frame it.

Of Microscopes and Wonder

During ISEA 2010, science and arts collective Hackteria offered a DIY microscopy workshop that showed how to turn a cheap webcam into a microscope by simply inverting its lens. To complete this rudimentary though functional microscope, those who attended were given directions on how to build a microscope stage that had to comply with rather simple optics rules but had otherwise no aesthetic or material restrictions. The process concerning the collection of specimens and the construction of the instrument was unanimously considered empowering, enabling individuals with little or no technical knowledge to put together a functioning instrument. However, it was the moment the reverse webcam/DIY microscope was turned on and the mysterious world of the microscopic was suddenly revealed to the onlooker that caused most excitement. The workshop itself almost came to a halt, with mesmerized participants obsessively staring at a myriad of tiny organisms, suddenly made visible, busily making their way across the area magnified by the microscope. In the following hours, the participants kept going back over and over again to check on their creatures or trying different specimens to explore more of that unknown world. Equipped with LED and other simple electronics, they successively lit, stimulated and embellished this newly found mysterious world, to observe and wonder at its reaction and to turn it into a personal staged scene, a theatrical performance where the observer played the god-like director.

Proposed as a DIY workshop where technological instruments and scientific processes are demystified and détourned by artists and makers, Hackteria did far more than disclose the scientific principles needed to construct a homemade microscope and to introduce the participants to the new and unusual applications that this instrument could offer. The simplicity of the technologies used and the minimal operations performed during the workshop moved the attention of the participants from the technological aspects of microscopy, to the way in which default notions of seeing affect not only our approach to the object observed, but also how we build the instruments made to observe such object.

This shift fostered reflections on the significance of unveiling the invisible, an operation practiced in microscopy and scientific visualization and obtained by means of technological instruments such as the microscope (light or EM, depending on the magnification needs and the size of the object studied), and a variety of software packages like Tecplot [1], Vmd [2] or Chimera [3] designed for a range of distinct scientists and offering features that can be chosen according to what needs to be accomplished. How do

cultural assumptions and conventional approaches to seeing affect our reactions to the unveiling of the invisible? How are they reflected in the way these invisible objects are reproduced and re-created by means of the above technologies and software packages? Can these assumptions be rearranged?

Rearranged Context

The participants in the Hackteria lab were not indifferent to these dynamics, as their attitudes towards those tiny organisms captured by the webcam/microscope replicated exactly those default approaches to the invisible that many mainstream activities would invoke; mainly, an inclination towards "disembodied witnessing"[4], encouraging to interpret the microscopic world as alien and abject, resulting in a certain entitlement to manipulation and subjugation of the object to fit goals to their own benefits (or aesthetic pleasure) [5]. Yet, the nature of the environment, the minimal distraction posed by the technologies employed and the format of the workshop, which leaned towards self-reflexivity, facilitated a discussion about, and challenged, many of the cultural, scientific and goal-driven assumptions that creep into this and other similar activities.

The case of Hackteria is not an exception. A growing number of artists and creative individuals actively participate in scientific practices involving microscopy and the visualization of the invisible. To different degrees, they all manage to foster moments of reflection like the one described above, to create short-circuits, in the endlessly repeated narratives promoted by conventional modes of representation and normative rules leading to the visualization of the microscopic. However, the way that these short-circuits happen is rarely by means of direct critique or confrontation. In fact, most of these artistic initiatives seem to simultaneously implement and defy these regimes of knowledge. Artists participate in, rather than completely reject, the conventional rules existing in the sciences and in the cultural rituals of looking; being well-aware of the seductive power of the tropes that dominate their objects of research, they appropriate and exploit them. At the same time, they break these very rules and rituals, by relocating them outside the lab, by engaging the audience in debates about specific issues raised by their research, or by introducing slight changes that shake and induce reflection on problematic elements perpetuated by the above cultural/scientific notions.

Drawing upon a comparative approach that takes into consideration both conventional scientific practice and artistic elaborations in microscopy and scientific visualization, the purpose of this paper is twofold: first, it seeks to show how the above dynamics, both manifestation and subversion of a biopolitical regime that promotes an implicit homogenization of the message communicated by given practices of seeing, are also exemplified in many mainstream scientific operations that examine and visualize the invisible. The aesthetics and variety of scientific visualization in popular science magazines and science journals often reveal the urge to constrain, regulate and control visual expressions to serve a number of agendas. Thus, these visual expressions support and tiredly repeat old ideas of the microscopic as spectacle, other and abject. This inclination, however, is constantly ousted by a drive towards new ways of seeing, and towards challenging these notions, through subtle introductions of innovative elements (technological and conceptual) into the image.

Second, the above considerations confirm that the representation of the microscopic, whether it is done by an artist or by another professional is heavily mediated through, and not severed from, our cultural assumptions and notion of seeing. Works proposed by the Hackteria collective and by other artists like

Suzanne Edwards (whose work focuses on general microscopy), Luke Jerram and Caitlin Berrigam (who focused on the visualization of, and our coexistence with, viruses) are not exempt from engaging in the biopolitical mechanisms that characterize the scientific practices in which they are engaged. However, their location at the crossroad between the sciences and the arts puts them in the position to reveal with greater clarity those problematic areas and those assumptions that characterize the study and representation of the invisible. As a result, their work might be able to create dedicated spaces of debate, promoting public awareness of the practice of seeing, facilitating shifts in the already transformative fields of microscopy and scientific visualization.

Biopolitics of the Invisible

Using visual language, microscopy and scientific visualization are fully embedded in a system that mixes and exploits, on the one hand, technical information and "entertainment", and on the other hand well-established visual tropes and innovation aspiring to move away from these tropes. These aspects seem in opposition with each other. Yet, they coexist any time the microscopic is reproduced.

Historically, Stafford reminds us, "the division between a sensuous, pleasurable, or merely curious *watching* and a rational, tasking, language-driven *observation* arose during the eighteenth century"[5]. The entertaining nature of a scientific image portraying a microscopic organism ("enjoyable watching" [6]) distracts the viewer from the specific information ("exacting observation") provided by the image. However, the entertaining component also draws attention to the image, following a historical practice of seeing the object as the "spectacle of nature"[7], and as the work of god. The approach of the scientist towards the object seen through the microscope appears to be more the one of a voyeur than a detached viewer. The practice of observing organisms through a lens was an experience that combined a sadistic attitude towards the dirty and base, yet marvelous and fantastic, organisms under scrutiny, as well as a composed observation of rigorous scientific material on the invisible unknown where "mysterious animalcules with unexpected powers could be not only watched under the enlarging lens, but controlled and directed, even as they rushed by"[8]. The invention of solar microscopes that would allow many to observe minuscule worlds on a slide "contributed to the growth of a new and visual form of education heralded by the publication of scientific 'amusements', physical 'recreations', and useful toys"[9].

Today "There are a variety of potential uses for visual representation as a learning tool [..]The scientist, the science communicator, and the public use visual images in many of these capacities, as news and information about science is made available"[10]. Despite the rise of a new "instrumentalized" looking where images are produced to achieve goals and to communicate specific information, entertainment and aesthetics were never expunged from the scientific observation and rendition of the microscopic. In fact, the contemporary goal-oriented practice of microscopy has maintained an implicit aggressive approach to the space of the microscopic as a territory that can be colonized and dissected, subjected and manipulated. The object of study is treated as if it could be indefinitely manipulated through processes like staining, coating and freezing. This treatment is reflected in science magazines and journals, where microscopic entities are depicted in isolation, are artificially tinted with fluorescent colors, their shape geometrically enhanced as if they emerged from an alien world. This assumed otherness uncannily brings up memories of the colonial and postcolonial approach to the racialized other, and the apprehension towards the mysterious and base world of the exotic unknown [11]. This entitles the scientist to

manipulate microscopic entities without much ethical regret and entices viewers to express a voyeuristic curiosity not unlike the one manifested by their Eighteenth century colleagues.

The entities we examine through the microscope are translated as images, which "reproduce something recognizable, with which we are able to interact and that we can seize in their characteristics"[12]. These images are pieced together through a pattern of associations extending along history and culture, helping us organize our memory and our thoughts, enabling us to retain what we see by enacting more associations with other familiar images. The observer classifies an object and associates it to a variety of other forms and objects. This mechanism of self-regulation turns images and gestures into a communicable form of knowledge. Tropes and cultural indicators drawn from popular imagination (the fear for viruses, or the assumed dirtiness of other microscopic organisms are all characteristics evoked by the colors and shapes used to reproduce them on journals and magazines) have sometimes the ability to distort messages disseminated by labs or by scientific committees, by creating false assumptions and alarmism, and triggering stereotypical ideas of the microscopic as dangerous, filthy, monstrous. Yet these tropes and cultural references are needed. Eliminating these elements would hinder the recognition of a microscopic entity such as a bacteria or a virus or would obstruct the communication between scientists working in different areas of science, or between technicians and graphic designers.

The practice of microscopy and visualization are located in a biopolitical system, where the homogenization promoted by the tropes utilized, the claims of scientific objectivity and exactitude, as well as the well-established conventions that bind the activity of scientists and other professionals are constantly trying to catch up with an increasing variety of techniques, aesthetic experimentations and unconventional perspectives. Assumptions about the behavior, or the disruptive characteristics of bacteria and viruses are passed on and recognized across different images through patterns, colors and shapes, they areadded as familiar elements to the scientific data retrieved, acting as invisible agreements that allow the recognition of a particular entity. While any innovation in the visualization industry needs to acknowledge these elements, it also constitutes a continuous challenge to them. In fact, any slight modification to or elimination of a trope to validate a new scientific finding might throw the whole system in disarray, as the patterns of recognition that had been put in place are disrupted.

In Foucault's account, biopower refers to the "conjunction of strategies adopted by the state and a diverse range of institutions and agencies to constitute and govern the population, made possible by forms of specialized knowledge and self-governing participants"[13]. Visualization and microscopy participate in this system by appealing to a series of implied rules that are not imposed, but are needed to keep the whole system in balance. The above-mentioned historical combination of information and aesthetics in early microscopy simultaneously modulates and challenge the practice of seeing. In a similar way, the default patterns and conventions used implicitly govern and limit microscopy and the resulting visualization. Yet, the never ending renewing and upgrading of visualization devices and imaging techniques, voice the drive of scientific visualization towards engaging with incessant innovation, as well as the inability to come out with a fixed set of regulations on how the microscopic must be represented. The dialectics between these contradictory tendencies does not paralyze, but fuels the continuous renewal of scientific visualization and fosters new ways to approach the study of the microscopic.

Microscopic Transformations

As mentioned above, a variety of artists have engaged with the practices of microscopy and visualization. The Hackteria collective, as well as other artists such as Luke Jerram, Suzanna Edwards and Caitlin Berrigan have followed the trends of the industry: they can't escape assumptions and tropes utilized by mainstream science and understood by the general audiences. In fact, this seems to be the only way that works engaging with these scientific subjects can communicate with a crowd accustomed to deciphering scientific messages by using common patterns and by assuming a quasi-colonial approach to the objects represented. The focus of these artists is on triggering small innovative changes that reflect on sometimes-unnoticed details in the production of microscopy and visualization. This proves effective in shaking assumptions that had never been questioned before. Thus, following this principle, in a series of glass sculptures reproducing the molecular structure of well-known viruses, from HIV to SARS, glass-blowing artist Luke Jerram eliminated coloring, and with it, a number of assumptions that are normally evoked when fluorescent colors are used to represent microscopic organisms. Indeed, Jerram's colorless sculptures trigger a series of reflections regarding the role of colors in the molecular visualization of viruses. First, this choice dissipates the wide-spread idea that the colors embellishing pictures of microscopic entities are natural and not artificially applied (for technical or ideological reasons). Second, if the choice of colors to portray a microscopic substance can influence the way in which we see and interpret the image, then, eliminating one of these elements has the potential to underline the extent to which such practice reflects and, in turn, "adversely distort the opinion of the viewer" [14]**.**

Similarly, Caitlin Berrigam' molecular models of the Hepatitis C virus, faithfully reproduced "from a magnified 3D cryoelectron micrograph" found in the Protein Data Bank, were sculpted using chocolate, and offered to the gallery goers to test their "desire to eat the enticing chocolates mixed with a repulsion for the infectious virus"[15], and thus, to challenge popular assumptions of contagion and virus-human co-existence. While the accuracy of the appearances and the material used, chocolate, triggers anxiety regarding Hepatitis C and its means of transmission (apparently some spectators had to be reassured that the chocolate candies contained no virus), the edible form of this particular representation definitely exposes the uncanny familiarity and ubiquity of this virus, with which many people often silently and secretly, sometimes unknowingly, coexist. Berrigan's decision to use chocolate is, according to the artist, an **"**approachable way to ignite discussion and facilitate awareness in public environments" [16].

Like Jerram and Berrigam, Suzanna Edwards' series of micrographs focused on the rendition of the microscopic object and on the effect that processes, instruments and assumptions have on the way we represent and we see such objects. Using an old stash of Nineteenth century slides she had found in a charity shop, Edwards took digital photographs of selected specimens which she submitted to a number of different microscopes (from light microscopes from the Nineteenth century to modern electron microscopes) "documenting and utilizing each stage of microscopy development"[17], and illustrating how the image of the specimen reproduced by each microscope was transformed according to the instrument and magnification used. When we see an image reproduced through a microscope on a science magazine, seldom are we told what type of microscope has been used or what processes have been utilized to obtain such picture. We are never shown how other microscopes would portray the same object. While Edwards' archival work doesn't fit the immediate agendas of science, it carries both educational and historical significance and may benefit both scientific and popular audiences. In fact, by exhibiting a variety of micrographs that expose the processes that lead to the visual representation of the

scientific object, it manages to redress the assumption that these images reflect an immutable, standardized, and "verisimile" reality: it shows how the object, once portrayed by the microscope and passed through editing, technological manipulation and conventional analytical approaches to seeing cannot be understood as neutral.

Regardless of their diverse topics and goals, the above artworks have the ability to lay bare unquestioned issues in the practices of microscopy and visualization. This is achieved by displacing and appropriating these practices and by turning them into creative gestures and artistic experimentations. Science is relocated outside the lab and turned over to the collective reflection of individuals, who might or might not be aware of issues concerning microscopic organisms and the practices that lead to their visual display (in galleries, cultural gatherings or groups of discussions). These artworks may become effective in producing different levels of molecular transformations: they enable the artist to expose specific and novel aspects regarding a microscopic phenomenon and the way we observe it that conventional visualization could not be able to do; they indirectly affect the aesthetics concerning the practices of looking and the very scientific production of images in science.

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COMPUTATIONAL DRAWING: CODE AND INVISIBLE OPERATION

Brogan Bunt

Drawing upon my own experience in developing the algorithmic drawing project, *Loom*, this paper considers the relationship between conceptual and non-conceptual dimensions of drawing in computational art. It is concerned particularly to reflect upon the nature of this aesthetic labor, which involves not only programming but also the blind space of procedure.
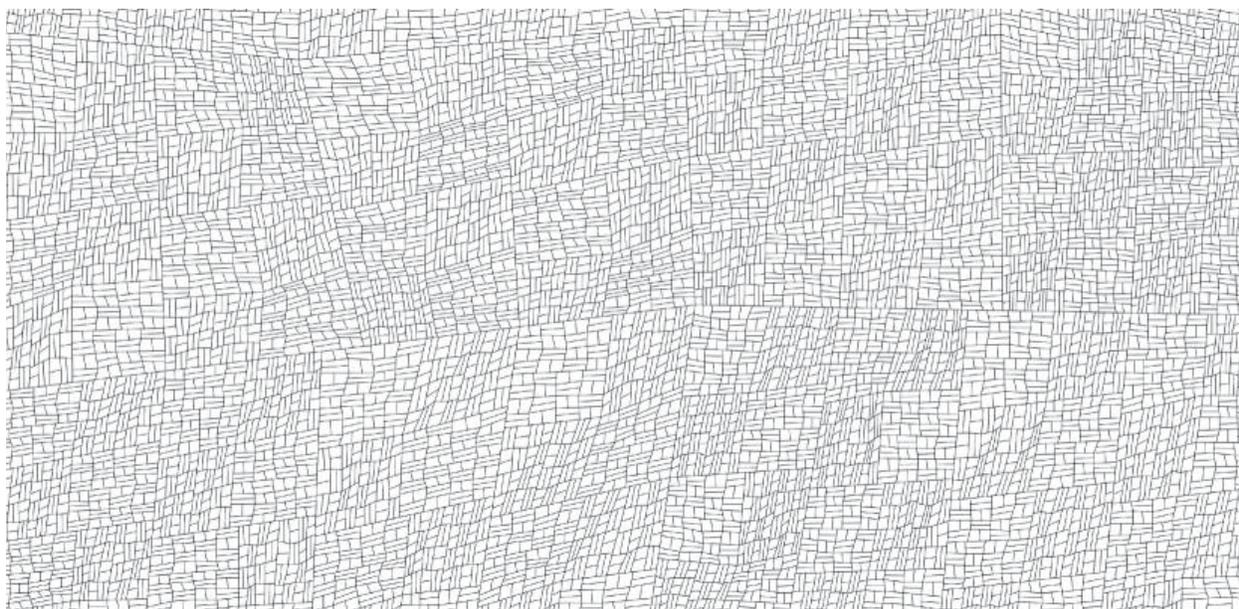
Loom, 2011, Brogan Bunt, archival ink-jet print (author's image).

Subdivide an initial polygonal shape into a set of smaller polygonal shapes. Apply the same process to each of the polygons in the new set. Continue recursively.

This instruction could be regarded as the concept informing my recent exhibition of algorithmic drawing work, *Loom*. The work explores aspects of recursive geometric subdivision. Simple shapes are subdivided into further smaller shapes. Applied many times over, complex patterns and textures emerge. I have reservations, however, about expressing things in these terms, since my aim is to question the notion of a purely conceptual space that precedes and dominates the sphere of technical implementation and execution. The instruction above echoes the form of a Sol LeWitt wall drawing statement, yet it can hardly be said to be purely conceptual. It is expressed in linguistic terms. It is mediated through the impurity and materiality of language. More specifically, in conceiving the aesthetic possibility of polygonal subdivision, I am drawing upon particular programming constructs and dimensions of computational process. My creative ideas are shaped by the thinking of data structures, algorithmic pathways and iterative patterns.

However, my interest here is not so much in demonstrating the various ways in which my conceptual drawing statements are inevitably affected by the space of programmatic logic and implementation, but

in attempting to reconsider the relationship between the conceptual and non-conceptual aspects of computational making. Drawing upon the model of the Jacquard loom, my work positions computational processes as mechanical means of weaving virtual cloth from simple algorithmic patterns. My aim is to engage with the compelling power of computation, which is linked for me to the mystery of its dumb operation - its strange invisible labor. The computer is bound by regimes of instructional necessity, yet the opaqueness, scale and speed of its processes suggest an uncanny agency. This paradox is vital to my work. The abstract algorithmic schema – whether expressed as a conceptual statement or as a formal body of programming code – is never sufficient on its own. It must be played out on a surface. It must pass from the uncertain consciousness of code to the uncertain unconsciousness of iterative procedure. It is precisely in the tension between algorithmic conception and repetitive, non-reflective enactment that the process of drawing takes shape.

COMPUTATIONAL LABOR

The images in my *Loom* exhibition depend upon a work of programming. However, another dimension of labor, the computational labor of machine execution (drawing), is also relevant. How can we make sense of this work? Can it even properly be considered a genuine form of labor?

Within the Hegelian-Marxist tradition, labor serves as a vital index of human rational and social activity. It represents the sublimation of immediate gratification towards the goal of producing useful things. [1] It is something that we undertake and endure with other ends in mind. In this sense, a key aspect of human labor relates to the awareness that we could be spending our time differently, that we are sacrificing the here and now for some other delayed space of superior satisfaction. This aspect of conscious, steadfast and resigned choice is clearly absent in mechanical forms of labor. The labor of the machine is unreflective. It simply proceeds. It is precisely this feature of machine labor that attracted Alan Turing when he set out to critique David Hilbert's axiom of decidability. [2] The distinctive characteristic of the finite state machine is that it proceeds step by step, without any contemplation of alternative possibilities. It is this incapacity to reflect that finally leads to its undoing. A recursive logic pushes it towards reflection, becoming trapped in an internal contradiction. Very importantly, however, Alan Turing's conception of computation does not represent an effort to distinguish the special character of human labor and thought. Instead, it serves to clarify the mechanical character of axiomatic mathematical procedure. In a critical and ironic manner, it demonstrates the relevance of the machine in conceiving the apparently pure workings of mathematical logic.

If machine labor appears especially alien, it is because it represents an aspect of ourselves that we are especially keen to avoid. It serves as the uncanny double of the repetitive, mechanical, materially determined and non-reflective dimensions of human action. In this manner – in its curious, unsettling agency – machine labor disturbs our self-image as free and rational agents. Within this context, it is worth recalling that Aristotle distinguishes between thinking and unthinking dimensions of *techne* (making). The habitual character of manual labor, which can proceed without a clear understanding of underlying causes, is contrasted to the conceptually informed practice of the master-artist.

Inanimate things bring about the effects of their actions by some nature, while manual workers do so through habit which results by practicing. Thus master-artists are considered wiser not in virtue of their ability to do something, but in virtue of having the theory and knowing the causes. [3]

Here the rift between human and mechanical labor takes clear social shape. Hegel also emphasises this social dimension, tracing its historical and dialectical development. He argues that the rise of industrial society transforms labor into a vehicle for alienation. In becoming social (and economic), in shifting from the sphere of individual and local production towards the general commodity market, labor grows increasingly distant from any space of immediate concrete realisation or exchange. Endlessly abstracted and endlessly deferring immediate gratification, concrete labor becomes decoupled from human scales of meaningful action. The rise of industrial manufacturing processes – of machine labor and of human labor rendered machinic – only exacerbates this sense of alienation: "[the worker] becomes through the work of the machine more and more machine-like, dull, spiritless. The spiritual element, the self-conscious plenitude of life, becomes as empty activity." Machine labor produces what Hegel terms a "life of death moving within itself." [4]

Despite this negative assessment of the implication of machine labor, from my point of view the interesting feature is that Hegel does not position mechanical labor as an entirely alien force (an external imposition). Instead, an intrinsic dialectic is acknowledged. The contours of modern alienation are immanent within human labor at the outset. They are evident in the initial split from immediate appetitive being. In its dimension of stoic self-abnegation, human labor takes shape as a paradox. It is both constitutive of rational human being and indicative of a turn away from the simplicity of integral organic being. In this sense the separation of the machine – the dull, dead, spiritually vacuous motion of its instrumental functioning – appears as an exacerbation or materialisation of a tendency that will have always been, in some sense, properly human.

PERFUNCTORY EXECUTION

In my experience, programming represents a liminal space. It projects an intimate and entangled relationship between human and machinic processes of coding and decoding, agency and determination. Nonetheless, software programming is typically conceived in terms of notions of conceptual priority and anteriority. Here, an interpretation of the legacy of conceptual art becomes relevant. The work of Sol LeWitt, for example, is often regarded as emblematic of a neat, hierarchical split between conceptual and material-practical aspects of making. In an article about his 2004 *{Software} Structures* exhibition, Casey Reas positions Sol LeWitt's wall drawings as a model for his own software art practice.

The relation between LeWitt and his draftsperson is often compared to the relation between a composer and performer, but I think it's also valid to look at the comparison between a programmer and the entity of execution. [5]

Software programming is likened to the conceptual field of LeWitt's written wall drawing instructions, while the field of program execution (of computational process) is likened to the manual labor of realising the instructions on any specific wall. At the same time, however, Reas acknowledges a key point of difference. LeWitt's instructions lack the precision of programming code. They are conveyed in natural language and directed towards human readers. Rather than entirely restricting the space of execution, they work to suggest a focused field of creative possibility. Reas is keen to regard software art in similar terms, aiming to identify a form of conceptual software practice that precedes actual software programming, providing a generative conceptual basis for all manner of actual algorithmic drawings.

The work develops in the vague domain of image and then matures in the more defined structures of natural language before any thought is given to a specific machine implementation. [6]

He employs the term "software structure" to designate this pre-computational, creative-conceptual field and associates it with a potential for intuition and expressive freedom.

I want programming to be as immediate and fluid as drawing and I work with software in a way that minimizes the technical aspects. I often spend a few days creating a core piece of technical code and then months working with it intuitively, modifying it without considering the core algorithms. I use the same code base to create myriad variations as I operate on the fundamental code structure as if it were a drawing – erasing, redrawing, reshaping lines, moulding the surface through instinctual actions. [7]

No doubt LeWitt's wall drawing work is full of curious paradoxes in which the machinic and the intuitive intersect, but it seems odd to harness it in the interest of describing a notion of expressive and de-technologized computational drawing. LeWitt is associated much more with a critique of the modernist concern with subjective, materially-based expression. As Ana Lovatt suggests, "[a]gainst prevailing notions regarding the immediacy, directness and primacy of drawing, LeWitt devised a drawing practice that was always already mediated by technologies of reproduction and communication." [8]

Now while Reas never positions software structures as literally material, he conceives them very much in terms of "the vague domain of image". [9] In this manner, the notion of software structure recalls the mute and intuitive aesthetics of formalist modernism. It envisages an intimate, traditionally expressive realm of creative conceptualization that is grounded in the space of perceptual manifestation. In this respect, Reas reinforces the boundaries between the intuitive and the procedural. The domain of conceptual expression, of software programming, is positioned as a form of alienation from intuitive conceptualization. It manifests the underlying concept in an estranged language that is properly distinct from the inner sanctum of creative conceptual imagination. A conceptual space is delineated, but in terms that precisely correspond to the reassuring visibility of the material image.

I prefer another reading of LeWitt's wall drawing project. Rather than indicating a neatly hierarchical division between the conceptual and the operational, his work suggests a play of mutual imbrication, mirroring and exchange. Moreover, rather than the conceptual appearing as a subjectively grounded sphere of autonomy and dominance and the executable as an utterly derivative space of expressive material determination, their relation is articulated in profoundly curious and unsettling terms. Consider this classic statement from his 1967 *Paragraphs on Conceptual Art.*

In conceptual art the idea of concept is the most important aspect of the work. When an artist uses a conceptual form of art, it means that all the planning and decisions are made beforehand and the execution is a perfunctory affair. The idea becomes a machine that makes the art. [10]

This appears to belittle the sphere of actual making. The work of manual drawing is portrayed as trivial and secondary. However, there is an ambivalence. The term "perfunctory" suggests a task that is mechanically performed, without any sense of subjective investment. This strangely opens up an affinity to the nature of conceptual practice. LeWitt insists that "the idea is a machine that makes the art." [11] The conceptual then is also interpreted in mechanical terms. Both the conceptual and the executable are stripped of subjectivity. They both preserve a procedural, non-reflective aspect. In his 1969 "Sentences on Conceptual Art," LeWitt describes the ideational blindness of the conceptual: "The artist cannot imagine his art, and cannot perceive it until it is complete." [12] Ultimately, the intuitive machinery of the conceptual enters into relation with the machinery of making.

28. Once the idea of the piece is established in the artist's mind and the final form is decided, the process is carried out blindly. There are many side effects that the artist cannot imagine. These may be used as ideas for new works.
29. The process is mechanical and should not be tampered with. It should run its course. [13]

The value of the "perfunctory" is clearly evident here. It is a productive dimension of mechanism that tests and inspires new concepts. Although apparently distant and distinct, the spaces of conception and execution find themselves allied and linked. They share a common antagonism to the thinking of subjective expression. Together, as paired coordinates, they suggest a notion of drawing that reaches beyond the human, struggling to find effective means to engage with dimensions of blind process.

SHIMMERING

I will conclude by briefly considering an alternative model for thinking the relation between conceptual and non-conceptual dimensions of computational practice. It is drawn from a specific mode of painting within Australian Indigenous art. Howard Morphy describes the technique of Eastern and Central Arnhem Land painting: "painting is seen as a process of transforming a surface from a state of dullness to that of shimmering brilliance (*bir'yunhamirri*)." [14] He describes a clearly defined set of steps:

1. The painting surface is covered in an overall wash (typically red-ochre).
2. The key forms are outlined in yellow and black and basic figurative elements are coloured in.
3. Large portions of the surface are covered in "cross-hatched" infill with a special long brush.
4. The final work involves "outlining the figures and cross-hatched areas in white to create a clear edge which defines their form." [15]

Stage one is a straightforward process. Stage two depends upon high-order artistic skill and a close understanding of relevant representational traditions and protocols. Morphy notes that the second stage is performed relatively quickly by "a senior person." [16] Stage three is the most time-consuming, demanding technical skill but less demonstrable cultural knowledge. The final stage draws the painting together and is closely directed by the senior artist.

My specific interest is in the sophisticated mediation that this artistic process enables between elements of conceptualization and mechanical technique. The term 'mechanical' has to be used carefully here. It is less, in this instance, to liken Aboriginal painting to the characteristic forms of industrial production than to pinpoint a dimension of iterative, non-conceptually grounded process within Aboriginal art-making. It is not as though the work of producing cross-hatched infill does not have conceptual, aesthetic resonance, it is that it gains this resonance and this potential to shape a shimmering aesthetic surface by casting itself in terms of a repetitive articulation of time and space. The work has a ritual, performative aspect. In relation to the cross-hatching, Morphy argues that "Yolngu are not merely producing an aesthetic effect but moving the image towards the ancestral domain. The cross-hatched surface of the painting reflects the power of the ancestral being it represents, the quality of the shininess is the power of the ancestral beings incarnate in the object." [17] In this sense, the work becomes a means of summoning and invocation. Slow and mechanical, it shapes a real and affective alignment with dimensions of ancestral being and opens up the possibility of manifestation. From this perspective then, processes of conceptualization and mechanical technique are mutually imbricated. The distinction between concept and technique does not take a binary shape, but is instead structured as a play of mediation within the overall creative process. Concepts emerge as much from the labor of mechanical repetition, which

serves as a field of intimate communication and connection, as from the processes of mechanical repetition are inevitably inflected by the rich context of cultural meaning.

This example indicates other ways of making sense of the relationship between conceptualization and practical making within art; suggesting the need to re-evaluate the non-reflective character of making and to acknowledge the dynamic exchange between concept and mechanism within art. The relation between the two is no longer cast in binary and hierarchical terms – rather they appear congruent and enmeshed. I would argue that something like this is also what the creative programmer experiences. The close relation between writing, compilation and running that programming entails fosters a new, uncertain relation between the regimes of conceptual logic and mechanical operation. The programmer seeks not only to choreograph and determine computational processes, but also, at the same time, to explore an uncanny space in which the already alien algorithmic concept passes into the executable, non-reflective event and phenomenon.

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CYBERNETICS AND THE INTERACTION BETWEEN PURE AND APPLIED SCIENCES AND THE HUMANITIES

STUART BUNT

In this paper I argue that the interactions between arts and humanities and applied science are more successful than with pure science. Further that the reason for this difficulty is the different paradigms used by those working in the post-modern humanities and the modernist, positivist scientists, that they are in fact incommensurable.
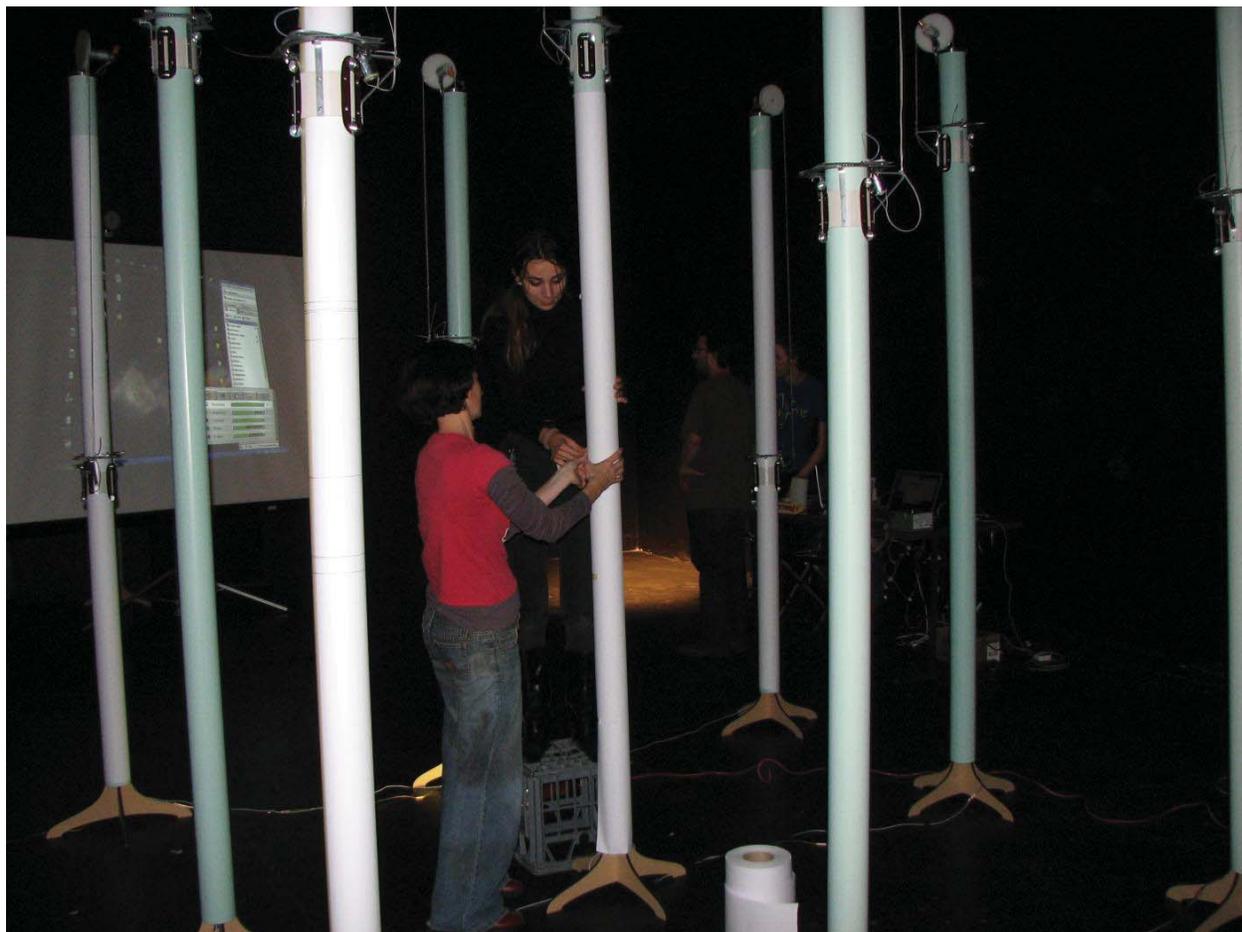
Silent Barrage under construction for the Silver Artrage Festival at The Bakery, Northbridge, Perth, Western Australia. This piece is by Guy Ben Ary and Phil Gamblen with the Potter lab in Atlanta Georgia. Each column bears a rapidly and noisily rotating disc which draws on the paper surface of the columns, the movement of the drawing discs are controlled by dissociated cortical neurons held in culture in the Potter lab and communicating with its embodiment over the internet.

SymbioticA, was founded in 2000 with financial help from the Lotteries Foundation of Western Australia, matched by funding from the University of Western Australia. [1] The original grant was written by Stuart Bunt, Oron Catts, and Miranda Grounds to provide a space for artists and scientists to interact in a

situation of mutual respect rather than dependency. One of the first projects of *SymbioticA was Fish and Chips* produced by the *SymbioticA* research Group was seminal in developing the principles and directions of this research laboratory. The researchers involved in this project formed a loose collective known as the SymbioticA Research Group or SARG. Using techniques developed during my D.Phil [2] research. Guy Ben Ary gathered a team of experts to produce a complex art work. Guy, and the kinetic sculptor Phil Gamblen have gone on to perfect, develop and extend this work with later pieces such as *MEART* and *Silent Barrage* which have been exhibited world-wide. [3]

For details of these works the readers are referred to the *Fish and Chips* web site. [4] Briefly these pieces consist of neural tissue driving a mechanical drawing device. In the pioneering *Fish and Chips* work the valves of the beautifully sculpted pneumatically driven arm, designed by Phil Gamblen, were controlled by the output from the region of a goldfish's brain connected to an isolated eye (the optic tectum). [5] An electrode picked up the electrical output of the tectal neurons in response to the images provided to the fish eye. A computer program written by Iain Sweetman then extracted patterns of neural activity and used them to control the pneumatic valves operating the drawing arm.

This relatively trivial science (the original physiological methods were first used in the 60's), [6] when brought into the public arena (*Fish and Chips* was first shown publicly in The Bruckner Opera house at Ars Electronica in 2001) [7] produced a powerful art work to be appreciated on many levels. How did we feel about such a "semi-living" object; part fish, part machine? A machine controlled by a non-human brain, with no human intervention can be very confronting. Could isolated neural tissue be creative? Did such an "artist" need feedback, to see what it produced? What were the ethics of using living animals in an art work? Later we were to encounter problems of ownership – who had the IP and moral rights on the - art works - produced by *Fish and Chips*?

In this paper I want to use *Fish and Chips* and other mechano-organic devices as exemplars of the interactions between art, science and engineering/medicine. I intend to make a clear distinction between these three practices and discuss the positive and negative interplay between them. I do not subscribe to the recent fad for suggesting a "third way," a romantic fusion of the arts and sciences, [8] a movement practically ignored by the sciences, but gaining popularity in the new media art world. In fact. I will argue that the language and gestalt of postmodern or post – postmodern arts are, in the words of Thomas Kuhn, incommensurable with those of the essentially modernist sciences. By science I mean pure or basic science, which is research carried out purely to increase our knowledge and understanding of the world. It presupposes an external reality independent of the observation or observer and in this way differs significantly from the creative arts that attempt to communicate an individual internal opinion about the world or to encourage the audience to bring their own interpretation to the work or performance; and from the post – modern humanities that resist the idea of contextually, semantically independent "truth."

Funding for such basic research is now rare and increasingly under pressure as public understanding and political support waivers (those in the arts will be all too familiar with this). Most research grants now demand an opening statement as to how the research will benefit the funders or mankind. Most research carried out in universities is now applied research, research to solve a known problem. This is engineering, bioengineering, not science, and I include in this medical research. It involves developing new technology, applying science, not adding new basic knowledge of the world. I see this as quite different in its methodology to pure science although there has historically been a continual positive feedback between science and technology.

The interaction between the arts and humanities and applied science and engineering is often positive. Here, the purity of the methodology is less important than finding a solution. Creativity and imagination have important roles. Much of current art practice and research involves the finding of a solution, how to communicate or represent the artist's concept, how to engage the audience, there are more similarities here than with the coldly analytical pure sciences. In many cases the arts identify new issues and problems to solve before engineers have even approached the solutions. There is a rich history of science fiction pre-dating or even inspiring later inventions. If we look at cyborgs, science fiction has often anticipated later developments, from Isaac Asimov's laws of robotics to prosthetically assisted soldiers. This positive relationship between the creative arts and applied science has been recognized recently by the Chinese government. Recognizing that many of the innovators and entrepreneurs of Silicon Valley were great science fiction fans when younger, they are now mandating more reading of science fiction in an attempt to increase the imagination and innovation of its engineers. [9]

While there is a clear interplay between the pure and applied sciences it is difficult to find any solid examples of a positive exchange between the arts and pure science. For example if we examine the field of bio-mechanical machines we see that the basic science involved requires an understanding of neuroscience, in particular how neurons and how the neural circuits they form, operate. The science underlying the electronics involves, understanding electromagnetism and with the use of transistors some quantum mechanics. This science has provided much inspiration for the humanities, "quantum" must be one of the most misunderstood and misquoted words in science. However it is difficult to find art/science collaborations that have contributed to our basic understanding of neuroscience or electro-magnetism. The humanities may have enhanced our understanding or misunderstanding of the implications of these discoveries and the errors that can creep into research due to human fallibility, but have they contributed to their discovery?

When we look at the art works involving mechanical arms and nervous tissue, they raise issues about the ethics of using living tissue, our ambiguous relationships with semi-living organisms, even reservations about the perversion of living material that this may be seen by some to represent. However, there is little contribution to the basic science. Take the examples of *MEART* and S*ilent Barrage*. Here the driving material is dissociated cortical neurons cultured in the lab of the engineer Steve Potter. [10] Potter's laboratory was set up to investigate the self-organising properties of neurons in culture. In his "normal" lab work Potter's lab has looked at the way these neurons can control external agencies and whether feedback from the outside world can be used by the neurons. While this looks like basic science, it is nearer to an engineering project or even an art research project as the neuroscientific foundation for the work is weak or non-existent (although in a nod to the funders statements are made about solving epilepsy). All neuroscientific evidence we have points to the almost crystalline precise organisation of cortical neurons (which is laid down in early development) as being crucial to cortical function. Any disturbance of cortical organisation in development leads to severe functional deficits.

Where the art work has succeeded is in highlighting future possibilities and drawbacks of this work. Anyone presented with *MEART* or the whirling drawing poles of *Silent Barrage* cannot fail to engage with the confronting embodiment of a possible future "machine." No scientific paper can communicate so directly with the public. However, one could argue that this interplay between basic science and the arts has been largely negative as works are often displayed out of context and with minimal documentation (this is after all an art piece not a scientific exhibition). The audience may take away a predominantly negative impression of the potentials of the technology. This may well be a needed antidote to the positive "spin" of the medical companies advertising their surgical robots or prostheses, but the art works have far less control over what they communicate and may well misinform. Many viewers of *Fish and*

Chips embodied it with impossible sentience and feared it unnecessarily. This has lead some scientists to be wary of working with artists, for fear of the negative impact.

The humanities have always employed critical analysis. They have, quite appropriately, applied the blow torch of social science and commentary on the sciences and have shown its many flaws; its sexism, elitism, Western dominance and corruption, the influence of big business and government on what is and is not researched and published. This has had a positive effect by making scientists aware of the limitations of their endeavours, but has had a largely negative effect on public opinion as this negative publicity is rarely matched by positive stories outside of medicine (an applied art?) and manned space flight, even the latter is now coming under fire for being an indulgence since the 2008 financial crisis. In the 21st century, the implementation of science often has more to do with societal acceptance than whether the science is correct or the resultant products efficient. The resistance to genetically modified foods, nuclear energy and anthropogenic climate change is not based on deficits with the science or engineering but with concerns over the effects of its application.

Philosophers such as Feyerabend have shown that hypothesis selection in science is not necessarily logical; that advances may be delayed by all too human resistance to new ideas. However, in spite of all its flaws, basic science has been enormously successful in its explanatory power. The strength of science does not lie in its random methods of hypothesis selection but in the empirical method. The examination, over and over again if necessary, of evidence using counter-intuitive methods, first laid down by Francis Bacon in the 17th century, but still as valid today. These rules for examining evidence call on the practitioner to deny his or her human traits, to not follow personal feelings or biases, to not be impressed by fame or reputation, to not follow popular opinion, to always maintain a healthy, independent scepticism.

This is the major point of departure from the arts, where the art work is all about the opinions, intuitions and feelings of the artist and his or her interaction with the audience, the "populace." These are very high level interactions, complex and contextually situated. No wonder postmodernism emphasises the complexity of the world, the interconnectivity and relativity of "truth" and "evidence". In contrast scientists are trained to avoid (as far as possible) all relativity and be as objective as possible, to "de-humanise" their work and reports so that the evidence should be independent of their opinions and personal experience. When C P Snow wrote his seminal work *The Two Cultures* he was describing both a class war and a wall of ignorance between the humanities and the sciences, berating the academics for their ignorance about the basics of science. How times have changed, it is a rare practitioner in the bio-arts that does not have a good understanding of the applied science (if not the basic science) underlying their collaborative work. However, most scientists are stuck in a post-modern world, perhaps it is they that are the new Philistines, ignorant of advances in the humanities. Universities still teach undergraduate science students (if they are taught any philosophy at all) the philosophy of science of Karl Popper, first proposed in the modernist twenties. Hypothesis testing requires evaluation of evidence, far from postmodernism, there is no suggestion that all points of view may be valid, the evidence must be ranked and the most unlikely abandoned. Scientists will even (though sotto voce in today's POMO world) say there are "facts" – that water IS made of hydrogen and oxygen, that this is context independent, will be so whether measured in a lab in Manhattan or a primary school in Kinshasa. If there is a disjunct it is now the scientists who do not understand the postmodern world of the arts and humanities.

This "dialogue of the deaf" between the arts, humanities and pure science would be of only academic interest were it not for its effect on public policy. The media is dominated by the humanities and the postmodern view of all views being of equal validity not privileging science with any special right to the

"truth" or even acknowledging that there is such a thing as an independent truth. This leads to the curious spectacle of climate change skeptics and charlatans like "Lord" Monckton being given equal airtime with a sole representative of the thousands of highly qualified and specially trained climatologists convinced of the anthropogenic causes of climate change. The basic science is given no special value, and as the "audience" does not share the same anti-common sense rigour of the scientific community they have no problem with ignoring the scientific evidence for what for many (particularly those reliant on continuing expansion of consumption) "feel" is right. Recently the Australian chiropractic association refused to censor a member who was promulgating lies about immunization, including long discredited studies linking autism with the MMR vaccine, on the grounds that he was "entitled to his opinion." Worldwide scientific advisors have been politically marginalised as harbingers of vote losing doom. This abandonment of the empirical method is a frightening trend that leaves us no real alternative on which to base decisions that will effect our health, and the future well-being of the planet.

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DEMATERIALIZATION, MEDIA, AND MEMORY IN THE DIGITAL AGE

David R. Burns

On the 10th anniversary of 9/11, I explore the effects that the repeated broadcast of lossless imagery of the fall of the World Trade Center has on the individual and collective consciousness. I examine the relationship between the media industry's representation of events and personal and collective memories of events. I will also screen, *Rebirth*, my abstract 3D computer animation exploring my memories of the fall of the World Trade Center.
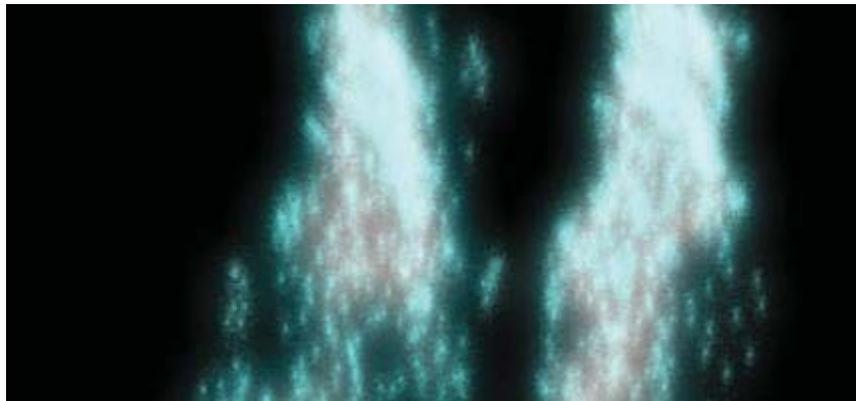
Fig 1. Digital still from Rebirth, 2006, David R. Burns, 3D computer animation, © 2006, David R. Burns.
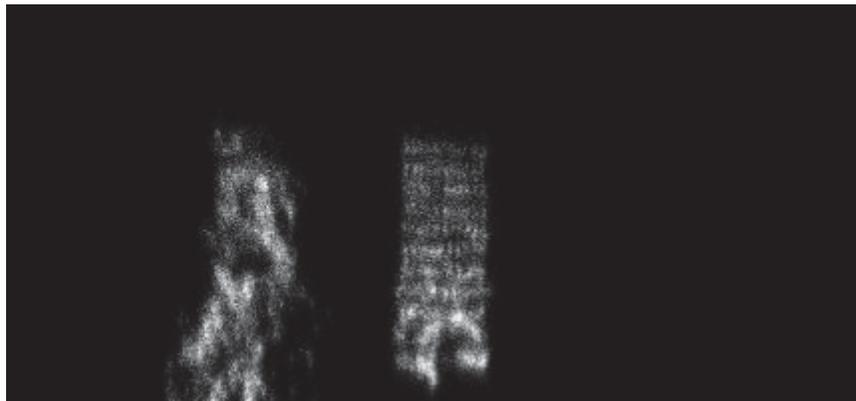
Fig 2. Digital still from Rebirth, 2006, David R. Burns, 3D computer animation, © 2006, David R. Burns.

Introduction

The ten-year anniversary of the September 11, 2001 terrorist attacks on the United States is an important milestone to reflect on those events and examine the media's influence in forming memories of what transpired that day. While several media outlets including Yahoo! News, [1] National Public Radio, [2] and CNN [3] are commemorating 9/11 in a journalistic context, my paper and 3D computer animation offer a personal remembrance of, and reflection on, the tragic events that took place on 9/11 in New York City. My paper explores the relationship between the media industry's representation of important events and our personal and collective memories of these events. The tenth anniversary of September 11, 2001 is a meaningful time to revisit a paradigm shift in the ways media are used to influence and mediate personal and collective memories.

September 11th 2001 was a perfect example of a paradigm shift in the way real-time memories are processed using digital media technology. On September 11th, U.S. civilians experienced an attack on U.S. soil via digital broadcast in real time as the events were unfolding outside their homes. This catastrophe was an example of a larger shift at the intersection of technology and memory. Digital media technology allowed viewers to experience events in real-time as never before possible on this grand scale because the archived digital recordings of memories did not dematerialize each time they were recalled. Instead, the digital memories remained intact and preserved, irrespective of the number of times the digital memories were replayed. The digital media technology used to record and recall the events were lossless and sharply contrasted with the older, lossy analog media technology traditionally used to record events. Archived memories that are stored on analog media such as film degrade over time much like the organic memories that we keep in our minds. Before exploring the dramatic effect of digital media technology on memory, it is helpful to examine Vannevar Bush and Nelson and Englebart's research using analog and digital media technology to mediate memories.

Background

Vannevar Bush's Memex machine and Ted Nelson and Doug Englebart's Xanadu artificial memory and information cataloging recollection system have explored the way memories are processed using media technology. Bush aimed to design a system that functioned similarly to the way natural memories are recalled in humans. He first outlined his concept in a 1945 Atlantic Monthly article titled, *As We May Think*. [4] While Bush's Memex machine was never actually built, he described an analog system of recording and accessing information on microfilm. His analog system could be linked to other archived data and linearly accessed using associative links. [5] Bush envisioned creating a tool that would connect society with memories and information so that individuals could better understand the human experience. Bush envisioned his Memex machine as an "extension of human memory." [6] Bush's work influenced Nelson and Englebart to develop a system called *Xanadu*. [7] In contrast to Bush's analog system of recollection with microfilm, Xanadu used digital hardware to archive and access information with digital hyperlinks to dynamically connect associations. [8] Compared to Bush's *Memex*, *Xanadu* was a more complex, dynamic, and interactive digital system for replicating human memory. [9] Bush's *Memex* machine used physical media -analog microfilm- mailed to colleagues to be added to other Memex machines' collections of information. *Xanadu*'s "original hypertext model" [10] used digitized information that could be accessed in real-time using hyper-links across digital networks regardless of physical location. Bush's analog model took time for information to be delivered and processed by humans into memory. In contrast, Nelson and Englebart's *Xanadu* digital system provided real-time access to and mediation of memories.

Bush, Nelson and Englebart's work can also be used to examine the way analog and digital films can be used to archive and recall memories. In the past, memories were recorded using analog film and tape technology. The analog images and sound were representative of the original experience for the first several times that the analog media was played back. Over time, after the analog media was accessed several times, audio-visual information dematerialized and clarity became lost during the recall process. Because of the restrictions of older analog technology, memories that were captured using the analog process were also trapped in a linear method of recall. In contrast, digitally recorded memories are better able to retain the original clarity of the author's experience, due to the fact that digital images and sound can be copied and recalled infinitely without the loss of information or clarity of the memory being recalled. An additional benefit of digitally mediated memories is that they are better suited to be recalled on multiple delivery systems for greater ease of accessibility across geographies. Digitally mediated memories can also be experienced non-linearly, providing participants with greater accessibility for reconstructing and recalling memory information using multiple access points in a way that is most meaningful to them.

Personal Narrative

The ten-year anniversary of September 11, 2001 offers a unique opportunity to explore what can happen when a highly personal and collective event is recorded to the neuronal and digital memory systems:

Early on the morning of September 11th 2001, this author was still asleep in his cozy apartment in downtown Manhattan until being awoken by a phone call. I can still remember the phone conversation that jarred me out of bed. "Hello? What do you mean the WTC was attacked? Stop joking around. I am going back to bed! Turn on the TV? This isn't funny." To verify that this was just a bad joke my friend was playing on me, I turned on the TV to watch the news. There it was, playing back over and over again: a plane crashing into 1 WTC (World Trade Centre). In disbelief or shock maybe, I opened my window to stare downtown at the smoke that had by now begun to billow rapidly. This event was real! I was simultaneously watching 1 WTC burning both on TV and out of my living room window.

The feeling of watching in real time as the digitally represented WTC and the organic WTC burned on both the television set and outside my living room window seemed to put my immediate world on public display, as if I was now a part of the digital media being internationally broadcast across the world. I hadn't realized yet just how powerful this connection between myself and society was in the context of what I call, a "memory footprint." Instinctively, I grabbed my digital video camera and headed for the roof. I wasn't sure why I was doing this; I just knew that something tremendous was underway that would be deciphered later.

Once on the rooftop, I used my natural, organic eyes to view the natural images of 1 and 2 WTC billowing smoke. These images were burned in real time into my organic neuronal memory systems. Not fully comprehending what was unfolding before my natural input devices, I switched over to taping the event using a digital video recorder. Looking through the viewfinder, it became difficult for me to discern what was real and what was my memory of the earlier television broadcast. The feeling was very surreal. I had not yet processed the earlier TV images of the plane slamming into 1 WTC. Now as I looked through my digital video recorder's digital viewfinder, I found myself looking at a composition built of digital bits similar to the memory I had of the images that were represented as color pixels on TV. After staring through the viewfinder for a few minutes, my earlier memories that were recorded onto my natural

storage device, my brain, began to be processed by my consciousness. The realization that the memory of the event I had experienced was, in fact, still taking shape and form in real time was so intense and confusing that I had to pause the digital recording and look away from the camera's viewfinder. I was caught somehow in a real-time memory of great destruction, but that memory was not able to pass. The memory of watching the destruction of 1 WTC on television now merged into the real-time representation and memory of the destruction of both towers, 1 WTC and 2 WTC, that were in the process of being written to my analog neuronal memory systems.

I was processing with my natural eyes and brain and simultaneously recording discreetly on digital videotape. What was a natural observation? What part of my understanding came from the digital representation I had just seen? Confused, I looked through the digital viewfinder again. I needed to confirm that I was in fact physically and mentally cognizant, that I was indeed on the roof of my apartment building experiencing and memorializing a real-time event. I needed to make sure that I was not trapped in the confines of my living room and stuck in front of the TV set unable to differentiate what was real, what was recorded, and what was being digitally broadcast to society. I can only describe the feelings I had and the environment around me as chaos. It was as if I was trapped in a horrible film and everything that I watched through the camera's viewfinder made me a spectator of this horrible film.

Snap! I became aware of the real-time events unfolding again. Other people on the roof were shouting as something fell in the distance and more smoke billowed up into the sky. I turned and left the rooftop. Not sure what I was experiencing, I needed to sit down and process the events that had just unfolded before me. Later, I returned to the rooftop. There were many more people there now, and we were all witnessing the same event. However, something had changed. The skyline looked emptier. There was more smoke now and it was coming from the smaller buildings that surrounded 1 and 2 WTC. Again, on went the digital video recorder… An almost identical sequence of images to what I had seen earlier when 1 WTC and 2 WTC were burning was now being repeated multiple times as the rest of the WTC network of buildings, WTC 3, 4, 5, 6 and 7 began to plume smoke.

I wonder now, looking back at the time of that event and the several days following it, if the memories that I recall are my own. Have my own experiences of the event and memories of that morning recorded by my organic memory banks been replaced by the digital images broadcast on the TV repeatedly hour after hour for days and weeks on end? Is my memory of the events of that day more a composite of all of the digital images and analog stories recounted by my neighbors, colleagues and family that were in NYC that fateful day? I still have the digital video recording of that morning. Originally, when I came up with the idea for this project, I had thought that I would be strong enough to edit my digital video and transfer some of my digitally recorded memories to you today. It has been a decade since I put that digital videotape back in its case, but my organic memories have not yet faded enough for me to feel comfortable watching a digital, and therefore lossless representation of that day's events.

Rather than display the digital video footage that I recorded on 9/11, I will screen my 3D computer animation, *Rebirth*, that is representative of my memory of that day. *Rebirth*adds to the dialog and the process of individual recollection and memory of the tragic events of the destruction of the WTC on 9/11. *Rebirth* represents my memory of my personal experience. However, the audio-visual abstractions of the representations of the events on 9/11 contained in the animation are left open for audiences to interpret. It is my hope the audience will have a shared viewing experience in watching *Rebirth* that connects participants with a shared memory of an artist's renderings of the events of 9/11. Because the imagery is abstracted and there is no dialog in *Rebirth*, hopefully the audience will feel more liberated to

interpret and explore the imagery in the 3D animation. The viewing experience will then be archived into each individual's neuronal memories for later recall.

Conclusion

Ten years after 9/11, real-time events are more instantly accessible to influence collective memories than they were in 2001. Digital media technology has enabled more people than ever before to memorialize, archive, and access events and information in real-time. Digital media technologies that were unavailable a decade ago connect millions of people with each other's memories of important events in real-time and increase access to individual and collective memories. The global accessibility of high-speed Internet connections and mobile media networks have enabled individuals separated by great geographic distances to access individuals' representations of events and memories in real time. The instantaneous access to individual memory is shaping a collective global memory that is constantly updating and expanding.

The recent media coverage of Osama Bin Laden's death in 2011 is an example of the way digital media technologies that were unavailable a decade ago are now used to augment a collective global memory that is constantly updating and expanding. Osama Bin Laden's death saturated media beyond traditional forms of print, television and radio broadcast mass communication. News of Bin Laden's death immediately inundated social media and mobile media platforms including Twitter, Facebook as well as broadly accessible websites formatted for mobile phones. [11] In fact, the White House announced Osama's death with a tweet and a Facebook post immediately after President Obama's formal announcement of the event in his television address. [12]

The immediate access to real-time information is a further move on the paradigm shift in the way real-time memories are processed using digital media technology. Digital media technologies and social and mobile media platforms enable participants to experience events that inform their memories in real-time on a scale never before possible. Unlike the analog recordings that dematerialize over time, digital recordings of memories do not dematerialize each time they are replayed. Instead, digital memories remain intact and are preserved for later recall. The immediacy, permanency, and interactive qualities of digital mediated memories are transforming individuals' experiences with creating, accessing, and archiving memory on a global scale.

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BLUE SKY VINEYARD: OPPORTUNITIES FOR SUBVERSION OF THE POWER STRUCTURE IN THE SURVEILLANCE ASSEMBLAGE

Deborah Burns

My paper explores the potential of digital media arts technology to disrupt and resist apparatuses of control in surveilled commercial spaces. Although the consumer culture in these spaces appears complicit with the potential power in the surveillance assemblage, the leveraging of digital media arts technologies offers opportunities for the subversion of the power structure in the digitally networked surveillance assemblage.

Blue Sky Vineyard, a southern Illinois winery, is a surveilled commercial space. The multiple video cameras, credit card machines, and wireless network at this private location create an electronic surveillance system that can be used to monitor its patrons. Through my critical ethnographic study, I closely examined the culture and surveillance system at this location. Although the consumer culture at Blue Sky Vineyard appears complicit with the vineyard's potential power in the surveillance assemblage, theleveraging of digital media arts technologies offers opportunities for the subversion of the power structure in the digitally networked surveillance assemblage.

In its promotional materials, Blue Sky Vineyard says that it creates "a taste of Tuscany in the hills of Southern Illinois." [1] Indeed, patrons are encouraged to delight in Blue Sky's simulated Tuscan environment; visitors are asked to "enjoy the large indoor seating area" that overlooks the "vineyard and rolling countryside." [2] The "tranquil atmosphere" that Blue Sky advertises is supposed to create the "Comfort of Home" with the benefit of free wireless high speed internet. [3] The images of the rustic windmill and the Tuscan-inspired edifice surrounded by rolling hills foster the impression that Blue Sky is a relaxed environment where people can leisurely enjoy food and drink.

Upon entering the space, multiple laminated placards notify patrons in bold lettering that "This Property is Protected by Video Surveillance." These notifications did not appear to create any cause for unease among the patrons at Blue Sky. Patrons who sat directly in front of these signs for hours did not comment on the signs. The signs were relatively small, approximately 6 inches in width and length, but even those patrons who stood within inches of the signs did not discuss them.

Similarly, Blue Sky patrons did not appear to pay attention to the five video cameras that are located in the tasting room space. The three video cameras located in the wine bar area are well above eye-level and are skillfully integrated into the simulated Tuscan environment. The two video cameras that are located outside the Blue Sky wine bar area appear to be identical to the three wine bar area cameras, but they are not as well camouflaged in their environment as the wine bar area cameras. All of the cameras are small round structures, probably no more than six inches in circumference, which are painted in a neutral gray hue.

The cameras and credit card machines that are located at both the wine and food bars at Blue Sky can be seen as being part of a larger surveillant assemblage. This assemblage is made up of formerly distinct surveillant systems that have combined to become synthesized into a larger system. According to Haggerty and Ericson, this desire for integration across and among surveillance systems "allows us to

speak of surveillance as an assemblage, with such combinations providing for exponential increases in degree of surveillance capacity." [4] Thus, visual surveillance can be combined with database surveillance to create an integrated system that is far more effective at surveillance than each of its component parts. Surveillance assemblages span the world with various surveillance devices working together to create data files on people in public and private spaces.

The combination of surveillance systems can be seen at Blue Sky Vineyard. Assuming Blue Sky gathers and records the information from its cameras, it could gain a wealth of information about its patrons and their habits. The cameras could enable the Blue Sky staff to gather practical information on which patrons drink which wines and how they use the tasting room space. They could allow the management to gain insight on who their patrons are, how long these patrons stay on the premises, and how Blue Sky can more effectively market their wares to sell additional products. When this visual information from the video cameras is combined with textual credit card information gathered when patrons make their purchases, Blue Sky can gain even more insight into their patrons' identities and spending habits. Blue Sky could link patrons' names on their credit cards with their images from the video cameras to identify these patrons and carry out targeted marketing initiatives. Through the surveillance of the free wireless network, Blue Sky could monitor the internet traffic within its walls. Once patrons consent to enter the free wireless network, Blue Sky has the ability to gain access to the data that patrons are obtaining on their laptops. Blue Sky can gather information from patrons' internet searches on the wireless network such as their online shopping activities. Blue Sky could combine this information with the information from the video surveillance and credit card information to further expand the variety of consumer goods that it offers its patrons and carry out marketing initiatives that are even more targeted to particular patrons. The integrated combination of the video, credit card, and wireless network surveillance at Blue Sky is a far more effective surveillance mechanism than each of its component parts.

The integrated combination of the video, credit card, and wireless network surveillance allows Blue Sky to construct a digital double of its patrons composed of pure information. Haggerty and Ericson call this data "a decorporalized body, a 'data double' of pure virtuality." [5] Indeed, Blue Sky may find that the digital doubles that it can create when it combines the data about Blue Sky patrons from the multiple video, credit card, and wireless network surveillance sources to be more useful to them in many ways than the actual living Blue Sky patrons. Haggerty and Ericson explain that digital doubles are "increasingly the objects toward which governmental and marketing practices are directed." [6] The Blue Sky management may use the digital doubles of its patrons, virtual bodies composed of pure information, to make marketing and product placement decisions. This is an indication of a hyperreal existence where "simulation is characterized by a precession of the model." [7] When and if Blue Sky uses the information from the surveillance assemblage to send its patrons publications on Blue Sky's events, the digital double of the Blue Sky patrons becomes more real to Blue Sky that its patrons' corporal bodies.

Blue Sky Vineyard may not use the information that it gathers from the multiple video cameras, credit card machines, and wireless network to monitor its customers. Perhaps the video cameras are not even operational. They may be simulations of surveillance that are displayed to discourage shoplifting and deter patrons from acting inappropriately. Blue Sky may not even monitor its wireless network. However, as shown by the examples above, the surveillance assemblage at Blue Sky is potentially very powerful because it can grant Blue Sky the ability to gain vast amounts of personal information about its patrons. Should it wish, Blue Sky can use the surveillant assemblage at the vineyards to create digital doubles of its patrons.

Indeed, if Blue Sky is using the surveillant assemblage, Blue Sky may not only be watching its patrons, collecting data from their credit card transactions, and monitoring their internet usage. The surveillant assemblage at Blue Sky is not a fixed entity with defined limits. Indeed, "to the extent that the surveillant assemblage exists, it does so at the potentiality, one that resides at the intersections of various media that can be connected for diverse purposes." [8] The surveillant assemblage is an unstable, moving target because it can change at any time with advancing technology or changing demands on its infrastructure. For example, although microphones are not yet commonplace on closed circuit equipment, recent technological advances can allow Blue Sky to add microphones to its closed circuit television apparatus. In fact, Blue Sky may already have this technology. With audio surveillance, Blue Sky Vineyard can gain additional information about its patrons. It can listen to patrons' comments about its wine and other consumer products. Blue Sky could potentially carry out even more targeted marketing by combining audio data from its patrons with their video, credit card, and internet data to create richer, more complex data doubles.

It is interesting to consider that Blue Sky management and employees may not be the only people monitoring Blue Sky patrons or potentially constructing digital doubles of these patrons. The dynamic nature of the surveillant assemblage allows the surveillant assemblage at Blue Sky Vineyards to connect to other parts of the larger surveillant assemblage that extends across southern Illinois and the world. This larger surveillant assemblage is composed of both private businesses and public governmental authorities. Although it is not likely that Blue Sky Vineyards links its closed circuit surveillance television network to the local police department's database of criminals, there is the potential for this connection. Should there be a local man who is being pursued by law enforcement authorities, Blue Sky can provide its closed circuit surveillance television tapes to assist in the fugitive's arrest. The data from the closed circuit television at Blue Sky, a private business, can be shared and distributed to the federal law enforcement authorities as well as international governmental authorities.

Just as the surveillant assemblage extends across private businesses and governmental authorities, it also extends to private citizens' homes and personal digital devices. The surveillant assemblage is a rhizomatic system where widespread access to technology has given private citizens the opportunity to gain access to surveillance technology. [9] The so-called playing field has been leveled for the average man or woman. Private businesses like Blue Sky Vineyard and governmental agencies like the local southern Illinois police department and federal and international governmental authorities no longer have the exclusive ability to electronically surveil others. Private citizens have gained the access to technology that enables them "control, rather than be controlled by, a recording gaze." [10] With the consumer electronics industry's expansion into personal media devices in recent years, consumers have gained increased access to smaller video cameras, camera phones, and audio recording devices. Private citizens have set up web-cams to document their lives and broadcast this data live across the World Wide Web to others across the world. These citizens have taken control of the camera and used it to serve their private interests.

According to Haggerty and Ericson, while this increased access to technology has not resulted in "a complete democratic leveling of the hierarchy of surveillance, these developments cumulatively highlight a fractured rhizomatic criss-crossing of the gaze such that no major population groups stand irrefutably above or outside the surveillant assemblage." [11] Private citizens, including young children, low-income, and traditionally disadvantaged populations, have gained access to inexpensive video cameras and audio-visual recording features on low-cost mobile phones. These recording devices allow these marginalized populations to access the surveillant assemblage and add their own media content to this vast, dynamic, and rhizomatic system. One of the most famous demonstrations of this increased

access was a private citizen's video recording of the police beating of Rodney King in Los Angeles. This recording resulted in a "turning back of the eye of authority upon itself." [12] The hierarchy of surveillance where law enforcement had the nearly exclusive power to electronically surveil the public was disrupted when a private citizen used media technology to challenge law enforcement's account of the events.

These disruptions and places of resistance are what give private citizens the opportunity to resist the hierarchical power structure in the surveillant assemblage. This hierarchical power structure favors institutional actors such as corporations and governments because these entities are far more organized and well funded than private citizens. According to Michel deCerteau, "*space is a practiced place*" and sites of resistance such as the recording of the police beating of Rodney King constitute deCerteau's places. [13] Like the surveillant assemblage itself, these actions and sites of resistance lack stability, but they are liminal places that offer the potential to challenge the current power structure in the surveillant assemblage. Should these isolated sites of resistance work together to expand the surveillant assemblage, they could threaten power structure of the surveillant assemblage and grant private citizens greater power in this assemblage. The more that private citizens work together to create places or sites of resistance, the closer society comes to an ideal democratic leveling of the hierarchy of surveillance. This democratic leveling of the hierarchy of surveillance would not allow Blue Sky to have greater and more powerful surveillance mechanisms than private citizens. Private citizens would have the same opportunities to surveil Blue Sky that Blue Sky has to surveil them.

Although it may seem unlikely that there will be the democratic leveling of the hierarchy of surveillance at Blue Sky now, there were multiple moments of disruption and sites of potential resistance at Blue Sky. On many occasions, I observed patrons using mobile media devices to record the grounds of Blue Sky. One man walked around with a handheld video camera to give his colleagues the opportunity to see "this cool place." A woman video recorded the bar because she thought that it was "so beautiful and unique." I witnessed other patrons using their mobile phones to take digital images of the tasting room space. These were moments when the surveillant assemblage at Blue Sky was expanding. There was a blurring between the observers and the observed and the subjects and the objects of observation. Indeed, these moments offered opportunities to resist the power of surveillance that Blue Sky potentially holds over its patrons. These moments are interruptions that can be viewed as challenges to the hierarchy of surveillance at Blue Sky Vineyard.

Such moments can eventually lead to other moments in which the surveillant assemblage grows to include more private citizens who are expanding the surveillant assemblage at Blue Sky. By leveraging digital media arts technologies, private citizens can offer opportunities to subvert the power structure in the digitally networked surveillance assemblage. Digital media artists can create media art pieces by placing webcams above their laptops and recording the activities at Blue Sky. They can digitally capture video and still images of the video cameras recording the Blue Sky patrons and the Blue Sky employees. These digital media artists can curate the images and broadcast their live and archived digital video and photographic data on websites that they can promote across the United States and the world. Digital media artists can also construct digital documentaries of the events at Blue Sky. They can take a sequence or series of still digital images of the video cameras themselves showing the video cameras in the context of the environment and how they are used to surveil the space. Digital media artists can document the participants and activities in the space and post their documentary data on websites that would expand the surveillant assemblage at Blue Sky.

Aside from using websites to expand the surveillant assemblage at Blue Sky, digital media artists can also expand the surveillant assemblage with art installations in public and private exhibition spaces. Digital media artists can use live digital feeds of the real-time surveillance activity and the digital still images they record at Blue Sky to construct visually and intellectually compelling art installations. Through these installations, participants at public and private exhibition spaces would have the opportunity to witness the live expansion of the surveillant assemblage at Blue Sky. More adventurous digital media artists may try to expand beyond the physical manifestations of the surveillant assemblage at Blue Sky and intercept the Blue Sky closed circuit television system, duplicate the data from this system, and create an art installation inspired by this system.

There may be legal implications to such activities, but such concerns may be inconsequential as the surveillance assemblage grows to include more data. [14] As the surveillance assemblage becomes larger and accessible to more people, these people can work together to represent their interests in the legal system. For example, the legal battles over Napster continue, but many users feel free to download music off the internet.

According to William Bogard, the "very logic of information networks that information must be free to flow between any part of the system, for surveillance means more ways to observe the observers, bypass their firewalls, access their databases and decode their communications." [15] The master's tools have the potential to eventually dismantle the master's house. If the surveillant assemblage eventually expands to include more and more people and their networked technology, it becomes an increasingly open structure. Bogard explains that if "an information network is a rhizome, then information must be able to travel in all directions, directly or indirectly, from every node to every other node." [16] The more virtual nodes that are included in the assemblage, the more difficult it becomes for both institutional actors and private citizens to monitor the surveillant assemblage.

This growth and expansion makes it increasingly difficult for governments and corporations to maintain control over the data in their information networks. Powerful and institutional members of the hierarchy need increasingly sophisticated technology to protect privileged information. However, these powerful and institutional members also supply private citizens with "the very information gathering, interception, sharing, blocking and editing tools they need to defy that control." [17] Through purchasing and co-opting this technology, private citizens can gain access to this technology as it becomes available. [18] They can use this technology to subvert the power structure in the surveillant assemblage. When digital media artists capture video and still images of themselves in the Blue Sky space and post this information on the internet, they participate in and influence the creation of their digital doubles.

Blue Sky Vineyard is a commercial space that offers the critical ethnographer a wealth of information about surveillance and consumer culture. As a critical ethnographer, I chose an inductive qualitative approach to my study and I began "with an ethical responsibility to address processes of unfairness or injustice within a particular *lived* domain." [19] I locate my study within the tradition of critical ethnography because I am committed to challenging the status quo and revealing the concealed power relations in our complex society. [20] My study identified opportunities for changing the consumer culture at Blue Sky Vineyard so that digital media artists can challenge the vineyard's potential power in the surveillance assemblage. I offered examples of activities that operated in liminal places, moments of disruption, and sites of potential resistance at Blue Sky. However, my study is not bounded by the confines of Blue Sky Vineyard. The strategies that I identified in my study can be extended to other

private and public locations across the United States and the world. It is my hope that people will embrace these strategies in these expanded contexts.

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PLAYFUL POTENTIAL – A SHORT GENEAOLOGY OF LUDIC INTERFACES

Mark Butler

This paper proposes that the ludic plays a fundamental role in the development of digital culture. From the beginning, personal computing and its interfaces have shown playful characteristics. The following will reconstruct a short genealogy of playful interaction, focusing on the development of *Spacewar!* as a pivotal moment; and take a critical look at the applicability of ludological concepts to digital media culture.

In a broad sense, ludic interfaces have been around since the beginning of cultural history. Their genealogy is at least as old as archaic board games like Mehen or Senet from Egypt's predynastic era (ca. 3500-3100 BC). The boards of these games offered recreative play in the full sense of the word, bringing together fun and spirituality while interfacing the earthly sphere and the netherworld. However, I would like to use a narrower definition of ludic interfaces that binds the term closer to digital technology, keeping in mind that, on the one hand, computers are related to board games insofar as the architecture of both implements a recursive rule governed process; and underlining, on the other, the qualitative leap in the genealogy of ludic interfaces that Alan Turing's conception of the "universal machine" from 1936 marks, insofar as it is programmable and offers the architecture of a meta-game, i.e. is capable of modeling every conceivable symbolic system. Both games and Turing machines enact the collision of freedom and determinism, "paidia" and "ludus" (Caillois), variable input and processed code, thereby offering an experience that oscillates between contingency and necessity.

Rule based games are key artifacts that helped develop the thinking about computer programs. Turing – as well as other computer pioneers like Charles Babbage, Konrad Zuse, Claude Shannon, John von Neumann and Norbert Wiener – spent time thinking about chess and the possibility of implementing it on the computer. The media theoretician Claus Pias emphasizes the essential role of games in the development of the computer:

The fact that Babbage, Zuse, Shannon, Turing or Wiener spent time thinking about playing chess, is neither biographical coincidence nor ex post ›use‹ or ›misuse‹ of the computer for the sake of play, but rather a ›thought picture‹ [*Denkbild*] (Benjamin) of the computer itself. [1]

Games were exemplary applications in the early years of computer science that offered important solutions for programming problems, which reached far beyond the purpose of play. Furthermore, it was only a few years after the construction of the first computers that the first simple games were implemented on them, one of the oldest documented ones being Noughts and Crosses from 1952.

At the end of the decade, the A.I. pioneer John McCarthy began to work on his chess program at MIT, with the help of students from the Signals and Power Subcommittee of the Tech Model Railroad Club (TMRC). Shortly thereafter, a group of these students formed around McCarthy's assistant Steve Russell and developed the first digital action game between December 1961 and April 1962 on the Electronics Research Laboratory's brand new PDP-1 (Programmed Data Processor): *Spacewar!* [2] The PDP-1 was equipped with one of the first programmable cathode ray tube screens and, more importantly, followed the direct interaction paradigm that had been inaugurated by its predecessor the TX-O (Transistorized

Experimental Computer Zero), the first transistor based computer that had been developed at MIT's Lincoln Laboratory in 1955, leaving the design philosophy of batch processing behind.

Even before the PDP-1 arrived the group around Russell was planning a new demonstration of its possibilities. In harmony with the Zeitgeist, the ludic interface pioneers were fascinated by spaceflight and their fantasies revolved around galactic battles between spaceships, drawing upon science-fiction films of the Toho Film Studios as well as the Lensman pulp space-novels of Edward Elmer Smith. According to J. Martin Graetz, the group came up with three criteria that a good demonstration should fulfill:

1. It should demonstrate as many of the computer's resources as possible, and tax those resources to the limit; 2. Within a consistent framework, it should be interesting, which means every run should be different; 3. It should involve the onlooker in a pleasurable and active way – in short, it should be a game. [3]

Thus Russell's group developed *Spacewar!*, a game that simulated a duel between two spaceships. Both ships began at opposite ends of the screen, while a randomly generated star-field was shown in the background. The action unfolded in real-time, with visual output and manual input. The movement of the ships obeyed the laws of a virtual physics – acceleration demanded time as well as valuable fuel and when a ship gained momentum, the law of inertia applied. In the first version of the game, each player had four binary switches at their disposal to control their spaceship: thrust, turn left, turn right, fire torpedo. However, since the switches that had been delivered with the PDP-1 hadn't been developed to be flicked hundreds of times within a few minutes, they quickly broke. Therefore, the ludic interface pioneers had to quickly develop new controllers. Kotok and Saunders developed the first 'game-' or 'joypad' out of parts made to steer model trains – a simple controller with four buttons for the four functions. In later versions, the group used an U.S. Air Force control stick that they found among discarded military equipment – the first 'joystick.'

The game was a huge success in the community surrounding the TMRC, even though the MIT administration gave all other uses of the PDP-1 a higher priority. The game's real-time visual-manual-interaction fascinated and captivated almost everyone who played it and the game ran during every free moment of the PDP-1 that spring. A large amount of the time spent playing with and working on *Spacewar!* – a difference that was steadily being subverted by the digital medium – occurred during late hours. The original version of the game was continually modified in the course of the following weeks during night time hacking marathons: Dan Edwards implemented a sun with a gravity field in the middle of the playing field; Peter Samson replaced the random star-field in the background with a precise replica of the night sky that ran through a 24 hour cycle every 60 minutes; Graetz developed a hyperspace jump that made the player's ship teleport to a random position on the screen; and Russell programmed a subroutine that showed the score for an open house day in spring of 1962.

Spacewar! was so successful that the producers of the PDP-1, the Digital Equipment Corporation, included it in the main memory of the computer thereafter. Furthermore, the game was also ported to other computer systems. Thus, it became popular in university computer labs nationwide, reaching as far as Stanford on the west coast. As it spread, further modifications were made such as space mines, invisibility, partial damage, an electric shock to accompany the destruction of one's ship, a multi-player-mode and a 2½-D version. The program permeated digital culture at the turning point from mainframe computing to personal computing. It influenced the pioneers of the PC-paradigm shift, for example Alan Kay who not only considered *Spacewar!* a standard application for his Dynabook – a prototypical laptop

for children that he worked on at the Xerox Palo Alto Research Center (PARC) – but also, and more importantly, built conceptually upon the playful real-time multisensory interaction the game offered. [4]

Playful Interaction

Spacewar! is one of the first computer hacks and the most elaborate that had been performed at the time of its implementation. It emerged from the young hacker culture at MIT that can be characterized by a playful relationship to technology and the world at large. The game was developed through a reappropriation of the digital computer – a machine that had previously been almost exclusively used for supposedly 'serious' endeavors such as breaking encryption, processing large amounts of statistical data or running military simulations – to model a science fiction fantasy. The question of what constitutes a sensible use of computers has a different answer for different people. The hackers saw much of the authorized use as unnecessary, just as many sanctioned users saw the development of *Spacewar!* as a waste of computing resources. Pias underlines the relativity of 'legitimate' computer use that the hackers brought to the fore:

Every program that runs is legitimate. There are no false games in the true, but only aborted play and crashed programs. Every use can only appear as a misuse within a context that is delimited by law or economy, encoded by normality or passed down through institutions. [...] Hacking subverts the terms of right or wrong use, it deconstructs in a sense »misuse« itself, by showing that an idea of technical function, which is bound to a human intentionality of purpose, doesn't make any sense with regards to computers. [5]

In closing, I would like to sum up the relevant ludic dimensions of this complex web of human and technical "actants" (Latour) that cannot be grasped with the idea of the "homo ludens" (Huizinga), but rather calls for a conceptualization as "ludic cyborg." [6] The first ludic dimension of this human-machine interaction network that must be mentioned are the "affordances" (Gibson) of the PDP-1. The hardware offered a new mode of interacting with the universal machine that marks a radical shift in the philosophy of computer design: instead of focusing on maximizing the efficient use of computer cycles through batch processing and time-sharing it enabled users to interact with the machine directly, along different sensory channels in real-time. This shift in design philosophy imparted the technological artifact with ludic potential; unfolded within it an invitation to play that was joyously accepted by the first generation of computer hackers.

The attitude of the hackers toward the hardware is the second ludic dimension that needs to be underlined. They approached the hardware with a playful spirit. Hacks were defined, at the time, as autotelic endeavors that were performed for their own sake and the aesthetic pleasure they offered, as opposed to utilitarian tasks performed for some external purpose, out of a sense of duty or for a reward – the opposite figure to the hacker being the "tool." This intrinsic motivation is a defining quality of play. Hackers such as Richard Stallman confirm the playful character of the hacking mindset: "[H]acking means exploring the limits of what is possible, in a spirit of playful cleverness. [...] Playfully doing something difficult, whether useful or not, that is hacking." [7] The more playful shrewdness an endeavor exhibits the more 'hack value' it has. For no other reason than to satisfy a playful impulse the ludic interface pioneers not only reappropriated the universal machine in the form of the PDP-1 – turning it into the first 'Playstation' *avant la lettre* – but also reengineered model train and military controllers in their striving to perfect the aesthetic experience of *Spacewar!*. The hackers realized the playful potential of the computer by interacting with it, not as a tool, but as an aesthetic and ludic medium.

The third ludic dimension that needs to be highlighted is the openness of the game program. From its inception onwards, *Spacewar!* was constantly modified. The code was part of the budding computer culture's commons and this unleashed a wave of collective creativity. The productive interaction among programmers that condensed around the game points to the community generating power of play; furthermore, it also implemented the highest ludic form: the transformation of the rules and the frame of play.

The final ludic dimension that demands foregrounding is the deterritorialization of play space that occurred around *Spacewar!*. The line demarcating the sphere of work and the sphere of play – a strict division formatting our culture over the last 200 years – began to dissolve in the development of the program: the hackers played while working and worked while playing. In light of limited computer resources and the paradigm of time-sharing under which they had to work, hackers of the first and second generation used every free hour of the mainframes they had access to. They had to use these expensive machines when 'serious' tasks were not being run on them. Thus, the customary rhythmic alteration between daily work-time and nightly recreation was quickly suspended. At the same time, the hackers took a liking to programming during late hours, because they were more conducive to fusing with the machine code in inebriated hacking marathons and achieving a state of "flow" (Csikszentmihalyi). In short: their activity pattern subverted traditional 9 to 5 rhythms. Places like MIT's Electronics Research Laboratory, Xerox PARC or Stanford's A.I. Lab (SAIL) were places where the separation of work and play was undermined during the emergence of popular computing. Or as Les Ernest, the director of SAIL stated: "Sometimes it's hard to tell the difference between recreation and work, happily." [8] Here, for the first time, a playful labour or "playbour" [9] paradigm emerged that has continually unfolded and gained currency up into the present, parallel to the exponential growth in playful interaction with the universal machine. This expansive tendency of play in digital culture – which can also be seen in the rise of alternate and augmented reality games, time consuming online game worlds and full-body kinaesthetic interaction – calls classical ludological theories (Huizinga, Caillois, Bateson), which put their emphasis on the distinct demarcation of the ludic, into question and draws our attention to the transgressive productivity of play.

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THINGS TO DO IN THE DIGITAL AFTERLIFE WHEN YOU'RE DEAD

Dan Buzzo

There are currently few procedures or public awareness about what happens to online digital identities after death. This paper discusses what happens with personal electronic information after death and looks to what is argued to be the rapidly approaching digital Afterlife. This afterlife of new emergent behaviour offers a challenge of almost unimaginable scope to the creative vision of Artists, Philosophers, Technologists and Cultural thinkers.

Introduction

As more people live increasing amounts of their lives online the issues associated with physical death in the digital realm are becoming pressingly visible. Year by year deceased users leave behind petabytes of seemingly 'immortal' data. Yet despite growing amounts of such legacy data there is currently little legal or cultural precedent as to how to treat the personal data of dead users.

"five billion images and counting on Flickr; hundreds of thousands of YouTube videos uploaded every day; oceans of content from 20 million bloggers and 500 million Facebook members; two billion tweets a month." [1]

"One and a half million Facebook users die each year. Twitter faces a similar mortality rate. It's a growing problem for the social-networking sites - and often even more so for the relatives left behind. " [2]

"We feel comfortable saying that 375,000 US based Facebook users will die this year and nearly 1.5m will die worldwide. That's 3 per minute!" [3]

The industry giants have, it could be argued, largely ignored or evaded the discussion of how to deal with legacy data. An early indication of this may be the tragic case of L/Cpl Justin Ellsworth. A US Marine killed on active duty whose parents fought Yahoo! Inc. in Oakland County Court. Their fight was for the right to their son's correspondence whilst he was posted overseas. Yahoo! argued that their terms and conditions prevented transfer of any users account, even after death. The court ruled in favour of the Ellsworth family and Yahoo! were ordered to hand over all data. [4] [5]

Historical dealings with the issues of legacy, inheritance, privacy and ownership associated with personal data in the social media arena has been subdued at best. Many of the businesses involved have as their financial lifeblood the 'positive externalities' of users interactions with the, largely free, services and tools they provide. Tools that are eagerly consumed by billions of people across hundreds of nations.

In recent years, however, the issue of legacy data has become more visible in the public consciousness. Correspondingly there are a small but increasing number of tools and services, waiting to serve what can only being seen as a significant growth market. Tools helping people deal with the issues of legacy data online. From mydeathspace.com, amongst the first to gain public notoriety, to the recent entrant to the arena legacylocker.com. LegacyLocker, for a fee, will hold your digital passwords and essential documents in preparation for handing them over to your nominated executors after your demise. Their ser-

vices even afford you the ability to send personalized messages after receiving confirmation of your corporeal end. Similarly, Entrustet.com offer a variety of services to the living to help manage their data after death including AccountGuardian and seemingly conversely AccountIncinerator. The latter delicately described to be useful so that;

"My family won't have to spend time deleting my online accounts after I pass away. I want my friends and family to remember me for me, not my Facebook profile" [6]

There are an increasing number of writers and commentators investigating the area of user death, legacy data and the persistence of our online expressions. The primary focus of many discussions, however, deals solely with concepts of legacy and inheritance. Whilst there are many significant issues to address regarding the peculiarities of data some experts argue that there may be ample social, cultural and legal precedents to deal with the issues of those that pass away, the people that survive them and how their effects, chattels and assets are dealt with. After thousands of years the legal and cultural framework for dealing with the inevitabilities of death are generally well defined. Though the issue of legacy data is new it may be that the current difficulties experienced by surviving friends and relatives of deceased users will be diminished as the legal establishment slowly moves to accommodate this new phase in social existence.

One amongst the new 'Digital Legacy' discourse is Digital Death Day. DDD is an annual celebration and discussion of all things digital and 'end of life' and this years conference in Europe is billed as;

"…primarily concerned with provoking discourse around the social, cultural and practical implications of Death in the Digital World. Thus stimulating a reconsideration of how death, mourning, memories and history are currently being augmented in our technologically mediated society." [7]

and the suggested professionals that should attend include;

"Funeral Director, Data Systems Admin, Digital Designer, Grief Counselor, Solicitors and Barristers in Intellectual Property and Estate Law, and Clergy." [8]

Previously a more unlikely attendee roster could scarcely be imagined.
Digital Death Day is one of several initiatives bringing public and academic questions together with business commentators. The objective, to create meaningful dialog and document good practice when dealing with the basic problem:

Users Die

When looking at the current state of discussion regarding issues of mortality and persistence of personal data there is a lag between the academic sphere and the general public discourse. Looking at issues associated with data persistence and legacy there is a proliferation of articles and opinions being expressed within mainstream media.

The nature of how, where and why this data is created captured and stored. Also the relationships that the public has with the, largely, monolithic organisations that started the trend of ubiquitous data capture are under review.

Understanding of 'personal data', its' complexity, its' persistence and its' inherent value in what is sometimes referred to as the 'attention economy" amongst the general public is increasing. [9]

Doc Searls from Harvard University argues further than this by making the distinction that there is a converse 'Intention Economy' when he writes;

"The Intention Economy grows around buyers, not sellers." [10]

Searls expands this idea in the area commonly referred to as VRM, Vendor Relationship Management. [11]

It can be argued that there is a burgeoning awareness of the nature of the hidden exchange that takes place with web service providers such as Google, Yahoo!, Facebook, Twitter et Al.
The most dramatic illustration amongst the general users of online services surrounds that of ownership and administration of personal data. This is brought home most strongly with the situation of what to do with the digital expressions left by dead users.

Year by year as more of the general public begins to understand the depth and inherent value of their personal data there is an increasing impetus behind projects dealing with protection of personal data and the Portability and interoperability of personal data. This is both working alongside and a partial product of issues of privacy, estate and inheritance of personal legacy data.
VRM, Vendor Relationship Management is a natural counterpart to the ideas and practices of Customer Relationship Management (CRM) are beginning to reshape the argument around our relationship with service providers and our personal data. That the very data about our lives is no longer considered to be just ' a positive externality' for service providers of the interactions we have them but is something that is intrinsically valuable, both in a personal and commercial sense.

"VRM tools provide customers with the means to bear their share of the relationship burden with vendors and other organizations. They relieve CRM of the perceived need to "target," "capture," "acquire," "lock in," "direct," "own," "manage," and otherwise take the lead of relationships with customers. With VRM operating on the customer's side, Customers are also involved as participants, rather than as followers." [12]

"The primary theory behind ProjectVRM is that many market problems (including the widespread belief that customer lock-in is a 'best practice') can only be solved from the customer side: by making the customer a fully-empowered actor in the marketplace, rather than one whose power in many cases is dependent on exclusive relationships with vendors, by coerced agreement provided entirely by those vendors." [13]

The Berkman Centre for Internet and Society at Harvard University
(Harvard University, 2011)

Currently several projects and specialised areas of discourse are looking at aspects related to this area including, OpenID, oAuth, OpenSocial, VRM, (vendor relationship management), PDS (personal data spaces,) the Mine! Project, Identity Commons et al.

Approaches such as FOAF, Friend of a Friend, RDF, Resource Description Framework, and other related semantic technology approaches use data definitions to rigorously define relationships between pieces of information. With the goal of altering the outpouring of discrete pieces of digital content into a sea of congruent pearls of related, discernable, malleable information.

"FOAF is a project devoted to linking people and information using the Web. Regardless of whether information is in people's heads, in physical or digital documents, or in the form of factual data, it can be linked." [14]

Though there is great hope for the future of the Semantic Web using technology approaches such as FOAF and RDF. There are critics of this technological approach to classifying everything with strictly defined taxonomies. Writers such as the American Cory Doctorow points out some basic realities that put a proverbial spanner in the works for an all encompassing semantic web particularly;

"When asking people to classify their own data –"People lie. People are lazy. People are stupid, know thyself is a tall order and people are notoriously poor at describing themselves and their own behaviour. Schemas aren't neutral. Metrics influence results. There's more than one way to describe something " [15]

Next steps

When one looks at the state of legacy data, that is information and processes set in place by living users who have subsequently died, it is interesting to see this from the standpoint of the 'post human condition'.

British writer Robert Pepperell in his 1995 publication 'The Posthuman Condition: Consciousness Beyond the Brain' argued the point that 'Consciousness is not restricted to the brain.' and that 'Consciousness is the function of an organism, not an organ.' [16]

From a PostHuman standpoint the 'us' of who we are is not contained within our skin, the concept of our identities is fuzzy at the edges and permeable. The 'Who' of who we are is a function of the expressions we make during our lives. For generations we have been extending the nature of our identities initially with simple tools and mechanical devices to extend our bodies and presence and latterly with ways to extend our minds. We can record and store our thoughts and memories externally for later retrieval with photography and text. With writing our presence can travel through time. We can even express simple decision making capabilities and behaviours that operate for us external to our bodies, in the digital realm.

It is this new ability to express capabilities and behaviours external to our bodies that is the one of the truly exciting new development of recent humanity.

It has been noted that we are entering an age of 'Personal Automation'. Where simple cognitive and decision-making processes and functions are being externalised and automated; Using networked, digital technologies we are now able to offload parts of our behaviour to external subsystems.

Living digitally

Previous generations have lived on after their deaths though the extensions of their selves generated during their lives. People alive today have personal experience of William Shakespeare and have 'met' (albeit in a very small sense) Henry VIII, King of England in 16th Century. Part of who they were (corporeally) lives on through the expressions they made during their lives. We can still interact with something of them but just like the media they incorporated into themselves and their expressions thereof during their lifetimes, their ongoing presence is 'passive'.

DIGITAL IS NOT BY ITS' NATURE A PASSIVE MEDIUM.

As people express more and more of themselves in a digital, active medium I believe that there are direct, observable phenomena starting to occur within the digital realm. These phenomena point to what could be something radically new in human identity. Simple emergent behaviour is already happening as people begin leaving active digital expressions online after their deaths.

As Meredith Chin, Spokeswoman for Facebook says in her interview in Jenna Wortham's New York Times article "As Facebook users die, Ghosts reach out" [17]

"It's a very sensitive topic, and, of course, seeing deceased friends pop up can be painful." Given the site's size, "and people passing away every day, we're never going to be perfect at catching it"

James E. Katz, a Professor of Communications at Rutgers University, said the company was experiencing "a coming-of-age problem." "So many of Facebook's early users were young, and death was rare and unduly tragic," Katz said. "They don't want to be the bearer of bad tidings, but yet they are the keeper of those living memories," [18]

Perhaps it is these simple expressions of post corporeal identity that are so sensitive. Reflecting directly as they do in the living's memory of other physical beings now gone. Even in everyday colloquial parlance we are acknowledging this digital persistence and altered state of being. Lauren Laverne, a daytime DJ on 6music, a UK national radio station, talked recently of how she had been enjoying following Kurt Vonnegut on his twitter feed. Vonnegut died April 11th 2007.

Ironically on 21st August 2011 he/it tweeted "It is a very mixed blessing to be brought back from the dead"

Although these and other simple 'emergent behaviours' can be identified as basic processes I am convinced that they are a real and new as yet unquantified space & state of being identity. Exactly the issue that drives FB new policy of 'memorialisation' is the behaviour the points to evidence of an emerging 'afterlife'

THE EXCITEMENT IS IN THE POTENTIAL

The area I believe is directly related to these issues of legacy and inheritance stems directly from the problems that digital legacy seeks to address; that of persistence of our digital expressions and particularly with the 'active' nature of these digital expressions.

Stories of 'friending' suggestions for dead users on Facebook are legion, and parts of its recent policy on deceased users attempts to staunch the questions this raises. Tweets from the last.fm accounts of those no longer living or other similar behaviours from our surviving digital selves can arouse both confusion and alarm in equal parts from those still in a deceased users social circle whilst those online with no knowledge of the person's passing will initially see little difference in behaviour.

When looking from an evolutionary perspective perhaps this is v1.0 of what we might come to think of as a 'digital afterlife'. After a hundred years when we reach v75.0 we may see it as the embodiment of a real digital afterlife. Not one where people continue on as the same identity but rather as a transition phase in being with a relationship to the corporeal much like to a butterfly to a caterpillar.

This rapidly approaching digital Afterlife offers a challenge of almost unimaginable scope to the creative vision of Artists, Philosophers, Technologists and Cultural thinkers. This paper outlines some of the challenges and opportunities that are on the horizon in a current, near and far future context.

In our collective imaginations future ideas of a digital afterlife are ever-present. In art, religion, literature - seemingly all cultural arenas the question of 'what happens next' has been with us since time immemorial. In almost every aspect of 'future fiction' there is an element of persistence or even new existence after corporeal end. Ideas and concepts of 'the other' and post corporeal transcendence are deeply embedded in the human psyche. Perhaps this is the beginning of the realisation o some of these dreams and desires.

The current generation of digital natives have new and subtly altered perceptions of the personal, the social, the political, the economic and even the physical. Why not also the corporeal ?

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THE WOMAN'S I/EYE: 'IN-BETWEEN' STRATEGIES IN THE WORKS OF SHIRIN NESHAT AND TRINH T. MINH-HA

Monica Calignano

Starting with Homi Bhabha's definition, my aim is to explore the 'in-betweenness' of territories through the woman's I/eye.

Can women really cross the borders, and how do they achieve it?

The artists Shirin Neshat and Trinh Minh-ha give an answer to these questions in their visual works, where women finally break the silence and become the subject, and not the mere object, of looking.

In his introduction to *Nation and Narration* Homi Bhabha writes:

The 'locality' of national culture is neither unified nor unitary in relation to itself, nor must it be seen simply as 'other' in relation to what is outside or beyond it. The boundary is Janus-faced and the problem of outside/inside must always itself be a process of hybridity, incorporating new 'people' in relation to the body politic, generating other sites of meaning and, inevitably, in the political process, producing unmanned sites of political antagonism and unpredictable forces for political representation. [1]

According to Bhabha, nations should not be considered as unitary societies but rather as "interruptive" spaces. The meaning of every nation, of every culture, lies in what the postcolonial critic calls the "in-between space," between nations, frontiers and boundaries — "an international dimension both within the margins of the nation-space and in the boundaries in-between nations and peoples." It is thus a natural derivation that "the 'other' is never outside or beyond us; it emerges forcefully, within cultural discourse, when we think we speak intimately and indigenously 'between ourselves.'" [2]

Bhabha's ideas are useful to understand the actual realities of migration and exile nowadays: every movement here involves a transition, through space and time, of people migrating from one country to another, and across boundaries. It is in the 'interstices' that today people – and artists – build their own home.

Women's art is not just predicated on the migratory movement; even more, it is what 'lives on' this movement.

Many women artists have recently turned to cinema or video-art and video-installations, in order to express their experience as migrants. The countless borders to be crossed everyday – geographical frontiers, frontiers between genders, and frontiers among different media – are experienced in a singular way, by artists such as Shirin Neshat and Trinh Minh-ha: these two artists are constantly in search of the right artistic dimension where women can speak – and write – themselves, by getting possession of the Western male gaze that has ruled them, in life, in society and in art, for so long. On her part, Shirin Neshat, when interviewed, repeats that she does not belong to any place, that she is a stranger and that she cannot identify any place as 'home.' Her "in-between" position belongs only to herself; as a consequence, her art is the way through which she seeks to reconcile with her past and her culture, so as to

open up, for women, the possibility of a dialogue. The position of Trinh Minh-ha is somehow different, but she is worried by a similar preoccupation: the Vietnamese artist reflects on the equation between the English words for "I" (identity) and "eye" (the organ of sight), in order to show how human identity asserts itself primarily through the act of seeing.

My question would then be: how does the female I/eye place itself in the "in-between space," the space between different countries, and different media?

Strategies of *counter-signing*

In the works of Shirin Neshat, the frontier underlines what inextricably divides men from women in the Iranian society. She started as a photographer, before moving to videos and movies which, as she insists, gave her the chance to display the constant dualisms between East and West – and between women and men – in a more powerful way. In addition, video allows the artist to give voice to what, or whom, has been voiceless, making the unmoving finally moving. Most of Neshat's videos are shot in black and white, presenting a two-channel-technology which is functional to the content of the videos; they draw a portrait of the Islamic society, especially focusing on the spaces occupied by men and women in this society. [3] In her videos – *Soliloquy* (1999) is a remarkable example – Neshat investigates the "third space," – an expression she shares with Homi Bhabha – the space in which distinctions between different lands and cultures do not exist any longer.

Almost every work of Neshat is conceived as a big installation to be shown in museums and galleries: often consisting of two separate screens, one in front of the other, in a dark room, upon which the videos are shown simultaneously. In this way, the viewer, standing between the screens, is part of a process that involves his/her choice of choosing to watch one video or the other. In Neshat, we experience a frontier between two genders, and also a frontier between different media: as the artist affirms, multimedia languages are powerful, because they involve people and allow the viewer to become part of the work, by merging and contaminating his/her body with the video and the computer. Her purpose is to tear off the screen, and put the viewer at the center of the installation, often projected on more than one wall. The body is central to Neshat's work, especially because, in Islamic society, the female body is the actual field where all battles take place.

This close relationship between the viewer and the image is particularly relevant to the installation entitled *Women without Men*, which was projected in February 2011 on the statues of Sala delle Cariatidi in Milan. In this exhibition, people move among the images reflected on the statues, in a multisensorial experience, as if they were part of the stories told by the screens. The installation consists of fifteen screens made of tulle, and it tells the stories of five women in Tehran, who gradually find shelter from their difficult lives in an enchanted garden. The screens do not follow a chronological order or a linear narration, they are randomly shown one after the other; this forces the viewer to move from one video to another, becoming the editor of the images, the one who puts them together and, in a certain way, who draws out his/her own story out of the images.

Jacques Derrida's words seem to echo here:

By definition the reader does not exist. Not before the work as its straightforward "receiver." The dream we were talking about concerns what it is in the work which produces its reader, a reader who doesn't

yet exist, whose competence cannot be identified, a reader who would be "formed," "trained," instructed, constructed, even engendered, let's say invented by the work. […] The work then becomes an institution forming its own readers, giving them a competence which they did not possess before. […] It teaches him or her, if s/he is willing, to countersign. [4]

The notion of "countersignature" is also fundamental in the work of Trinh Minh-ha, who in her own way explores the question whether it is possible, for women, to cross the frontier. According to Trinh, "a creative event is a journey": the journey, with its meaning of 'crossing,' seems to play an important role in her career too: "West is, at the same time, inside and outside me," she says. We all know that people who live on the border can see and understand things from different points of view; still, with Trinh, we also understand that these people can speak not only for themselves, but also 'nearby' the Other. The difference is crucial if we think that the artist actually began her career by shooting documentaries. In her work *Reassemblage* (1983), among the signs scrolling on the screen, we read: "I do not intend to speak about, just speak nearby." The declaration of intents is polemical towards the way anthropologists and documentaries have always treated the subjects of their studies, that is, by taking the place that actually belongs to the subjects of their studies, and talking of them as if they themselves could not speak at all. To reverse this trend, and avoid any hegemonic position, Trinh decides to use the pronoun "I" without the capital letter. It is her way of stating that one can come close to something only in an indirect way, by letting things come over, without a pre-determined direction. This is the reason why she pays great attention to the role that speed plays in society: only by moving slowly, and by granting silence, are we able to play with the dimensions hidden in the interstices of the world.

In all fields, including language, there are multiple dimensions: one should play with all of them in order to create new meanings starting from old words and ideas. It is essential to work on silences, intervals, pauses, on the relationship between different things and different people. In this respect, Trinh Minh-ha proposes "a decentred narration made of intervals," as Lidia Curti says. [5]

Furthemore, as Iain Chambers says:

Here on the threshold of vision that is marked by the elsewhere and its transitory exposure, the image comes undone, stutters, and for an instant is traversed by an oblique glance able to catch something in its unfolding. There exists the possibility to multiply on the image a multitude of senses, of directions, to rob it of unilateral intent in order to free it for a further movement. Here emerges a cinema of the 'gap,' of the 'interval.' [6]

Trinh locates her aesthetic vision inside the passage, the border crossing, the movement across space and time, the interval between life and death – in *Night Passage* all the subjects and the bodies are displaced, de-centered, un-done by the movement both of the camera and of the train.

Cinema — especially digital cinema — is a specific choice: because of its intrinsic mobility, it is considered as the most migratory art, and stands out as a transcultural phenomenon: movies can in fact be shown in different places and at different times. New media do not just help us collecting memories, by functioning as archives of what happens around and inside us; they mainly allow us to intervene: as a consequence, digital media are the most suitable to bear evidence of migration.

As in Neshat's works, in Trinh's movies, the frontier is there, even though sometimes only imagined: in Trinh's art, however, it seems more fluid, as if one might creep into it. This is remarkable in *Night Passage,* whose story is based on the novel *Milky Way Railroad* by the Japanese Kenji Miyazawa. [7] The film tells the story of a trespass, a crossing of the spatial-temporal dimension observed through a train window, and, more originally, through the I/eyes of women. When transported onto the screen, the male characters of the novel become female: under the eyes of the women, the 'gender frontier' crumbles away. According to the director, a change takes place when one repeats something by adding something new: thus, Trinh's work can be read, by quoting Derrida again, as her "countersignature" to the work of Miyazawa:

My law, the one to which I try to devote myself or to respond, is the text of the other, its very singularity, its idiom, its appeal which precedes me. But I can only respond to it in a responsible way […] if I put in play, and in guarantee […], my singularity, by signing, with another signature; for the countersignature signs by confirming the signature of the other, but also by signing in an absolutely new and inaugural way, both at once. [8]

Trinh seems to tell us that what is important for women nowadays is their ability of placing themselves across cultures, traveling and slipping across boundaries: exiling themselves, in the sense of soaking into new worlds, new experiences, new meanings. Still, *Night Passage* is not only Trinh's personal, totally female, countersignature of Miyazawa's book; it is "a spiritual journey of a young woman with her best friend and a little boy, into a world of rich in-between realities." [9] These realities are shown by means of a fragmented and deconstructive strategy: single episodes, single images framed as sequences, seen through a train window. As in her *The Fourth Dimension* (2001), the train serves as a moving and, at the same time, motionless frame, through which the human eye/I makes a sense of the reality. In this way, according to Trinh, "the gap between photography and cinema tends to become the bridge": the bridge that, once again, accounts for the importance of the infra-ordinary.

Starting from Miyazawa's story, Trinh leaves just the frame unchanged. Characters, who were formerly male, become female. On the night train, the young Kyra meets her best friend Nabi and Shin, Nabi's son – later we will find out that Nabi drowned trying to save Shin's life. During the night journey, Kyra discovers the "power of communication" and the bondage with Nabi, who supports her throughout the passage. Together, they run across the Fourth Dimension Railroad, a place of transit and movement where Kyra finds herself at the end: thanks to the journey, she becomes a woman able to leave her past behind her, and to move on; she learns the importance of going on, which is the rule of the Night Passage: "don't stop in the dark or you'll be lost; move to the rhythm of your senses, go where the road is alive." [10]

With her personal countersignature of Miyazawa's novel, Trinh seems to succeed in finding a common path where men and women can live, at least figuratively, one next to the other: she only needed to change the story by declining it to the feminine, so as to prove herself able to cross the frontier between genders.

On the contrary, for Neshat, it seems that there is no possibility of crossing the frontier, neither for men or women. What happens when such a division leads people – women – to choose, even unconsciously, exile in an enchanted place, a fabulous and magic place, where the real and the surreal merge? Neshat's movie *Women without Men* tells a fairy tale, based on the homonymous novel by Shahrnush Parsipur, a story about the impossibility of a dialog.

Parsipur, like Neshat, comes from Iran but, unlike her, she cannot come back to her country where, because of her work — dealing with many taboo subjects in Iran, as prostitution, rape, virginity and reaction to male domination – she has been imprisoned and tortured several times. [11] In Parsipur's most famous novel *Women without Men*, the characters are strong women, who, at a certain point, take important decisions that lead them to run away from home — the place of their confinement — in order to take shelter in a garden outside Tehran. They arrive to the garden as in a trance state, walking as in a dream across silent and dusty roads. All of them will fulfill their destinies in different ways: some of them die and return to life, some disappear or transform into other essences, such as trees, wind or light.

In the garden of *Women without Men*, narration turns magic, the magic of a "non-place," to use the French anthropologist Marc Augè's expression, which Derrida might call "a place to come." For each of the five women, the garden becomes the symbol of their freedom from male control, the place where they are capable of reinventing themselves outside the boundaries of male society. In the garden, they are both at home, in a safe and domestic space, and free to live as they like. Still, none of them seems satisfied with living so strictly separated from the outside world, so neatly separated from men. Apparently what Parsipur is telling us is that living completely isolated, without men, is not the right answer: in order to be human, women must not try to exile themselves from the outside world, by taking a position of separation from it, but, on the contrary, they should find their personal answers, their own ways of living inside society rather than against it.

Nevertheless, the garden of *Women without Men* recalls me the words of Julia Kristeva in her *Strangers to Ourselves*, [12] where she seems to suggest that the feeling of being a stranger can only be abolished in a different dimension, an imagined and fantastic universe totally separated from the real one … is that really so?

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TECHNO-HUMAN: NEW FORM OF HYBRID HUMAN; FROM SCIENCE-FICTION CINEMA TO THE POST-MODERN SOCIETY

Özgür Caliskan

This paper discusses the process of how human body and identity has become hybrid of human and machine being affected by technology and how this alteration has been materialized from science-fiction cinema to the post-industrial society. The term "techno-human" is used to define this new hybrid version of the human including implanted bodies, artificial organs, prosthesis, digital identities and avatars.

Introduction

Cinema has always been an art form which reflects what and how has happened in this world from the human point of view using various way of audiovisual communication to interact with the viewers; with us. Therefore, the questions and answers that people ask about everything have always been important for the cinema. Considering every film genre asks the questions and gives the different answers; according to Vivian Sobchack; science- fiction is "a film genre which emphasizes actual, extrapolative, or speculative science and the empirical method, interacting in a social context with the lesser emphasized, but still present … in an attempt to reconcile man with the unknown." [1]

In the post-industrial society, technology has become the unknown figure for our today and future, as technology and science improve rapidly. Every day, there are new machines and tools that we have to be exposed. Therefore, mainly, the role of SF genre has become exploring how these developments and tools affect human and what kind of interaction there is between human and technology. In other words, science-fiction cinema has had significant role as an art form to define and discuss the unknown and possible future of interaction between human and technology. As science-fiction cinema promises, today, in the non-fictional world, human being is exposed by machines; computers, mobile phones, the Internet, television, cars, prosthesis and any other machines. This new exposed human being is defined in theoretical and practical way since modern and post-modern periods have occurred.

Obviously, there are very important similarities between the human of post-industrial society and the represented human in the world of SF cinema in terms of physical body and personal identity. According to similarities of these two converted human being concepts; this paper aims to examine representations of altered human body and identity by technology in science-fiction cinema and how these representations have become real in non-fictional post-modern society today. In addition, the paper explains and uses a new term "techno-human" to define new hybrid human version which has similar identical and physical features with the represented human from science-fiction cinema and the real world of today. In the book "Terminal Identity," [2] Scott Bukatman claims significance of altered human figure by technology in SF cinema using his own term *terminal identity* which is related with the identity of techno-human and Bukatman says: "terminal identity is a form of speech, as an essential cyborg formation, and a potentially subversive reconception of the subject that situates the human and the technological as coextensive, codependent and mutually defining." [3] Considering the notion of techno-human, there is a strong relation between two human figures in SF cinema and the actual world; both are modified and their autonomies are awakened as Bukatman emphasizes the same for his *terminal* concept. Besides, to define the human of the post-industrial society, Giuseppe O. Longo uses the term *homo*

technologicus: "a symbiotic creature in which biology and technology intimately interact" and he explains this term as "homo sapiens transformed by technology" which is a new transformational type in a new space. [4]

In this regard, today, techno-human is the version of homo technologicus and considering these both definitions of Bukatman and Longo; -Bukatman's is for SF cinema and Longo's is for the non-fictional world- techno-human links these both notions concentrating on the alteration of body and identity by technology of human comparing with representation of the human in SF cinema. Furthermore, in structural meaning, techno-human does not only belong to the world of today or the world of SF cinema, it belongs to both of them; its area and time are also hybrid as itself.

Techno-body

The human body is reconstructed through technology in the postmodern period, and Stelarc explains this reconstruction as reposition of the body from the psycho realm to the cyber zone of interface and extension and he claims that the body needs this transformation to become the hybrid of human-machine. [5] In addition, to be exist and integrated in the world of techno-culture, one needs to improve his/her body but the nature does not help to regenerate the body. For this reason, the human is constrained to use the advantages of the new technology to accommodate the body for our own time and for the future. Thus, in the way of becoming techno-human, interpenetration between body and technology; one allows technology to penetrate into one's body so the body is implanted, extended and altered by machines. Furthermore, Stelarc mentions that redesigning of the body altering, implanting and extending it ends with the redefining the human saying; "it is no longer meaningful to see body as a site for the psyche or the social, but rather as a structure to be monitored and modified (...) the body is an object for designing." [6]

Additionally, techno-body might be considered similar with the cyborg idea of Donna Haraway, the cybernetic organism [7] and, the cyborg is generally defined as a presence which is a union of the cybernetic and organism at once, and also a blend of flash and inorganic. [8] Similarly, techno-body is a human body which is converted by technology, a new form of the human body, therefore, it is possible to say that cyborg is related with the techno-body and there is an interaction between both. However, specifically, techno-body approaches the machine and body relation involving the organic human body as the beginning point to discuss the techno-body in the conditions of the both fictional and non-fictional world.

In this case, the SF movie; *Repo Men* (Miguel Sapochnik, 2010), adapted by the novel of Eric Garcia, discusses the paradox of belonging and having the artificial organ in the near future which does not seem so far from today. Significantly, I choose this movie for the reason that it argues the artificial organs from the human body point of view; we see human bodies which become techno-bodies. In the future of *Repo Men*, one buys the artificial organs as same as today, and also if one does not have money; he can buy the organs with credits from a company. The buyer pays the instalment every month and if he does not / cannot pay the instalment, "repo men" take the organ back from him and he dies. This situation brings the question of belonging of the body with the artificial organs. Considering the movie, implanted body of techno-human does not belong to oneself concretely, and personally; one cannot feel that the mechanic part of the body belongs to oneself; the organ is just a new attached property of the body. If you have techno-body with the artificial implants, you cannot feel that your body does not completely belong to you like when you were born; inside of your body, there is something which makes you

have a techno-body; it is something implanted by technology, not by nature and physically, you are different than you were before. When the future of the movie is compared with our actual life today; it is possible to see people having techno-body with prosthesis and artificial organs. As people get used to lose their natural organs, they are getting used to have artificial ones inside of their body which will make them have a techno-body.

Robocop (Paul Verhoeven, 1987) movie is another example for the both fictional and non-fictional world for the reason that the protagonist of *Robocop*. Police officer Alex Murphy is human whose body is recreated with the machine prosthesis; *Robocop* had human body before having a techno-body. In this regard, *Robocop* movie can find its reflections and feedbacks on the real world immediately. *Robocop* brings a different perspective recreating the human body with machine prosthesis without covering it and also the movie shows the reasons and results of having a new machine body. Further,*Murphy* does not only come back to life, he also has improved and strong body than before so other police officers call him as "super-cop" also. In addition, without his new machine body, he also cannot live anymore, so he is obliged to his new body; he must have the techno-body to survive and his new body will not completely die, it just might be destroyed because it is a partly machine. This is also one of the contradictions of techno-human for the reason that any prosthetic parts of the body will not be vanished but the human will die and the human body will be rotten. Therefore, it is a contradiction of one is wearing something which will exist longer than one's body. In addition, the shape of *Murphy*'s new body is not different than his former body functionally; it has still human body appearance with his two legs and two arms because the main reason of recreating his body is not to produce a new existence, the aim is to make a human body which is stronger than the organic one and he just becomes a hybrid and his new human shape body also bring the functional advantages to him, because he still looks like a human with the shape of his body. Likewise, in the society of today, if one has prosthesis, he/she is not very comfortable to take attention in the public because of the prosthetic part of the body. This is the reason why the prosthesis technology has to imitate of the organic body as well as the real and original one. For why, it is difficult to wear a prosthesis which is very different than the organic body because even just wearing the prosthesis has already possibility to make one a scary object in public; as it happens when the skinned body of *Terminator* (James Cameron, 1984) is seen on the screen.

Identity of Techno-human: Digital Me / We

The idea of Michael R. Heim; "Digital We – Digital Me" (DW / DM) is the initial point of the altered identity of techno-human from SF cinema to the recent day. I want to use the term for more general issues than just the digital environment covering the area of all technologically exposed new identity of human, thus, with the new identity of human. For this reason, DW is directly related to what has happened to human personality with the invasion of technology in daily life and penetration of the human into the digital world of machines. Evidently, the alteration of human identity is not caused by one way direction because when the machines exist in our daily life, we enters in their area too, hence, the identity is affected by its own environment and also the environment of machines; digital environment and virtual world. Significantly, becoming DW has been undeniable by the techno-human of the 21st Century for the reason that we live with the machines, inside of the machines and machines are inside of us.

Michael R. Heim gives the title of the poster of *Minority Report*'s (Steven Spielberg, 2002) "You can't hide, - Get ready to run" as an example for the warning of DM of new human whose data profile is adapted by the computer with credit card purchases, online shopping, e-mail correspondence, health records [9] and today we have become closer to the DW with the social media/networks (Facebook,

Twitter) and blogs, mobile phones, video games and such. Obviously, we have alternative personalities inside of the machines and networks; they identify us as we introduce ourselves to them. For official usage of the digital technologies we have to become the real us but for other areas, our digital altered identity does not have to be the exactly what we are. DW/DM may be someone or something else different than our own. In this regard, Heim claims, "I" is transformed to "Me" being objectified in the virtuality. In addition, DM can be designed with "fake names, feigned interests, and fabricated references" hiding the real "I" behind the screen. [10] This is very much like what *the Matrix* (Andy & Lana Wachowski, 1999) brings the new idea of the combination of real and virtual world. Even we are not being penetrated by the cables to connect to the network with DM as it happens in *the Matrix*; we connect to the network with an altered identity. How the main character of the movie, Neo, is not exactly the same person in both virtual and real world, we have a digitized identity in the world of networks, or a video game. In this regard, it is possible to say that alternated identities have started when the computer has changed from calculator to the multimedia machine equipped with networks, games, and even televisions. [11] I mean, digital identity of techno-human has been created with personalizing computer and then use them as an entertainment and social device. In this process the non-fictional and fictional world of SF cinema has been developed concurrently and the boundaries between the DW and the real we has become more transparent.

As an illustration; in *TRON* (Steven Lisberger, 1982), the protagonist *Kevin Flynn* is transported from the real world to the cyberspace of the video game physically and spiritually, and if we think about the real time technology when the movie was produced, this transition from the real self to the virtual self is something new for the beginning of the 1980s. Almost twenty years after *TRON*, *the Matrix* brings another explanation to the concepts of real and virtual world and so the identity. Not like *TRON*, in *the Matrix*, the real body does not need to be transported to be in virtual space, the real "we" stay and the DW exist in the virtual area. Therefore, considering the technological developments in the world during twenty years; from *TRON* to *the Matrix,* it makes sense that we can have virtual identity without losing the real one. Obviously, the story of *the Matrix* is affected by growing usage of the Internet and virtuality on real life during the 1990s and the movie asks the question about the reality, and importantly; if there are two realities as the real and virtual one, where is the line between these realities?

When we consider more recent SF films, DW has changed, again with the development in the non-fictional world. Since *the Matrix,* 1999, also the deadline of the 20th Century, the virtual spaces and machines have invaded the space, everyday life and our body, rapidly, also the Internet environment and virtual space have played important role in our lives and virtuality has become popular such as social networks/media, blogs, video and photo sharing sites, virtual online games, video games and so on. In addition, "avatar" as a notion has become popular in the computing terminology and it is generally defined as the virtual representation of the user as a character on the virtual area. For this reason, the meaning of DM has been changed again as it is happened in SF cinema. For instance; the recent SF films such as; *Avatar* (James Cameron, 2009), *Surrogates* (Jonathan Mostow, 2009), or *Gamer* (Mark Neveldine & Brian Taylor, 2009) are generally tells the story about using the real avatars in the real world. *Avatar*, the human can control the body and identity of another existence, Na'vi, in the planet called Pandora, therefore Na'vi people's identity has become the avatar identity of the human. Similarly, *Surrogates* movie is about the future that people exist in the public with their surrogate robots so people just sit on the sofa and control their surrogates in daily life and in this situation people may seem different then their physical appearance or they may have different job than their real job. Likewise, in the future world of the movie*Gamer,* people play video games controlling the bodies of real people, for instance the main character *Kable / John Tillman* is a prisoner and he works as the avatar of the young boy *Simon Silverton* in a game called *Slayers.* Further, to become an avatar is also a job to earn money in

the world of real people and real avatars. Without reservation, we also have had similar levels from the 1980s until today, and considering the recent movies that I have mentioned, not completely the same but we have our avatars in virtual area; we can control our avatars as we have different personalities and we can be someone else on the Internet. Michael R. Heim explains the notion avatar as "flexible and fluid identity that reveals chosen aspects of the real I. Avatars can range from the simple e-mail nickname with graphic icons to the animated body about in virtual worlds." [12] It is maybe early to say that we can control other humans' bodies as our avatars, but we control the machines now; cars, industrial machines, computers, and also with our body we control the our avatars on the game on Nintendo Wii or Xbox Kinect, however, for the issue of DW; the identity of techno-human is more significant than the body, because the identity does not need to wear, touch or hear something to be changed, it is just changed from the environment and surely, we have similar environments with the movies that I have noted. In this regard, if we can behave like someone else in virtual area, we already have our DW, and maybe in the near future, it is soon that we will see our DW in the actual life, just like looking to the mirror. In brief, if we finish with the words of Heim, he says; "the avatar becomes a graphic embodiment of the world citizen, the Digital Me that attains freedom through deeper engagement." [13]

Conclusion

All things considered; techno-human is a notion to define new human who is exposed by the technologies and machines comparing the representation of altered human concept in science-fiction cinema with human concept in the post-industrial period of non-fictional world. The reason of my insistence to use the notion of techno-human is that we are not a completely machine "yet". In my opinion, the term has described the situation of today's human better including the human word and also signifying the effect of technology (machines) on human body and identity. In SF films and actual life, the human becomes the first object to represent and for this reason all technologies I have mentioned are produced and used for human being. In addition, the human body is used as the represented realm to proclaim the future possibilities of the technology and human relationship asking a question which is that is this relationship good or bad?

In general, considering the dystopian SF films, their proclamation is that the machine and human interaction will grow negatively and there might be a so-called war between human and machines. As there are not any distinctive proof that the technology is good or bad for people, the term techno-human also covers the both effects of technology considering negative and positive results of human and machine relationship. As techno-human keeps the human parts physically or identically, he/she also is exposed by the technology using its advantages and disadvantages. In this case, techno-human might be someone who has prosthesis, or someone who sits in front of computer without doing anything, or someone who uses a technological weapon, or someone who walks around the city with his/her Bluetooth earphone. Therefore, including the words *techno* and*human*, techno-human becomes the hybrid, as it does not matter where he/she comes from, or where he/she lives in; maybe in the world of ours or in the world of science-fiction.

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COLLATERAL DAMAGE: CLOUDS, CRIMINALITY AND CHATBOTS

Sheena Calvert

This paper comments on language within digital technologies, regarding the application, modification, mutation and transformation of language(s) within such environments. It takes the position that the language(s) of technology, continue to be intimately entwined with philosophical questions about the nature of language, while in some cases extending and reshaping them.
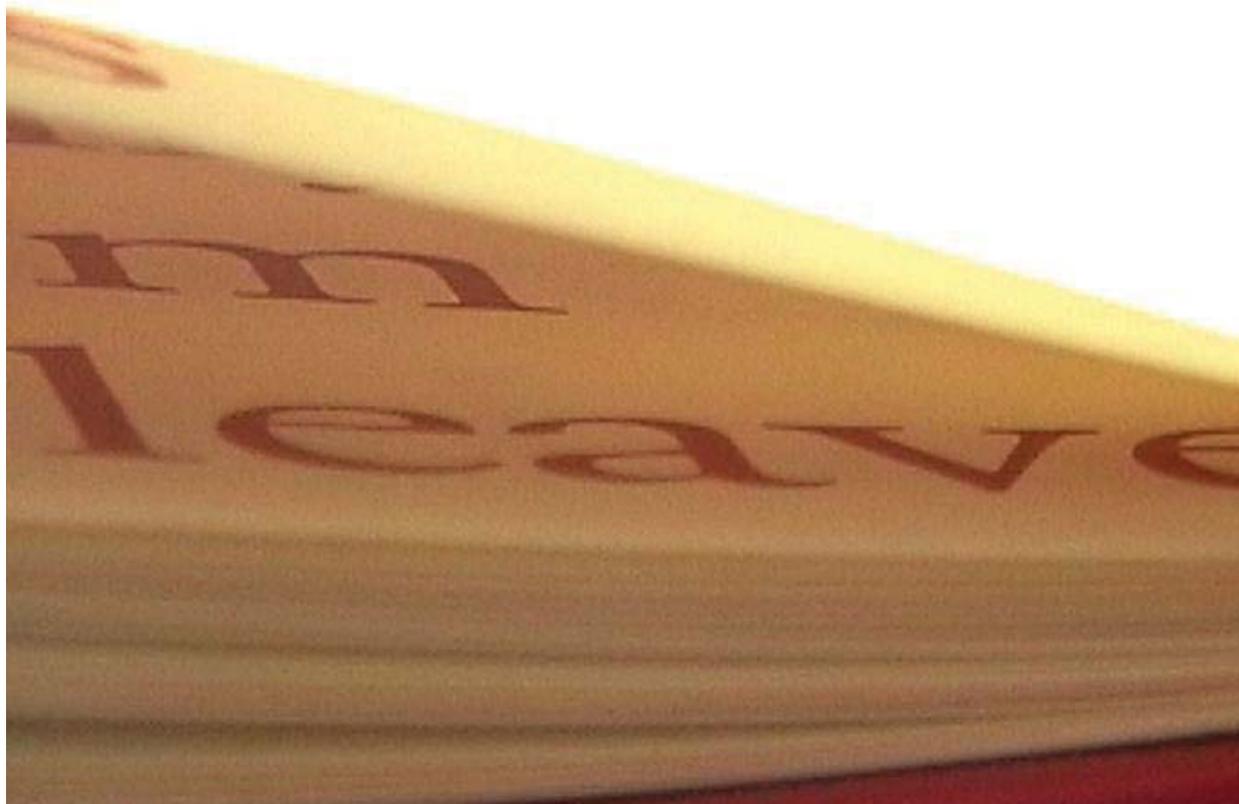
Scripta Manent, Verba Volant, Sheena Calvert, 2002. Artist's book, exploring the various qualities of material language, and the philosophies which which address them.

INTRODUCTION

This paper is intended as a series of small remarks, provocations, or pointers toward questions of language within online, digital contexts. Although beyond the scope of this paper, there is a more detailed argument to be made that the ways in which language frames experience, identity, concepts, and political and social realities, in online and digital contexts needs to be thought through entirely differently; and that philosophies of language which are primarily locked into a fixed, linear, speech or print-based mode of critique, cannot account for, nor adequately address, the specificities and shifting realities of language within those environments. As Ludwig Wittgenstein reminded us, in the *Philosophical Investigations*, language games change depending upon context, wherein new rules apply. [1] What language

games are we now playing, and why? Nonetheless, the primary question always remains: how do language and knowledge and/or experience interact? What becomes provocative is considerations of which philosophical questions about language remain the same, and which change, once we enter these new information playgrounds and environments. In terms of power, social interaction, identity and languages' relation to consciousness, there are new agendas, higher stakes, and altered realities. For example, in her paper *Precarious Flux*, Donna Leishman argues that testing the porousness of the boundaries between language and reality takes on a new significance within online contexts, when 'tongue-in-cheek' Tweets become the subject of court cases, and move towards criminal action.

LANGUAGE AND CONCEPTS

Johanna Drucker, in her essay, *Digital Ontologies*, draws attention to one of the fundamental questions of Western philosophy; the relationship between linguistic signs and the representation of thought:

The attempt to understand the connections that link human thought to its representation through the act of formgiving (in language, image or signs) is central to Western philosophy and aesthetics. [2]

Similarly, Adorno's observation in *Negative Dialectics* that "[O]bjects do not go into their concepts, without leaving a remainder" [3] sets us on a path of thinking about the problematic and unstable relationship between language and the conceptual or physical reality it attempts to describe. Adorno suggests that language is a totalizing system which, unsuccessfully, attempts conceptual closure; and which in turn mis-directs, or suppresses experience, along with the evidence provided by the object itself. The question for this paper, and this research, becomes: where might we glimpse the kinds of linguistic 're-mainders' he points towards, with their potential for revolution/redefinition, within the digital context? If objects of thought, are always more than their concepts (as apprehended through language); if they stubbornly refuse to be subsumed under such crude categories, then we might want to consider the many spaces and places within the 'digital,' where experience bleeds beyond the boundaries of the language used to frame or contain it. For example, the metaphors used to speak of intangible realities, such as 'Cloud' computing, arguably show the limits of language in matching either concept, or experience in digital contexts (later this metaphor will be explored as a version of the 'monstrous sublime'). However, where Adorno is speaking about the 'preponderance of the object' as something that breaks through the shell of the concept, what could be more immaterial, or non-objective than the digital? Leaving us to consider how we might use Adorno's ideas in this environment. I am indebted to Dr. Mark Walker for reminding me that when Adorno says, "[...] objects do not go into their concepts without leaving a re-mainder' what *concept[s]* are we talking about?[...]" Do concepts themselves change in the digital reality, and if so, how does language follow and explore this expanded notion of the concept?

Hegel thought that any kind of stable knowledge is an illusion. William Wallace translates his ideas in this way:

There is, in fact, a logical flux, a passing of contents tracelessly into one another, which is even more ineluctable and ultimate than the sensible flux from which it is so easy to retreat by an effort of abstraction. This logical passage makes it impossible to achieve the clearness, distinctness, and fixity which the Understanding desiderates, except for a limited range or span.[4]

In Hegel's view, thought cannot even rely upon the 'objects' of thought to stay fixed, still, closed, in order that it can perform its operations. There is always (despite our best efforts to contain it), movement, contingency, and slippage between the concepts, terms, and objects, which we apply our thought to; perhaps more so in an immaterial, digital space of infinite dimensions which operates in a state of flux and impermanence.

LANGUAGE AND POWER

The Situationist International's, texts on language and power, highlight the historical problem of language:

The problem of language is at the heart of all the struggles between the forces striving to abolish the present alienation and those striving to maintain it. […] We live within language as within polluted air. [5]

In 1963 and 1966 respectively, The Situationist International and Mustapha Khayati published two articles on language and power within the magazine/journal *Internationale Situationniste*. The first, entitled *All the King's Men* offers a stark reminder of the ways in which language, in the grasp of authoritarian forces, does damage to the authenticity of human experience, by always designating something 'other,' in the servicing of capitalist ideology: "Under the control of power, language always designates something other than authentic experience." [5] The second essay, *Captive Words: Preface to a Situationist Dictionary*, goes further, in claiming that, in the contemporary context, thought is in danger of becoming subordinate to mathematical rigor, stripped of its insubordinate, poetic potential via the 'instrument' (and instrumental use) of language. Both texts reiterate the Situationist theme of resistance to such power moves by proposing a language, liberated from its role as information, and which recognizes and harnesses the fact that: "[Words] are not completely automated: unfortunately for the theoreticians of information, [they] are not in themselves 'informationist'; they contain forces that can upset the most careful calculations." [5] Johanna Drucker returns to this point, when she says: "In every generation, some version of this question has been posed: If it were possible to understand the logic of human thought, would there be a perfect representation of it in some unambiguous, diagrammatic symbol set of entities and dynamic relations among them?"

Acutely aware of the nuances of language, including being opposed to any use of the ideologically-infused suffix 'ism,' frequently attached to their name, the Situationists both recommended and enacted an aesthetic and political détournement of language, with a view to reversing the power relations implicit in its various forms. The contemporary question that leads on from their work, is not whether complexities of power and language still reverberate within digital, contexts (clearly they do), but to ask whether the terms of engagement around those power dynamics have changed? Do we need new forms of détournement for these new times?

The Situationists said: "News is the Poetry of power." During the recent riots in London, much use was made of the word 'criminality' within the media accounts of the events. This word, reflecting a historical notion of a criminal class, was used as propaganda for a right-wing agenda. Language brands and proliferates spontaneously within re-tweets and news articles. The language game is the same, but the extent and speed of its pervasive reach is infinitely greater than the Situationists could have imagined.

LANGUAGE AND SUBJECTIVITY

Foucault, in *The Thought from Outside*, [6] argued that language is empty form. We fill it with subjectivity, but it pre-exists us, as a series of generic, non-particular entities. This is, perhaps, hard to think since we are always 'within' language, as we consider it. He says that the 'I' becomes our identity, but one born of an empty pronoun which lies in wait for a subject to utter it. We take over and bring alive the empty forms of language, with our subjectivity, but all language precedes *us*.

Only a determinate subject can animate the 'I.' We speak, we blog, we confess, we startle, we network, we dis/connect, through a language, which waits to be directed to a content, towards a goal. As Foucault reminds us, language, in itself, has an existence that is prior to its directedness; prior to its role in communication. It lies in wait, for a subject to inhabit it, and this strikes at the heart of simplistic notions of identity. The primary 'I' of language is impersonal, arbitrary, indifferent. The American Journalist, A. J. Leibling's statement that:"Freedom of the press belongs to those who own one" has been reconfigured and infinitely extended, to the limits of that concept, and beyond; transgressing a previous boundary, to an 'extreme.'

On September 8th, 2011, an article appeared in the online Telegraph, [7] outlining an experiment in which two science students had set up a randomized conversation between a pair of Chatbots, or online avatars/robots. Normally programmed to converse with a human being, the experiment involved them conversing with one another, during which the discussion quickly turned to the existence/or not, of God. What became compelling was observing where the breakpoints came in that staggered, awkward exchange; how the logic quickly broke down, and the nuances and subtleties of conversational form were lost; how inhuman it was, without being able to explain exactly why. These synthetic voices lack the timbre and richness of the human voice: their timing is fractionally, but significantly out of sync; lacking a human agent to recognize that subtlety.

It is a reminder that so much of communication is in the gaps, the spaces, the interstices, in the non-informational, non-informational attributes of language. Expression in language is the unmediated dimension of language: its non-representational, libidinal form (its excess). Language is much more than simple point-for-point communication.

When the Situationist International, in 1963, wrote: "Under the control of power, language always designates something other than authentic experience," [8] Bell Labs were automating the human voice, forcing a new space to open up between writing and speech, in the poetry of code; one as fundamentally detached from authentic experience as it is possible to be. This new relation between language and experience, between the subject and language, has only just begun to be understood.

Tone, timing, emphasis and modulation: these are all tiny, but essential pointers to the 'human' in language, where tone of voice, pacing, and emphasis is everything. We can tell an entire story with the nuances and inflections of our speech, and with the coded spaces between elements; we can convey disinterest, annoyance, empathy, control. How can coded language simulate these types of intramundane, to use Adorno's term for the significance of minutiae, details of our interactions? They require a sensitive and attuned human agent, to be constantly reading for signals, and a feedback system to be in place, which allows for the subtle interplay between signs and responses, space for error and adjustment; and the ability to inhabit multiple timings. Understanding is found in the far-from-seamless flow of such interactions, it's not a question of communication, but of 'listening' and 'hearing' differently; and of a

heightened sensitivity to the most miniscule deviations. What happens to these intramundane nuances of language in the digital space, and especially within synthetic speech and artificial language?

LANGUAGE AND THE SUBLIME

Adorno, in *Aesthetic Theory* remarked: "The feeling of the sublime [for Kant] is as a trembling between nature and freedom." [9] Lyotard has talked about the 'Sublime' as that which invokes the unpresentable, keeping open that which would otherwise be foreclosed by information technologies and by commodification. [10] For Adorno, Benjamin and Lyotard, concepts do not account for particularities. Whereas, the sublime recognizes the tension between reason and the imagination; between what can be understood, and what can be experienced. This form of difference involves the mind driving towards the limits of its abilities, toward the edge of conceptuality.

Kant, in *The Critique of Judgment*, makes reference to the 'prodigious' or 'monstrous' as being at, or exceeding the limit of, the sublime as a pure (immanent) magnitude. "An object is monstrous if by its magnitude it nullifies the purpose that constitutes its concept." [11] In this sense, the monstrous can be seen to aggressively exceed and consume its own concept; courting self-destruction. This form of the sublime violates the commonality of judgments by exceeding our powers of apprehension. Cloud computing is a form of the sublime (monstrous) aesthetic, which exceeds the concept: libidinal, erotic, unrepresentable. It is immaterial and non-comprehensible in its potential infinitude. Clouds are (arguably), beyond representation; they are indescribable, limitless, exceeding their own concept. What could be more sublime than clouds? What could be more immaterial than the digital?

LANGUAGE AS CONSTELLATION

'Constellation' is Walter Benjamin's term for the method of relating ideas in a montage of fragmentary, disjunctive, often temporally unrelated configurations, which nonetheless produce meaning by allowing unseen correspondences to emerge, instantaneously.In *The Origin of German Tragic Drama*, Benjamin explains the constellation as the place where:

[I]deas are not represented in themselves, but solely and exclusively in an arrangement of concrete elements in the concept: as the configuration of these elements… Ideas are to objects as constellations are to stars. [12]

Adorno's understanding of constellation, which he borrowed from Benjamin, has been explained by Martin Jay as: "a juxtaposed rather than integrated cluster of changing elements that resist reduction to a common denominator, essential core, or generative first principle." [13]

For Adorno, concepts (metal constructs, or ideas) are how identity thinking operates. In conceptual thinking, which wants to make a simple or generic classification of something thought, objects of knowledge are 'blocked' by such thought, from achieving their fullness. As part of this 'classifying procedure,' concepts profoundly prohibit knowledge of the object, and strip away what Adorno would term the intramundane: the particularities, or singularities; what makes an object what it is, but not in an essentialist sense. Conceptual thinking traps us into never seeing what lies beyond our concepts, in turn excluding the truth of things, and this is a major problem for thought, and a sticking point in terms of languages' ability to provide access to truth.

His answer to this problem is that concepts should 'enter into a constellation [which] illuminates the specific side of the object.' Concepts block, while constellations illuminate; concepts limit, while constellations expand and proliferate. Concepts are uncreative, while constellations are creative, and constellations are process-driven, rather than limited by outcomes, or defined by pre-existing categories. The concept by itself, cannot *but*formalize, exclude (difference), freeze (in static time), and identify. However, all that needs to happen is that constellations are allowed to explode the myth of identity thinking; such groupings of thought as are provided by the constellation cause identity thinking to evaporate. Single concepts are displaced by combinations of multiple concepts, such that subjective thought replaces abstract identity. The online, digital space, wherein language is constantly in a relationship of constellation-to-constellation, may be the ideal environment in which to recognize the power of the constellation to explode identity thinking, and its limited conceptual apparatus for apprehending the richness and multiplicity of the 'out there.'

COLLATERAL DAMAGE?

In conclusion, the question I wish to pose in this paper is simply this: if we are collateral damage to the continual influence (some might say 'tyranny') of language, how do we resist and rethink this, in the new information environments and playgrounds we inhabit? Moreover, if the persistent taboo which haunts language is making any attempt to stand outside it, in order to assess its influence, how do we break out of this double-bind? This transhistorical taboo consists of talking about language from within language. Arguably, there is no 'view from nowhere' that can allow us to speak about the ways in which language forms our experience, and our understanding, without using language. Even the most radical excavators of language (including Lyotard/Derrida/Nietzsche) have embarked upon this exploration from within the logic of the linear text/book, and the 'laws' of written/visual language.

How might we philosophize differently about language in a digital space? Perhaps Deleuze points to some possibilities. As John Rajchman explains, for Deleuze:

[P]hilosophy is not theory; it is an art of plunging into this peculiar zone of 'the unthought,' that destabilizes clichés and ready-made ideas, in which both art and thought come alive and discover their resonances with one another. [14]

We need mutually cooperative works of art and theory which consciously interrogate new forms of language in digital contexts, and ask searching philosophical questions, since in the end, these are ethical, not just aesthetic concerns.

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SHIRIN NESHAT'S WOMEN OF ALLAH: PHOTOGRAPHY AS THE LANGUAGE OF THE UNSPEAKABLE

Federica Caporaso

In this paper I'm going to analyze Shirin Neshat's photographic series *Women of Allah*, a work started by the artist when she came back to Iran after she had spent twelve years abroad, to find her country completely changed by the Islamic revolution of 1979. Through Neshat's work, I will try to explore the condition of estrangement of women in exile by analyzing the main themes the artist deals with in *Women of Allah* – that is the body, the veil and the written text – and I'll conclude with a very brief personal consideration on photography.

In this paper I'm going to analyze Shirin Neshat's photographic series *Women of Allah*, a work started by the artist when she came back to Iran after she had spent twelve years abroad, to find her country completely changed by the Islamic revolution of 1979. Through Neshat's work, I will try to explore the condition of estrangement of women in exile by analyzing the main themes the artist deals with in *Women of Allah* – that is the body, the veil and the written text – and I'll conclude with a very brief personal consideration on photography.

The Body

Shirin Neshat's *Women of Allah* photographic series seem to echo (obviously unintentionally) Helen Cixous's essay *The Laugh of Medusa*, which dates back to the late 1970s but is still absolutely relevant. Cixous writes:

Woman must write herself: must write about women and bring women to writing, from which they have been driven away as violently as from their bodies – for the same reason, by the same law, with the same fatal goal. [1]

Although there are thousands of differences between the time and the cultural environment in which Hélène Cixous wrote her essay and that in which Shirin Neshat created*Women of Allah*, they share a common ground. They both deal with 'writing' and the female body, they both denounce the expropriation operated on women by their societies; the fact that they've been deprived of their own bodies and their own voices (Cixous talks about a theft) [2] and, as it seems by looking at Neshat's women, their firm will of defending what belongs to them (the weapons can be symbols of defense, in addition to being symbols of violence and submission). For both Cixous and Neshat, writing seems to be the most important step towards freedom.

As Neshat and Cixous demonstrate, the female body is a crucial theme for feminist discourse.

Sidonie Smith explains it in such an eloquent way when, in her work *Subjectivity, Identity and the Body*, she (like other feminists) speaks about 'embodiment.' [3] A woman is embodied when she accomplishes all the duties society assigns to her, which means to be a mother and to be devoted to domestic life.

This is such an effective expression because it stresses on the fact that society strongly reflects on women's bodies, not only morally, but also physically. Neshat's choice to write directly on women's bodies, to show and hide their shapes at the same time, makes me think about how a woman's body can be modified by a society's rules, and at the same time how it can be turned into a means of subversion.

The Veil

All the women portrayed in the *Women of Allah* series wear a veil (usually black, but also white in some photographs). Neshat, in her interview with Scott MacDonald, describes the veil as: "[...] extremely controversial, which have been considered both a symbol of repression and a symbol of liberation – resistance against the Western influence." [4]

The strong feelings Neshat's works convey make me think about Edward Said's essay *Reflections on Exile*, especially where he affirms that "exile is a jealous state." [5] Neshat's veils that completely hide women's bodies, and the weapons her *Women of Allah* hold, seem to be symbols of defense of Neshat's culture and heritage. She is 'jealous' of her culture, which has been stolen both by the Islamic revolution and by Western culture, with its mutilating interpretations of the Middle East. Furthermore, as far as her personal experience is concerned, part of her heritage has been stolen by twelve years far away from home.

Moreover, Julia Kristeva talks about the indifference and incomprehension a foreigner has to face, by stressing on how hard it is for the 'others' to penetrate his innermost feelings. [6] The 'others' can't understand that corner in the foreigner's soul, where memories are hidden, hidden with care and jealousy (or with anger sometimes), that corner in which the mother-tongue lays buried, [7] in which memories and dreams swim together, ending up being the same thing.

Kristeva describes her relation with her mother tongue by using these powerful words:

I have not forgotten my mother tongue. It comes back to me, – with more and more difficulty, I admit – in dreams. Or when I hear my mother talking: then, after twenty-four hours' immersion in that now distant sea, I find I can swim in it quite well. [8]

There is an unreachable place in the exiled soul, which can be both a source of solitude and of pride, a sort of loophole from which one can look outwards without being seen, penetrated, understood, with an ancestral awareness that empowers the gaze.

That is why I like to compare the exiled gaze to those peculiar windows called 'jealousies.'

Thanks to this kind of window, you can see outwards without being seen from the outside. You're invisible, but you can observe the others: invisible like any outsider in a society, but therefore able to look at the other in such a singular way they will never experiment.

Jealousy windows make me think about that 'double vision' every 'hyphened identity' is endowed with, that ability of observing the world both from the perspective of 'others' and of himself / herself: to learn the gaze of the other, to think in two languages, to be drenched into two cultures.

This concept is expressed with such an eloquence and relevance by William E. B. Du Bois; in this famous quotation taken from *The Soul of Black Folk* he represents the distance between himself and the world that surrounded him by using the metaphor of the veil:

Then it dawned upon me with a certain suddenness that I was different from the others; or like, mayhap, in heart and life and longing, but shut out from their world by a vast veil. [9]

In some photographs, Neshat's veils seem to defend women from the world and from society, to preserve a culture threatened by the West; that seems to crush on a black veil whenever it tries to penetrate and understand the Middle East. It is the symbol of a distance, of a defense, and also of a double vision that makes Iranian women aware of what they want to conquer (emancipation) but without losing what is behind (and in) that veil, their culture and their heritage.

The Written Text

All the women portrayed in *Women of Allah* are covered with calligraphy in Farsi, added by Shirin Neshat directly on the photographs.

When Scott MacDonald asked Neshat why she had chosen to write in Farsi, she answered that, since she wasn't famous at the time, she didn't think about the audience, but she did the photographs for herself. [10] Moreover, when MacDonald asked her whether or not Iranians could understand those texts, she replied:

Yes, of course. Iranians not only could read and understand the meaning of the poetry but are also very familiar with the history and place of the writers in relation to Iranian society – something that would be impossible to translate to Westerners. [11]

The problem of language and translation is crucial to exiled people (or simply to foreigners), and obviously, even though one can be a master in speaking the 'other(s')' language, there are some things that can never be translated and that will represent a frontier forever (it can be surpassed, one can pass from one side to the other but can never erase it).

In her essay *The Other Language or the Condition of Being Alive'* Kristeva says:

Immediately, but also fundamentally, the foreigner differs from someone who is not, because he speaks another language. Looked at more closely, this fact is less trivial than it appears; it reveals an extravagant destiny: a tragedy as much as a choice. Tragedy, because the human being is a speaking being, and he naturally speaks the language of his group, the national language. Changing languages is tantamount to losing something natural, betraying one's mother tongue or, at very least, translating it. A foreigner is, in essence, a translator. He may reach a point where he blends in perfectly with his host language, or only partially. In most cases, however, he is regarded as a foreign precisely because his translation, however perfect it may be, betrays a melody or a mentality that is not entirely in tune with the identity of the host. [12]

Shirin Neshat proves to be deeply aware of frontiers, of those existing between languages, but also between the East and the West, between Women and Men. Her work very often represents a division between different 'universes' which cannot be surmounted (for example the barrier between men and

women in *Women without Men*). In an interview with John LeKay she affirms: "I see everything in the form of duality – paradoxical - in the inevitable cycle of life/death, good/evil, beauty/violence." [13]

Sometimes, as in the case of those language frontiers, there is no chance to pull them down. The veil, the guns, the writings in Farsi are there to defend and to be defended against foreign invasion. Obviously, the West can (and must) try to have a look on the other side of the frontier, try to understand and never judge what it finds, but there is no hope to pull down the wall, and any kind of invasion will be punished.

When I think of *Women of Allah*, I am not surprised by the fact that Neshat used her mother tongue instead of English. After twelve years far away from home, to write all over her photographs (and, in a certain way, all over herself) the letters, which are so familiar to her, were a natural reconciliation. Moreover, it would have been useless to translate those poems. A Westerner wouldn't have understood: he/she would lack the cultural background.

Why Photography

When dealing with exile, with feelings estrangement and pain, I am always attracted to those artists who use photography to convey their feelings. Obviously, to express the unspeakable, it is easier to use images, as in Italo Calvino's *The Castle of Crossed Destinies*. [14] In the book, the main characters, after many painful adventures, bump into a castle and enter the building in order to find shelter. Since they are overwhelmed by the feelings of pain deriving from their tough experiences, they find themselves speechless. They have no words and choose to tell their stories by using images (tarot cards) instead of speaking.

In the case of photography, the result can be even more powerful. To take a photograph means to keep something that was once there and 'alive' and to capture it forever in the realm of stillness, from which can arise a feeling not that different from what the romantics called 'the sublime.' Photography is something that belongs to ghosts [15] and to mystery, as Susan Sontag writes: "Photographs are perhaps the most mysterious of all the objects that make up and thicken the environment we recognize as modern." [16]

I think I can compare the effect photography can have on the spectators to that of masks. Masks are face-shaped objects deprived of what gives life to a face – the eyes, and the movement: that is why they are sometimes disturbing. They have the shape of something supposed to be alive, but are without 'life,' like zombies.

In my opinion, a photograph can be as impressive as masks and sometimes even disturbing: neither alive nor dead, the image depicted in a photograph contains itself the essence of the inexpressible, that capacity of awakening feelings of astonishment and anxiety able to arrive straight to the heart of the spectator

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SIMULATION BEYOND PERSPECTIVE. THE DISCOURSE OF HOLOGRAPHY AS A TOOL FOR IMAGERY, ART, MEDIA STUDIES AND SCIENCE

PIER LUIGI CAPUCCI

Holography suggests a visual universe in a culture where the visual simulation is the most effective communication system, and it alows us to reflect about a more comprehensive definition of "image". Holograms could be more and more present in the communication systems, in a delicate balance between presence and absence, immediacy and remoteness, materiality and immateriality, matter and energy. However, they will require designing the right applications.
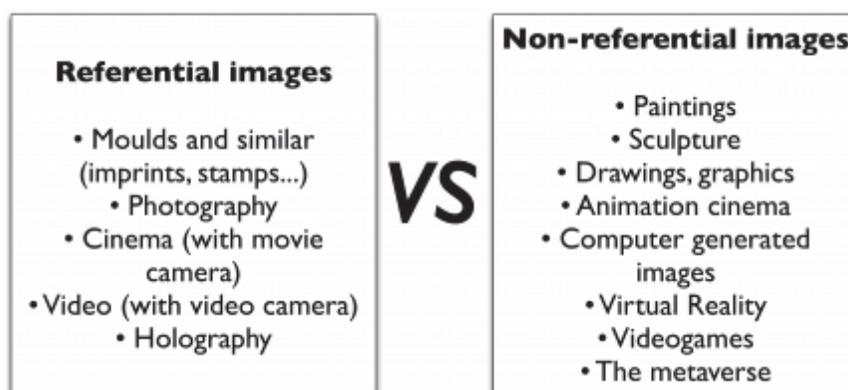
The two families of the images' realm: referential and non-referential images. A distinction based on how the images are obtained

A HISTORICAL FOREWORD

In 2010 the 50th anniversary of the L.A.S.E.R. invention was celebrated, while in 2011 is the 40th anniversary of the Nobel Prize awarded to Dennis Gabor, [1] the Hungarian scientist who invented holography. In 1947 Gabor was working in the microscopy realm, in order to make a light-made three-dimensional replica of a specimen that could substitute the original one, allowing the scientists to exchange it without any problems of degradation. Since the XIX Century the theories about the physics of light, and in particular on the interference of light waves, were achieved. However, unfortunately in 1947, no light source able to generate a monochromatic and coherent light existed, and Gabor, after repeatedly filtering the light of a mercury-vapour lamp, could only obtain a one millimetre square hologram. [2] Therefore, the holography-related studies and applications went into sleep for about 14 years, until the invention of the L.A.S.E.R. (Light Amplification by Stimulated Emission of Radiation).

The first functioning L.A.S.E.R. was operated in 1960 by Theodore H. Mainman in the USA. The L.A.S.E.R. can generate the highly monochromatic and coherent light for creating holograms, and in 1962 Emmeth Leith and Juris Upatnieks at the Michigan University in the USA made a transmission laser-viewable hologram, while Yuri Nikolarcvitch Denisyuk in the USSR created a reflection hologram viewable in white light. From this moment onward, visual holography exits the labs, and with the improvement of the re-

lated techniques and of the photosensitive supports, it can be used in many fields: from displays to pub-licity, from publishing to theatre, from art to security, from portraits to museums… Some early limita-tions in the original holographic process – for instance in the chromatic field, since the laser light has one colour and consequently generates monochromatic images – have been addressed. Since the early '80s, scientists and researchers have been experimenting on the holographic cinema and TV, [3] which in a few years will likely lead the holographic images to enter into our mass visual panorama. However, maybe this diffusion process will not be so plain because the holograms' peculiarities hardly fit into the ground where the everyday pervasive flat imagery is based on, and they challenge the way we make, use and enjoy the images.

THE PECULIARITIES OF VISUAL HOLOGRAPHY

Holography should not be confused with the so-called 3D techniques which are commonly used in the movies that are based on the stereoscopic recording and viewing processes: these techniques simulate the binocular vision and, unlike in the holographic process, they do not record and show the tridimen-sionality of the "real" space – which is a very complex issue – but only its depth. Moreover, holography should neither be confused with the pseudo-holographic applications that are called "holographic" be-cause they involve 3D images, but indeed they are made with techniques that are not holography-based. The holographic images are light-based but with relevant differences from the other light-based images. A light wave is defined by two values: the amplitude (information about the intensity) and the phase (information about the periodicity). The images generated by the light's recording (photography, cinema, video) are commonly produced, reproduced and transmitted by the media using only the wave's amplitude (more precisely: the distribution of its square). In fact, since no material is able to record the phase in an absolute way, this information is lost, although it pertains the spatial dimension of an object. By means of holography, according to the physical principle of the interference of two co-herent waves, it is possible to record the phase relatively to a reference wave with known phase distrib-ution, in a process which freezes in the space the wave reflected by an object, that encoded in a static interference pattern can be recorded on a photosensitive plate. The holographic process records the en-counter between the object beam (which is reflected from the object and, therefore, contains informa-tion about the object's surface and volume) and the reference beam (which only contains information about itself). It is indeed a very delicate process, with a lightwave-size space tolerance. When activated, this encoding (the interference pattern) can restore a replica of the original wavefront reflected from the object, so moving ones viewpoint in the wavefield, we can again see the object from different an-gles, with the sensation of its three-dimensional and concrete nature. [4] Holography activates a sensor-ial synergy between the sight and the touch, so that the real 3D holographic images, with total parallax, suggest the materiality of that space, of that object. The sense of touch, which is deceived, becomes the sense able to discern materiality from immateriality, physical reality from visual simulation (and this ex-plains why holography is so interesting for the military realm).

Although it is possible to digitally generate holograms by means of computers, [5] holograms are primar-ily analog referential images. In the picture with this paper, the images' realm has been classified in two families, based on how the images are made and not on what they represent. They are 'referential im-ages' and 'non-referential images'. In the first category, the images can only be obtained in the pres-ence of the referent (from the Latin *res ferens*, which means "that carries the thing"), namely of what is represented. In this category the presence of the subject, object or phenomenon during the image mak-ing process is mandatory: without this 'being there', in front of the camera objective or the photosensi-tive plate, there is no image. Recalling Roland Barthes, in front of a photo we can never deny that the

represented subject, object or phenomenon 'has been there', for some occurrence, in some time of its existence, in front of the photosensitive plate. [6] The image is generated by that presence (that 'being there') during the image making process, it is some sort of emanating made by the light action and the chemicals and/or the physics. On the other hand, in the 'non-referential' images that co-presence is simply neither mandatory nor relevant in the image process making.

Holography can create an accurate visual simulation, with total parallax: a replica of the real object, made of light which has the real object's visual properties but is immaterial, intangible. Holographic images are volumetric and can exist in a real and measurable space. While all the other imaging techniques that simulate reality are based on the Renaissance perspective, holography is not. The Renaissance perspective can represent the three-dimensional physical space onto a bi-dimensional one. Starting at least from the Renaissance, the thrust for reproducing the way we perceive space has played a key role in western culture. Although the perspective was invented in the third decade of the XV century – the work of Filippo Brunelleschi and the treatise *De pictura* by Leon Battista Alberti [7] – we are still immersed in (and influenced by) this way of representing and seeing the world. In fact, the perspective was inherited by photography, cinema, video, computer photorealistic images, virtual reality, 3D videogames, the metaverse: we live in a perspective-based culture. However, although the perspective is presented as an "objective" visualization technique, its objectivity is theoretically and technically based on the "point of view", that is on the most subjective and personal element. Moreover, moving away from that viewpoint decided by the image-maker means loosing information. Hence, we could affirm that the images performed by most of the modern and contemporary visual communication media are suited to a static and spatially privileged viewing position and to a substantially passive attitude of the viewer.

Holography gives more freedom to the observer: in front of a hologram we can choose the viewpoint and our spatial position, we can successfully change our own visual perspective, such as in front of a real, material, object and scene. Unlike the perspective-based images, moving in front of a hologram we acquire, instead of loosing, information, and this activity on the viewer's side can never be eliminated.

HOLOGRAPHY AND THE MEDIASCAPE

Holography stands apart from the media realm, it represents an exception that in part explains the difficulties of this technique to emerge and integrate into the mediascape, where all the other visual media simulate through the perspective using the same, although simplified, rules of the Renaissance perspective.

The media can produce, reproduce and transmit bi-dimensional images on flat supports. While in the holograms, the shape of the image and the shape of the support are different (in most holograms bi-dimensional supports display three-dimensional images), the usual images are morphostructurally dependent on the support: they have the same shape of the support. This allows an easy convertibility and circulation of the images among different media platforms. For instance, an analog photographic image can be digitized and transferred to a computer screen, to a movie and a TV program, it can be printed on paper on posters and journals, without any fundamental loss. Conversely, taking a photo of a hologram means flattening it, and so eliminating its peculiarity. Presently holograms cannot be translated into the language of the other media unless erasing their uniqueness, they can only be displayed through their direct exposition, they cannot be remediated. [8] The current media system have a high coherence and the images that it performs share similar morphostructural rules, so they can be easily transferred from

one medium to another without any fundamental loss of information: bi-dimensionality and image-support coincidence appear to be at the basis of this high level of compatibility, coherence and convertibility.

The mismatches between the holograms and the current mediascape are also evident in the fields of cinema and television. As said above, since 1983, there have been experiments in projecting holographic dynamic images and transmitting them in remote. Common cinema and television images are based on the perspective, and the spectator should be watching them from a precise viewpoint or area, which is situated on the perpendicular axe of the image at a distance from the screen which is a function of the image area (indeed we spontaneously choose this position in a cinema hall). The filmmaker chooses the perspective of the scene: we see the scene through his/her eyes, from the viewpoint he/she wants us to watch it from. He/she decides the frame from his/her personal point of view, which he/she proposes and then the cinema and TV language imposes it on the viewer.

As far as we know of the future holographic cinema and television, the classical figures of filmmaker and spectator could undergo a great transformation. The spectator could look at the image moving around it as if it were a sculpture, or he/she could be able to move his/her head to observe a background partially hidden by a close-up face, or an actor's profile: a totally different spectator from the passive one of the usual bi-dimensional narration. The filmmaker, whose narrative art's centrality would break up, couldemploy new exciting expressive opportunities to offer the spectator more topics, viewpoints and information to enjoy. The few spectators of the first 47-second monochromatic holographic movie, made in 1976 by the Russian scientist Victor Komar, tell that they could see a young woman holding a bouquet of flowers. At a certain point, she went out of the cylindrical screen and moved around in their space, and they could move around her and see her from different viewpoints. [9] Like in the Elizabethan Theatre, the holographic cinema halls will not require the chairs for a frontal passive view because people will be able to choose the perspective they are interested in.

With the holographic cinema and television there are no more three dimensions (two spatial and one temporal) but four (three spatial and one temporal). Time is the physics quantity that is responsible for the image motion and metamorphosis. In the common visual media, this transformation takes place on a bi-dimensional space, the support of the image. This means that the human visual system is allowed an easy focalization which remains roughly steady in time, only needing simple and small adjustments (in my opinion one of the reasons in the failure of the 3D cinema in the second half of the Fifties depends on having disregarded these requirements, and in fact, today's 3D movies are not so invasive on the space of the viewer). Therefore, for the visual system it is very comfortable following quick camera movements, flashing running shots, and rapid cuttings. Moreover, because of their inner structure, the camera optics can resolve only some parts of the image, hence acting as information limiters, and furthermore the filmmakers can use them as a system for focusing the viewer's attention. In fact, resolving only some parts of the image implicitly means suggesting to the visual system to discharge the unresolved information, limiting the amount of the information to be taken into account. For these and other reasons, commercial spots, music video clips and action films can reach the human physiological limit in the perception of rapid image changes. The universe of the moving flat images that we are usually staring onto ones flat screens is a metamorphic calembour in constant, discontinuous and rapid change.

Conversely, a look at the real world through a window involves a process which is much more complex. Like in a hologram, there are no unresolved parts of that panorama, and since it does not lie on a flat screen, our visual system must focus many parts of it at different distances in order to comprehend the

image. Although the fast visual system adaptability, this adjustment activity requires time, and it should be noted that this example does not involve any dynamic situations, which would have greatly complicated the process. If we only consider these arguments, we can say that the fast rhythm of the bi-dimensional movies if applied to the holographic cinema and television would simply be too aggressive for the human visual system. The future holographic dynamic images will certainly be performed, but not according to the languages of the current communication forms.

Therefore, both in the static and in the dynamic fields there are many basic incompatibilities between holography and the current media platforms. These mismatches are not only technical and technological, but pertain the way we produce, use and enjoy the mediated communication: they involve the global mediascape consistency. It follows that holograms require new displays, new visual media, and new genres of communication, even if they hybridize with the existing media.

Holography suggests a new visual universe within a culture where the visual simulation is the most effective communication system; and it let us reflect about the need for a more comprehensive definition of "image". We can believe that future images will also be holographic and that we shall communicate more and more through them, in a delicate balance between presence and absence, immediacy and remoteness, present and past, materiality and immateriality, matter and energy. However, the volumetric images require designing the right applications. Holograms have only been around for fifty years, and they are so promising. Art, science and imagination are welcome!

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LUDIC STRATEGIES IN PUBLIC ENVIRONMENTS

Moisés Mañas Carbonell & María José Martínez de Pisón Ramón

Starting with a concept of environment not only as 'what is around us' but as the cultural and visual agents we interact with, it appears that situations and interactions between individuals and media content are building a new kind of citizen, a *gamified* citizen that needs strategies to cope with the curious order of public relations we call *ludocracy.*

Figure 1.Protest June 19th - 15M Valencia movement Spanish revolution.
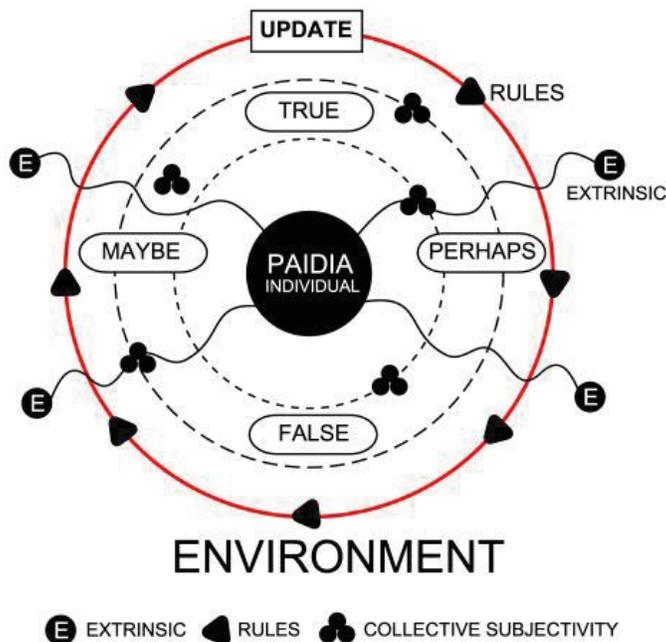
Figure 2. Ludic strategies graphic

Figure.3 Hibrid Playground, 2008, Diego Díaz, Clara Boj. Public space media interaction

1. INTRODUCTION. DESCRIPTION OF THE ELEMENTS OF THE GAME

This paper is presented as a panorama where we show the changes and issues that we have seen in the last few years in the relationship between the environment, art and game. To place ourselves in the text we need to clarify the meaning in which we will use these terms.

We understand "environment" not only as the atmosphere that surrounds us, but also on one hand as characteristics that come from the social and we consider this social environment mainly as "scenery of communication" and on the other hand, characteristics from the information technology field, defining the environment as a set of intrinsic conditions that are needed to make the system work, like the type of program, process or the characteristics of the devices that it consists of.

Let us focus on these word games that could come from these definitions, especially with: conditions, extrinsic, functionality, scenery and communication. From these terms we draw a graph, which is constantly moving due to the interactions that occur between them. The graphs shows movement from the outside to the inside passing by a variable of conditions, all with the fundamental need to work and complete a task in this communicative setting.

This visual model of the environment (Figure 2), which we suggest as functional, presents a variety of layers between the exterior and the space of the individual, in the exterior there are a set of rules that are updated from time to time. These set of rules are related to a political-social aspect and the coexistence that the scenery of communication suggests.

These rules and their variable mechanics define the game as the whole system that we call the environment. Inside this system we find outbreak of *Paidia* characterised by spontaneity, entertainment, destruction, human willingness that acts without ethical deliberation, [1] but this is only found intrinsically in the individual.

On the other hand, between the individual and the environment under rule, we find ludus "a play institutionalizes as a game." [2]

This "ludus" space maintains a relationship with the public. We understand the public from the definition of Habermas [3] as a process by which the citizens occupy the public sphere controlled by the institutional authority and they transform it into a *space* to criticise against the power.

As in the game, the process is more important than the object; the public is a continuity, a procedure which requires constant renewal.

2. THE ROLE OF THE MASS MEDIA WITHIN THE ENVIRONMENT

We saw in the definition the characteristics of the devices that make up the environment, influence in the conditions that the systems needs in order to work, we centre the role of the media in these devices.

The mechanisms of technical and conceptual devices that go beyond measuring the established communication, in the map of its developments and possibilities, the structure and ways of life in a community, its movements from physical to mental, adjusting the sense of sight and of hearing in proximity and distance, in real or delayed time, producing in only one direction as multi-linear and participative feedback.

"These lines of the mechanisms don't include or surround the system; each of them will be homogeneous on their own, (object, subject and language) but it will go in different directions forming unbalanced systems," [4] these unbalanced processes, these changeable directions can administrate and control knowledge, social practises, individual behaviours from these mechanisms (apparatus) of the state, the academy and the industry or consumption.

The impact of the media on the social fabric has been critically analysed by the Frankfurt school. With the passing of time we can see the hopeful position of Benjamin: to create an emancipation and to raise the awareness of the individual; like the perspectives of dehumanization, for the advancement of technological resources and the development of cultural industry that Horkheimer or Adorno presaged, they have drawn our present, hopeful but deceptive at the same time.

The mechanisms of control and the social machination continues to grow but the unveiling of its mechanisms, the access to its component and program codes, spread openly through the network generating a shared knowledge, a "wiki" of resources hoping that the individual will feel the desire to take action and think about the strategies that they should take to perforate these rules of the game, these mechanisms. We can act in the environment, in public spaces and know its conditions, function, setting and the means of communication.

3. STRATEGIES TO RE DEFINE THE RULES OF THE GAME

The latest social transformations which has taken place mainly in Europe have revealed some of the rules of the game, showing gaps in the social cohesion, levels of inequality or dark tunnels; the disappearing of homogenous spaces of well being have given way to new territories that the citizen has to discover.

Where to do we place ourselves on this board game?

The individual as a citizen see that "…the urban becomes what is always was: a place of desire, of permanent disequilibrium, and the seat of the dissolution of normalities and constraints, the moment of play and the unpredictable." [5]

And confronting this situation we establish new ludic strategies on different levels:

The first level of strategies include among others:

- The need to share the game: multi players. With the idea of not only sharing but creating collectively. [6]
- Take back some of the rules that are established by the system: Social networks. Using them as a witness to the actions that happen in the game.
- "That's true, Benteley agreed. After a time he said, No, there's no point in playing a rigged game. But what's your answer? What do you do when you discover the rules are fixed so you can't win?" [7]
- Generate new rules for the game. Build new media, with the intention of developing tactical strategies.
- "You do what I did: you draw up new rules and play by them. Rules by which all the players have the same odds. And the M-game doesn't give those odds. The M-game, the whole classification system, is stacked against us. So I said to myself, what sort of rules would be better?" [7]
- Play with the rules. Take the position of the joker to develop an in/out strategy in the actual system.
- Create low cost devices towards the democratization of the actual system.

The second level of ludic strategies placed:

- A new use of festivities and celebrations as a strategic switch. Profanity of sacred public spaces, [8] and public shows. [9]
- A rebalancing of the auditory and the visual. Suggesting the resonance as a relevant leader in the performative activity.
- Reusing the protocols and systems of symbols as a strategy to learn the game quickly.
- The re conquest of public transit spaces (squares and gardens) as play areas. Political game, economic and social.

And these strategies can give way to:

- Renovation of the significant potential of symbolic forms.
- Use of the route (path) as a graphic adventure.
- Reconversion of transit spaces in areas of consensus and public debate.
- Democratization of media.

- Search for Ludocracy. Reconstruction of the game from the consensus and little by little from all the players.

4. ART AS A FUNDAMENTAL STRATEGY

Art has the ability to bring together the rational and irrational containing a field as wide as the game. *Paidia* and ludus find space in art. The strategy, calculation, intuition or experience build practise that make us aware that we are playing and not just see and also interact in the "first person." [10]

For example," N55 rocket system" from the collective N55 is a low cost homemade devise made with functional and symbolic elements: the rocket is propelled with a mixture of polyethylene and laughing gas. This devise greatly increases the basic elements of protest, from seeds to texts; acting for example in one of its interventions, against Monsanto herbicide in a way very similar to how the industry operates in the air. The rocket spreads the seeds from a height of 5,200 meters. With this proposal the importance of generating new ways to intervene and use tactical strategies becomes evident.

The artistic practises that give new visualising systems can transfer stimuli to spectacular situations or small personal screens. For example*, Cell phone disco* (2006) by Ursula Lavrenčič and Auke Touwslage turns a personal device like a mobile phone into a collective ludic activity by visualising on a LED surface the electromagnetic waves that the telephones use when they are active.

On the other hand, Haruki Nishijima, in the piece *Remain in Light*, look for and capture analogical waves in urban spaces so that they can later be visualised in an exhibition space, the forms that they generate as perceived as extinct elements like what happens with the fireflies in Japan.

Against these low cost practises there are others that have a spectacular visualization system like *Body Movies* (2008), by Rafael Lozano-Hemmer, that project in public spaces, the shadows of the pedestrians in great
so that they reveal images that were previously taken in the city.

Also, *Lummo Blocks* (2010), by Lummo (Carles Guitiérrez, Mar Canet and Jordi Puig) and Javier Lloret, project a version of the Tetris game on the façade of the Medialab-Prado in Madrid in which the pedestrians can play interacting in a coordinated way to control the movement and position of the pieces.

Another piece that intervenes in the media, redesigning the normal visualization system in the news, is *News Map* (2003) by Marcos Weskamp and Dan Albritton. This case maintains a ludic relationship by means of a direct manipulation by the user themselves and under the parameter of the instantaneous news. It is relevant in this visualization what place the news occupies in these Medias and its level of relevance in the mediated society. The user has the ability to manipulate this system of visualization.

In this line of visualization, the example of *Grey in Men* (2010) by Julian Oliver and Danja Vasiliev, are highlighted in which they bridge the access point of wifi and camouflaged in the offer in public spaces (hotels, internet cafes...)

The locative games take part in a very direct way in the renovating of these ludic strategies, for example *Urban Codemakers*, (2011) by Troy Innocent, it is a game spread out on the streets of Melbourne

that through the creation of new iconic signs (ideotag) renew the language and culture through the game.

It is noteworthy to point out that, within these practises, *Hybrid Playground* (2008) by Diego Díaz and Clara Boj (Colectivo Lalalab) [Fig. 3] as an example of the re conquering of the playful urban spaces already existing in the urban space. Through mobile devices (PDA) the children not only play with the street furniture but also this furniture interacts with the video game installed in each of the children's' devises, creating a ludic experience between the physical and virtual, amplifying the classical playful spaces (playground) and reconverting it into an enlarged playful space.

These practises in the intervention of public spaces dissolve the limits of artistic space and dialogue, for example, with the behaviour of the *Skaters* as playful manipulators that find their board game in the urban spaces; or like *Parkour* (the art of moving)tracers of roads, trails, maps, territories, overcoming all the obstacles. There are no rules for the parkour and because of this it adopts a role close to *Paidia*, characterised by the spontaneity and fun while the skater assumes more the role of the joker, gambler or jester with the rules of the game.

These and other types of subversive practises that are not aggressive to urban spaces, like *street chalk message* or the *guerrilla sticker*, reflect creative ludic strategies that waver between the field of art and the urban, where the role of the players are based on the reconquering of the public space as a critical game.

5. CONCLUSIONS:

Returning to the idea of public space by Habermas, [3] we can sense this scenery of communication like a porous sphere that takes on the themes and contributions of all the players, a space in which we can make a new turn to recuperate the public debate culture, lost through its transformation in the culture of public consumption.

And resuming the idea of ludic strategy of profanity through the game Agamben, the citizen is freed from the rules of the institutional sphere, of what is sacred as he states, and he grants a new dimension of use: "to restore the game to its purely profane vocation is a political task." [8]

This environment that we propose is the correct place where we can generate communities of media producers through creative and ludic aspects. Throughout the text we have been collecting elements that shape this possible post- medial, redefining the role and extensiveness of the devises toward independent low cost systems and adopt as a tactical strategy the decision to act from the microphone without losing effective communication and producing a change of collective attitude by experiencing the game.

Its construction is feasible for the public distribution of free and open knowledge, growing outside of academic contexts under a more flexible and dynamic structure, and also by the diffusion of artistic practices that are outside the context of the art industry and establish an effective bridge to popular culture and street culture.

Have we already seen this present in the public sphere?

Perhaps more that its presence, we have seen its desire, embodied for example in the open and non-hierarchical structure of 15M with the re-adapting of symbolic forms and rules coming from other game systems (football red card=politician out of the game). Its system of communication is based on the effectiveness of the social networks, our desire would be that they were produced through independent devices as an answer to what Jose Luis Brea stated in 2000 "imagine the development of the independent devices that given their agility and presumed strategic effectiveness, will soon be able to rearrange the landscape of artistic mediations of experience." [11]

In these ludic devices, of action and communication is where we see the prints of ludocracy. Citizens' re adapting of the rules of the game step by step and under its consensus.

Faced with a reality that we elude, but where action is possible, these strategies allow us to have a greater awareness of the effects of that representation, so that by analyzingthe layers of pretense, rather than bend or fold it, we search in them points of symbolic escape from which individuals see everything an an graphic adventure because they are aware of the game.

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I WANT TO TOUCH YOU: TRANSREAL AESTHETICS IN VIRUS.CIRCUS

Micha Cárdenas & Elle Mehrmand

virus.circus follows the viral as a transversal line of inquiry that intersects with the militarization of medical authority, microscopic transnational migrations and global economic inequality. *virus.circus* is an episodic series of performances using wearable electronics, soft sensors and live audio to bridge virtual and physical spaces.

fig 1. virus.circus.breath, performed at the Museum of Contemporary Art, San Diego, 2010, photo by Ash Smith

fig 2. virus.circus.probe performed at Highways Performance Space in Santa Monica, California, 2011, photo by Frankie Martin

Due to recent viral outbreaks, protective latex barriers must be worn at all times.

Skin to skin contact may result in viral contamination.

Failure to comply will result in a minimum of 10 years in a federal penitentiary.

Touching, and illness, are prohibited by law.

The virus must be contained.

virus.circus follows the viral as a transversal line of inquiry that intersects with the militarization of medical authority, microscopic transnational migrations and global economic inequality. Consisting of an episodic series of performances using wearable electronics, soft sensors and live audio to bridge virtual and physical spaces, the performances explore queer futures of latex sexuality and DIY medicine amidst a speculative world of virus hysteria. The history of queer politics shows that the rhetoric of viruses such as HIV are used to control marginalized populations, while the response to viruses such as H1N1 reproduce these structures of power.

Transnational Inspirations

virus.circus was conceived on our flight back from the Hemispheric Institute of Performance and Politics Encuentro in Bogotá, Colombia, as we reflected on the inspiring performances we saw and the news of President Uribé's infection with H1N1. Deeply inspired by performances by La Pocha Nostra, Nao Bustamante, Tania Bruguera and Danza Contemporánea Integrada ConCuerpos, we decided to create a series of performances focused on an imagined future narrative where the virus hysteria of today and the resulting militarization of medicine in airports, hospitals and other public spaces, was even more omnipresent and legalized.

Living in the US/Mexico borderlands, living in San Diego and collaborating with artists in Tijuana, the effects of H1N1 were perhaps more apparent to us than in many other parts of the country. In April of 2009, the World Health Organization declared an outbreak of a new virus strain, Influenza A (H1N1), which raised great concern for its ability to move from pigs to humans.[1] On April 30th of 2009, the government of Mexico declared a 5 day shut down of major parts of its economy, and we watched the streets of Tijuana completely empty of people as businesses suffered. [2] By June 11th of 2009 over 10,000 cases of H1N1 were identified worldwide and the World Health Organization declared it a global pandemic.[3]

Our inspiration for virus.circus came from witnessing the intersections of the response to the virus with structural racism and control over people's movement. A notice to students sent out campus wide suggested three ways to avoid the H1N1 flu: "1. Use good personal hygiene… 2. Avoid close contact with people who are ill… 3. Avoid non-essential travel to Mexico".

[4]

The notice clearly reinforced structural racism against Mexico by choosing the ability to stay out of Mexico as one of its three main strategies for people to avoid illness, in effect making the students, staff and faculty who attend UCSD and live in Mexico invisible and secondary in efforts to maintain the health of the UCSD population. A second notice, sent only to a single research unit at UCSD said the following "A… researcher has a confirmed case of the H1N1 flu. He came into… to work on his research project yesterday, 10/14. He is now confined to his home until he fully recovers." The implication here is that employers, in this case Universities, can choose to restrict the movement of their employees based on an evaluation of their health.

The political effects of the H1N1 virus resonate with the ways that the HIV virus was associated with gay men. As the performance "Let the Record Show" by Gran Fury / ACT-UP re-performed and documented in 1987, a disturbing confluence of religion and nationalism with homophobia was prevalent in the US. With virus.circus, we sought to revisit and explore the implications of virus politics by imagining a future world in which the precautions against a disease like H1N1, spread much easier than HIV, were a part of daily life.

Erotic Politics, Erotic Affect

virus.circus asks how erotic affect can be a form of resistance to hegemonic narratives of embodiment reproduced by western medicine. Our strategy was to show that the erotic could still be a form of resistance in a world controlled by virus hysteria. As queer erotic practices have been the subject of structural oppression in modern western society, we sought to understand how the energy of erotic affect can be a source of resistance to forms of power which seek to extinguish it and also how erotic practices are shaped by the conditions of power under which they exist. To explore these possibilities, we imagined a world in which skin to skin contact is completely prohibited and, in reference to the condoms used to avoid HIV and the gloves used to avoid H1N1, latex barriers are required to be worn at all times. An initial gesture to create the scenario was to take a number of standard Center for Disease Control posters, which had become very prevalent after H1N1, and to modify them with our imagined future restrictions, including "failure to comply will result in a minimum of 10 years in a federal penitentiary", pointing to the convergence of medicine with the Prison Industrial Complex. We then distributed these posters throughout San Diego in public spaces and also displayed them throughout the Museum of Contemporary Art, San Diego, where we performed an episode of virus.circus.

Through a series of erotic experiments, *virus.circus* explores erotic forms of expression that do not involve touch, or which minimize touch, creating a deterritorialized erotics that appears unfamiliar to the viewer and allows them to imagine new narratives of erotic embodiment and new possibilities of sexuality and gender. In *virus.circus.touch*the two performers first weave throughout the audience and then face each other from across the room. We then walk towards each other slowly, focusing on the erotics of expectation, focusing on trying to arouse each other with eye contact and the way that we are walking. For this performance, an infared distance sensor was sewn into our costumes, which allowed us to move our Second Life avatars closer to each other as we walked, mirroring our physical distance. Our multiple simultaneous embodiment through our Second Life avatars is a transreal gesture that further deterritorializes our embodiment and adds dimensions of gender including transspecies, cyborg and mythological characteristics.

In *virus.circus.breath*, we focused on three types of breathing. The performance begins with rapid hysterical breathing as we attempt to bring the audience into the alternate reality by telling them, with great distress, "for your protection and the protection of others, please wear your mask" and "the virus must be contained", and handing them a medical mask commonly used to avoid H1N1. At this point we often faced concerned audience members who demanded to know why they needed to put on their mask and at times left the performance. We then proceeded to erotic breath control, in which Cárdenas wore latex gloves and slowly restricted the amount of air that Mehrmand could breathe. For this segment, we used a hand made pressure sensor constructed from neoprene, conductive thread and conductive fabric that detected the amount of pressure applied to Mehrmand's neck and changed the quality of the sound of our breathing, amplified with microphones inside of our masks

[6]

. The final part of the performance sees us lying on stage, below the projected image of our avatars having sex, doing tantric breathing to induce simultaneous energy orgasms. Here we are performing as two characters who are living within the restrictions of their society but still find ways of having erotic moments together. We imagine the fear of the rhetoric viruses as a trapping of logic that can be shaken off by the excess of orgasmic affect within the context of resistant practices creating their own new narratives of erotic encounter.

In *virus.circus.probe* we see the characters begin to resist the hegemony of western medicine and the narrative of fear of infection that is so central to it by developing their own Do-It-Yourself (DIY) Medicine and Femme Science. The authority of western medicine is coded into laws preventing acts such as practicing medicine without a license and which threaten years of imprisonment. Yet the amount of medical knowledge available to people is rapidly expanding both with the advent of websites such as Medpedia.org and with the widespread access to personal biometric technologies. The cyberfeminist collective Subrosa has pointed out in their book Yes Yes that "the rise of the University-educated male medical doctor" coincided with "the banishing of common (female and people's) knowledge gained from centuries of inquiry, experimentation, and practice, represents one of the greatest losses to the medical and scientific world in Western history".

[7]

In virus.circus we imagine two queer femmes who resist the system of knowledge known as Western Medicine, a system that their society uses to define their bodies and sexualities, by creating their own medicine.

Performing what we imagine to be Femme Science as proposed by Lisa Duggan and Kathleen McHugh

[8]

, in *virus.circus.probe* Mehrmand uses a metal instrument to test Cardenas' body, learning the contours and limits of her body, violating the hegemony of doctors as the only agents with power of knowledge of the body. Queer femme here is imagined as an affect created through embodied gestures that resist a claim that femininity is passive, and in contrast reflects an intentional construction of gender and forms of pleasure. Using conductive thread, we created a touch sensitive dress that responds to Mehrmand's various touches by changing the pitch of the bass sound emanating from the sound system. Wearing Polar Team 2 heart rate monitors allows us to display on a laptop the R-R interval values for our heart rate, a number representing the number of milliseconds between the R peak of our heart beats which can be analyzed to determine breath rate and which areas of the autonomous or parasympathetic nervous system are in use. Continuing on, Mehrmand tests Cardenas' limits by inserting the testing instrument into her anus. An accelerometer sewn into Mehrmand's glove detects the speed of each thrust, applying a proportional amount of vibration to her vagina with a strap on motor also wired to the glove. As the performance unfolds, the audience stands in a circle around the testing moment, recalling the medical amphitheater and implicating them as voyeurs in a shared intimate erotic moment of medical testing as foreplay and sex. As the scene unfolds, a graph of our heart rates is also drawn in Second Life, above our avatars looping in a sexual penetration animation.

Mixed and Alternate Reality

Wearable electronic garments allow the performers to experiment with transreal embodiment, extending their physical bodies sonically and virtually. virus.circus attempts to immerse the audience/participants in an alternate reality by creating a slippage of perception. Code switching between mixed and alternate reality, virus.circus asks how we can use reality as a medium, resonating across a number of modes including public space interventions, performances in museums and galleries, and networked performances to create augmented, alternate and mixed reality scenarios.

Conclusions

Across episodes including *virus.circus.touch*, *virus.circus.breath* and *virus.circus.probe*, New possibilities of embodied knowledge unfold through the sonification and visualization of biometric data including heart rate and R-R intervals, as well as data from an ultrasonic rangefinder bra, a pressure sensing choking collar, touch sensitive dress and a motion sensitive glove that controls a strap-on vibrator. We have developed open source hardware and software to facilitate new forms of erotic expression, deterritorializing our everyday erotic practices to make them nearly unrecognizable in order to facilitate imagining them as future narratives of resistance to the confluence of medicine and structural oppression.

Source Code

The following code is an excerpt from a patch for Second Life that reads from a local file and moves two objects in the virtual world of Second Life. We have used this code for numerous performances, including *virus.circus.touch* and drawing a heart rate graph in *virus.circus.probe*. We use Puredata as a bridge to read the data from the arduino and write that to a local file and then we use this code to read that file and move objects in Second Life. The patch applies to llappviewer.cpp in the Second Life 2.0 codebase. The complete patch can be found at http://transreal.org

```
// virus.circus patch

...

//set the UUID of the object to move

LLViewerObject *objectFound = gObjectList.findObject(LLUUID("38ee12bb-...-fa23e356e8a2"));


if (objectFound)

{

LLVector3 objectPos = objectFound->getPosition();

objectPos[2] = numFromPd;          //home z - 278.575;

objectFound->setPosition(objectPos);


LLViewerRegion* current_region = objectFound->getRegion();


if (current_region && (! gMessageSystem->isSendFull(NULL)))

{

    U32 update_type = UPD_POSITION | UPD_ROTATION | UPD_LINKED_SETS;

    U32    *type32 = (U32 *)&update_type;

    U8 type = (U8)*type32;

    U8    data[256];
```

```
    S32 offset = 0;


    gMessageSystem->newMessage("MultipleObjectUpdate");

    gMessageSystem->nextBlockFast(_PREHASH_AgentData);

    gMessageSystem->addUUIDFast(_PREHASH_AgentID, gAgent.getID());

    gMessageSystem->addUUIDFast(_PREHASH_SessionID, gAgent.getSessionID());

    gMessageSystem->nextBlockFast(_PREHASH_ObjectData);

    gMessageSystem->addU32Fast(_PREHASH_ObjectLocalID,     objectFound->getLocalID() );

    gMessageSystem->addU8Fast(_PREHASH_Type, type );


    htonmemcpy(&data[offset], &(objectFound->getPosition().mV), MVT_LLVector3, 12);

    offset += 12;

    LLQuaternion quat = objectFound->getRotation();

    LLVector3 vec = quat.packToVector3();

    htonmemcpy(&data[offset], &(vec.mV), MVT_LLQuaternion, 12);

    offset += 12;

    gMessageSystem->addBinaryDataFast(_PREHASH_Data, data, offset);

    gMessageSystem->sendReliable(current_region->getHost());
}


objectFound->setPositionAgent(objectPos);
```

References and Notes:

1. *http://news.bbc.co.uk/2/hi/americas/8016909.stm*
2. *http://news.bbc.co.uk/2/hi/europe/8028169.stm*
3. *http://www.cnn.com/2009/HEALTH/06/11/swine.flu.who/*
4. *http://adminrecords.ucsd.edu/Notices/2009/2009-4-28-3.html*
5. *http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1470625/*
6. *The pressure sensor was constructed based on documentation from Mika Satomi and Hannah Perner-Wilson, http://www.kobakant.at/DIY/?p=65*
7. *Subrosa Collective, Yes Species, p. 53, http://www.refugia.net/yes/yeschapters.html*
8. *"A Fem(me)inist Manifesto", Lisa Duggan and Kathleen McHugh, in Brazen Femme, edited by Chloe Brushwood Rose and Anna Camilleri*

(CON)FIGURATIONS OF EXILE

Silvana Carotenuto

The contribution that follows would like to be a synthesis of the (theoretical-practical) work carried out in the workshop devoted to "Exile Writing. Arts and Technologies of Women". The bibliography used in the workshop (the references to the pieces of art, in the form of novels, photography and video-art, dance performances and internet blogs) can be traced back in the proposal we offered to the participants.

Here I would try to explain the theoretical premise that brought me to reflect on the relevance of the figure of the exiled; then, in a development of this premise closer to my expertise, within gender studies or *écriture feminine*, I will try to show the interconnection between exile and women's invention and creativity – the necessity of re-writing (in a 'enlarged' notion of *écriture*, as a gesture that "can remain purely oral, vocal, and musical: rhythmic or prosodic") [1] the pains and sufferings of displacement, dislocation and diaspora, meets the capacity of female artists in a singular and exemplary manner: they narrate, envision, experiment, communicate the experience of their own and their communities' exile with an intense drive for intimacy, sharing, and survival; even more, their 'yes' to life takes the shape of a consistent innovation, of the technologies peculiar to their arts, producing renovation and transformation, linkage, fragmentation, and recombination of the languages of *teckné*.

Hospitality

'Banished'? O friar, the damned use that word in hell
(William Shakespeare, *Romeo and Juliet*)

"Any person who (...), owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable, or owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it."
(Convention Relating to the Status of Refugees", Geneva, July 28th, 1951)

A figuration is a living map, a report in continuous transformation of the self; it is not a metaphor. Being nomads, homeless, in exile, refugees, victims of war rapes in Bosnia, migrants without fixed home, clandestine migrants, it is not a metaphor…it is history tattooed on one's own body. [2]

Exile – the whole question of 'hospitality' resounds here: how to welcome the one who arrives unexpectedly, the one who flies away from the origin because of violence, expulsion, under the threat of death? What is so singular about the 'figure' of the exiled as to make it crucial for our thinking on hospitality? Hospitality should be absolute [3] – why does it connect to the singular figure of the exiled? Because, maybe it is the figure of the political par excellence, [4] maybe because s/he shares something common to human destiny – displacement, dislocation, diaspora, escape from the origin, insistent nomadism, loss and endurance. Julia Kristeva would say "we are all strangers to ourselves" [5] – the exiled

being experiences such strangeness even more, more vividly, under the strongest pressure – we might use the expression 'on the skin', if it did not keep its impression on the surface…

Women and the Arts

Much of the exile's life is taken up with compensating for disorienting loss by creating a new world to rule. It is not surprising that so many exiles seems to be novelist, chess player, political activists, and intellectuals…
(Edward Said, "Reflections on exile")

Skin/body – it is women who reach the highest percentage in the contemporary fluxes of exile. Among refugees, expatriates and the exiled, women undergo the imposed trajectories as the men away from their communities, in a double exposure – of race and gender. It would make a whole spectrum of difference; would not the hospitality due to the exiled woman be different? Would she ask for different acts of welcoming? 'Who' would welcome 'whom'? Today, are not the women on the planet questioning the places of their confinement (the home, *oikos*), of belonging (women's infinite practices of singularity) of residing – globalization, cosmopolitanism, crossing, fluidity? Women share the exile–from themselves; their 'double' exile – from themselves and from their mother tongue. They share it because they urge the work of hospitality – to their alterity, difference, hybridity, 'monstrosity', and constant metamorphosis. [6] To their 'writing' – it means here: their 'arts and 'technologies'. It can be a story, an image, a movement, dance, or internet writing; the diary, the novel, the short story; photography, video-art, digitality, blogs – there is an immense production of female oeuvre inspired by (the experience of) exile, devoted to the (impossible) testimony of its experiences, of its impossible trajectories – would this commonly mean 'being thrown into the world'? Would this 'common' mean an abstract overcoming of the difference between privileged cosmopolitan women in the western world, and their sisters expelled and scattered throughout the world? No, it is, rather, difference itself – in the signs of writing, in the frames of photography, on the screens of the installations, recorded by a digital camera or shared on the screens of computers, women are 'different' from themselves and from the others, only commonly incapable of 'staying' within the boundaries, the pages, the frames, languages, limits; and thus, necessarily – it is their strategies of survival – capable of crossing (lines of lands/lands of lines), of trespassing (geographically, culturally, linguistically, technologically), of overflowing (history, disciplines, lives), finally able to celebrate – their own hybridity, monstrosity, metamorphosis…

Paths of Exile

The film *Transit* by Bani Koushnusdi (2004) follows a group of young exiled men throughout Italy, in their escape to Paris. In France, there is a small room waiting for them – where they will wait for a pass to England. In the room, it is impossible to sleep or sing; still, on a mattress, there is a silent girl – why does she never speak? Where does she go at night, taken out by the guardian? One of the guys, left alone with her, starts asking – over the gift of an orange, with a strange music coming from the radio, the story she tells is a story of separation, literal loss, extreme and lonely survival: the girl was escaping from persecution with her sister and family; at one point, they had to cross a river – the girl crossed the water; her sister, the husband and their children were left behind! She never saw them again; this was months ago – now she despairs over their destiny. The screen remains dark, the voices are low; on the screen, however, the story writes the beginning of a friendship – maybe the girl and the boy will make it together to London …

This intense, dark and sad, wonderful and painful, film gives us the image of a specific diaspora: from Afghanistan to Europe. What about the journey away from the origin framed when it is framed by the photographer Emily Jacir, in her "Where we come from" (2003) or in "Memorial to 418 Palestinians villages that were destroyed depopulated and occupied by Israel in 1948", to tell us of the exile par excellence – so cruelly inscribed on Palestinians after the originary diaspora of the scattered Jewish people? What about the Algerian exile, if it is the wonderful work by Zineb Sedira to narrate the destiny of the 'mother tongue' for the generations-to-come: the artist's mother can speak only in Arabic, after years of permanence in France; the French – as a legacy of colonialism – spoken by her daughter; the English of her granddaughter? No origin, no sovereignty of one language [7] – exile is experienced in the multitude of languages – and if there is no communication through words, there will be love and affection through the eyes, the touch, the bond that dissipates beyond all claims to a commonality of origin. And what about "hai mish eishi" ("this is not life", 2001), a video by Alia Arasoughly who gives space to the women's everyday life contrasted with the television news from the Palestinian territories, or the docu-fiction "Who gives kisses from her lips" (2004) by Farkhoundeh Simin, dealing with a different tradition of 'marriage' – it was once up to the women to choose their husbands – in Iran… (you can watch how some young women in Naples, Italy, rewrote their own paths through exile on http://www.youtube.com/watch?v=stteSX7w1ys)

Exile-Writing

Obscure arrivals, transits and escapes – across the land of Afghanistan to Europe, between colonies and post-colonies; to give sense to the terrible conflict in Palestine; providing the details of the everyday life of women in an impossible confined life; perhaps, to let the memory of a different power of women emergence on the plane of visibility ... There are so many examples we could never be accurate here – still we could ask a different question: what would happen if we thought of exile as a territory for collaboration? If we thought of exiled women as agents of a common sharing? As the chance of the invention of new 'bonds', new collaborations, other forms of commonality, sensibility, and imagination? This could provide a line of attention across geographical boundaries, among female creations, in-between the female 'I' and the 'eyes' of women – in-between their arts and their technologies. In this case, we could gather the photographs of Newsha Tawakolian (www.neshatavakolian.com) together with the incredible images by Shirin Neshat in the series "Women of Allah"; we could compare, in their difference still resounding of the same chant, the video-art of Shirin Neshat in "Turbulent" (1998) and the retelling of Kenjii Miyazawa's *Milky Way Railroad* in "Night Passage" by Trinh T. Minh-ha (2004); [8] we could read the collaboration across the Partition of India and Pakistan between the novel *Cracking India* by Bapsi Sidhwa and its filmic re-elaboration in "Earth" by Deepa Mehta; we could read the extraordinary common work of the writer Shahrmuch Parsipur and the director Shrin Neshat around the fairy tale and the film *Women without Men*; finally, we could enjoy the aesthetic collaboration of the choreographer Isabella Rocamora with some exiled women within their shared "Horizon of Exile"(2007); we could finally reflect on what is happening in North Africa now, with the revolutions in progress, thanks to the digital tales told by the blogs of the young women who want to inform, communicate, create dialogue and the con-division of history across a whole population of migrants, expatriates, and refugees...

The Castle of Crossed Destinies (Italo Calvino)

After two thousands years of world history dominated by the sacredness of the Baby Jesus, might women be in a position to give a different coloration to the ultimate sacred, the miracle of human life: not life for itself, but life bearing meaning, for the formulation of which women are called upon to offer

their desire and their works.
(J. Kristeva, *The Feminine and the Sacred*)

This would only be 'one' line of work, the material for gathering women together and discuss, watch, think of exile, of its pains, together with their inventions. There would still be stories to tell – you can hear, watch and reflect on some of them, on their infinite paths of written and visual re-articulations their crossings of invention and creation, on the website 'Exile Writing' (http://www.melissaramos. com. au/exile_writing/index.html) – a palimpsest electronic space of the experiences of the women gathering in the Istanbul workshop, re-narrating, recreating, rewriting their sense of displacement in the city, on the page, on the screens, in the frames, according to their own 'thrown of chance'.

The crossing of reality and functionality, of creation and technological invention centres the figure of the female exiled as the locus of a necessary and urgent theoretical reflection, focusing on her artistic pro-duction as a crucial nexus of contemporary imagination – 'Exile Writing' can be taken as the collective proof of this thesis, through the narrative, visual, multimedia narration of our common displacement in Istanbul. Here I offer my own line of thought, one kind of path of reading its extreme potentiality – as if I were a character in Italo Calvino's *The Castle of Crossed Destinies*, it is my way of making sense of the cards of our common story…

Once upon a time, the inhabitants of the city of Babel had no need of translation. There and then women – marine creatures searching, veiled or unveiled, the depth of the underworld – were fluid, un-confined within any barrier of language; their space was the sea, water, the fluxes and the movements of waves. Then came (the lost) translation, the confusion of languages, the speaking in tongue – it was the vertigo from which Zoë was born, the Byzantine Empress who died in 1050, now, as a child, cradled by the curve of the world. Exposed to displacement and violence, her first question was: "How can we find peace?" Music, more music!! Indeed, her birth, her emergence from water and silence, was soon exposed to the craziness of the world – frames, inside/inside, the minaret, the prayers, men fishing, men doing their abduction – rigid shapes raising to the sky, hierarchy, conflicts, wars – was she alone in this world? It seems she is surrounded by loneliness; still there is music, a local violin playing, and a 'throne' waiting for her, a small and lonely barge (would she not resemble the Queen of Egypt, Cleopatra?) waiting to take her on. It signs the moment of her 'aporetic' responsibility: she is in the middle of movement and stillness – where could she rest in such madness? Could she dance at the beat of the violin? Can she sur-vive? In order to return to her underwater world, she urges for compassionate stories that countersign her destiny – she looks for stars ("female, enlightened celestial bodies, material or immaterial, durable or ephemeral") and for the images taken for 'wander': man and woman separated; the sea and the sky, covering her soul, a veil to hide her tears – 'writing' would be her inventing way back home, once again… Around the mermaid, there is light and magic; death can be overcome by strength, destruction can be won by rebellion. Is she looking for justice in the world? Justice would rise onto the horizon as a sign of the future, l'à-venir, messianism without messiah. Placed in-between the Devil and the Papess, blissed by the banishment of the Pharmakon*, writing would come to her/to us, from the water onto the surface – it would inscribe women's gathering around the goddess of Justice; it would feel other women's art and creativity, their thankful hands of invention – it would write their nightmares and dreams in spider webs, textiles, weaving and texting the cruelty of the world and, together, its militant witnessing: occupations of spaces of culture, birthing, improvements of common justice – fights/pride, battles! It would then fol-low the dance of the silhouette of chance, the choreography of women; it would perform the life of Zoë: life.* [9] *Would it be Theodora and her dog: a duo, two playmates who are "bound, bowing, wounded, found, hung, fallen, lumping, leading, turning" towards the invention of a new world, through the reap-pearance of music, the music of birds – with birds, there would be more poetry, more women, and more*

courage...! [10] *The ladder of writing is only indicating another 'passage', another transit, a different path, a sense of community, communality and communion for the exile of women – from them-selves* and *from their mother tongues…*

…we find: less and less poetry/less and less angels/less and less birds/less and less women/less and less courage. Jacob wakes up, he gets up. What becomes of the ladder? You have to take a rock, put it under your head, and let the dream ladder grow. It grows down – toward the depths. [11]

References and Notes:

1. Jacques Derrida, *Monolingualism of the Other, or, the Prosthesis of Origin*(Stanford: Stanford U.P., 1998), 65.
2. Rosi Braidotti, *Metamorphoseis* (Cambridge: Polity Press, 2002), 11.
3. Jacques Derrida, *Cosmopolitanism* (the opening speech for the celebration of the first congress of the refugee-cities in Europe 1996, an initiative of the Parliament of the Writers to grant hospital-ity to the writing of exiled artists), and also *Of Hospitality* (Stanford: Stanford U.P, 2000).
4. Giorgio Agamben, "Politico dell'esilio," http://isole.ecn.org/filiarmonici/agamben1998.html (ac-cessed September 2011).
5. Julie Kristeva, *Strangers to Ourselves* (New York: Columbia U.P., 1991).
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7. *Fichu*, (Paris: Galilée), 2002 by Jacques Derrida; in Italian, the first publication of the essay was bearing the title "La lingua dello straniero."
8. Trin T. Minh-ha, "Reading Miyazawa Kenji and Making 'Night Passage'," *Anglistica*, 11, 1/2, 2007.
9. This is the 'task' of crossing *zoo* (biological life) and *bios* (the life to be told, capable of being writ-ten), accorded to the women of new century comes from C. Clèment and J. Kristeva, *The Femi-nine and the Sacred* (New York: Columbia U.P., 2001) 14.
10. Helene Cixous, *Three Steps on the Ladder of Writing* (New York: Columbia U.P.,1993), 108.
11. Ibidem.

PROCEDURAL TAXONOMY: AN ANALYTICAL MODEL FOR ARTIFICIAL AESTHETICS

Miguel Carvalhais

This paper proposes an analytical model for computational aesthetic artifacts based on Espen Aarseth's work. It reflects procedural affinities that may not be found when focusing on surface structures and aesthetic analyses developed from them. The model attests to the importance of computational characteristics and of procedurality, both as conceptual groundings and as aesthetic focuses, as aesthetics pleasures in themselves.
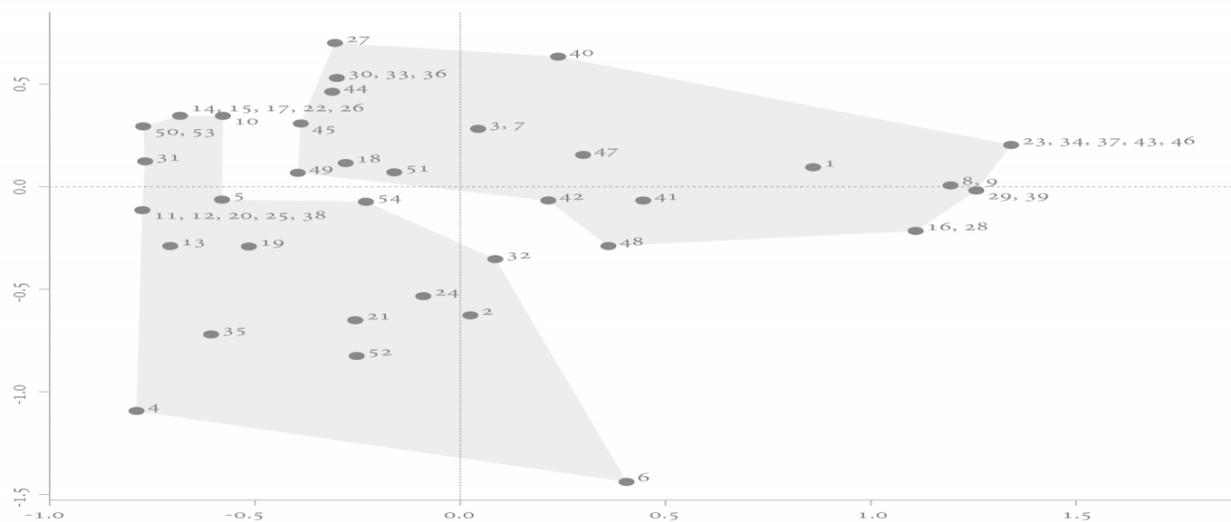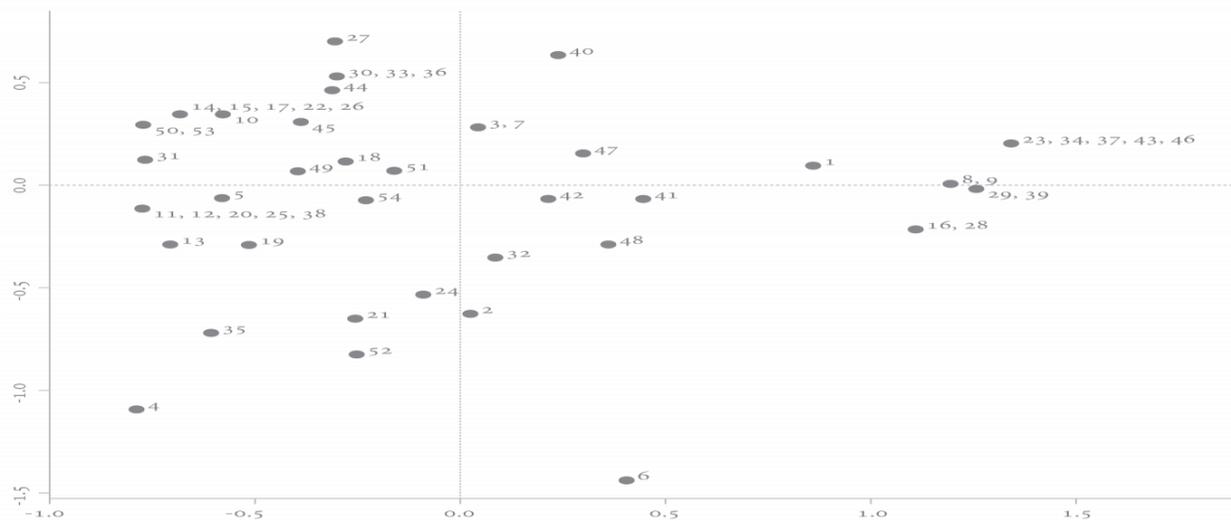
Figures 1 and 2: Plot of the first two synthetic axes of the MCA, showing only the systems (top) and the categories (bottom).

Introduction

The growing presence of computational media and tools in many areas of contemporary life brings massive change to all who interface with these systems, either as consumers or producers, as spectators or interactors, as writers, readers or *wreaders*.

'Artificial *poïesis,*' the production of computational aesthetic artifacts, is widespread. Computational aesthetic artifacts are created by practitioners with diverse backgrounds, methodologies and terminologies that are not always reconcilable and that create obstacles to mutual understanding, effective cooperation and criticism. However, in spite of contextual variations inherent to each particular field or project, and regardless of the specific functions, contexts or settings of production, there are many commonalities to be found among these works. Various phenomena discovered with or through these media are genuinely new and unprecedented, lacking clear references in other arts or fields of study, as well as a clear nomenclature, a disadvantage for their practice and study.

This work hopes to contribute to the development of a terminology for computational media, by proposing a framework for their study and criticism that is versatile and plastic enough to accompany their ongoing transformation and its effects in creative practices.

Motivation

The starting point for this work was Espen Aarseth's model for the analysis of cybertexts. [4] Although tailored to textual artifacts, this model presents several advantages: 1) it is focused on the structural, functional and procedural traits of the texts, rather than on their surface features or contents; 2) it is extensive enough to encompass different media and expressions; 3) it emphasizes common features found across most of the artifacts, rather than aspects that may be specific to some; 4) it acknowledges the interactive potential of the artifacts, without establishing a precedence over other important characteristics for the production of meaning and the development of the aesthetic experience; and finally, 5) it is workable, with a set of seven variables and eighteen possible values that create a space of 576 unique media positions.

By applying Aarseth's analytical model to a broader range of aesthetic artifacts, we asserted its efficacy and were then able to adapt and expand it, in search of a more comprehensive description of the works. The variables were tested for suitability and with the exception of one, all proved to be usable in the new model.

The model

DYNAMICS

The first variable in Aarseth's typology describes the contrasting behavior of signs in *static* systems – where they are constant – and in dynamic systems, where we repurposed the original values to describe *surface unit dynamics* (SUD) and *deep unit dynamics* (DUD), following a nomenclature inspired by

Krome Barratt. [5] SUD describes rearrangements of perceivable structures without the transformation of their foundations which is described by DUD.

DETERMINABILITY

Determinability concerns the stability of what Aarseth defines as the "traversal function" [4] of the artifact. This is the set of conventions and mechanisms that combine and project surface and deep units to the user. [3] If multiple experiences of the same artifact may result in similar behaviors or even in exact repetitions, we classify it as *determinable*. If on the contrary the artifact may lead the traversal function as much as, or even more than the users themselves, driving the experience into unknown territories and forcing users to adapt or react to new usage scenarios, we classify it as *indeterminable*.

TRANSIENCY

Transiency describes the temporal existence of the artifact. If the mere passing of time causes changes in the artifact's outputs then it is *transient*, otherwise it is *intransient*.

ACCESS

Access describes whether the totality of the artifact or its outputs are available to the user at all time, in which case the access is *random*, otherwise being *controlled*.

LINKING

Linking describes the existence of rules or devices that may lead the user through the traversal and whether the access to these is *explicit* or *conditional*.

USER FUNCTIONS

The last variable in Aarseth's typology describes which functions are available to the user besides the omnipresent *interpretative* function. In the *explorative* function, the user chooses which paths to follow along the traversal while in the *configurative* function new structures, i.e. surface or deep units, may be rearranged or created. These two functions are what "in addition to the obligatory interpretative function" [4] define an ergodic medium.

MODALITIES

Modalities will quantify the levels of perception involved in the user functions. They are defined sensorially [8] – *visual, audial, haptic* – and expanded with the perceptions of *motion* and *procedurality* – that of mathematics and of logical structures [11] – raising their total number to five.

AUTONOMY

Autonomy is a descriptor of the system's capacity to generate novelty – or to be somewhat creative – without resorting to external inputs. *Autonomous* systems either contain or generate all the data they need to produce novel outputs, while systems fed by external sources – or that include extensive sets of hard-coded data, digital data structures or digital streams, according to Berry [2] – are classified as being *data-driven*.

CLASS

This variable details the computational class – understood after Stephen Wolfram's definition [12] and Rudy Rucker's interpretation [10] – that better describes the outputs of a system. Static intransient outputs were classified as class 1, most of the static transient outputs as class 2, and those that exhibit complex behaviors as either classes 3 or 4, using the structure of the outputs to determine whether the system was class 3 (random, totally unpredictable) or class 4 (structured, at least locally, and at least partially predictable).

VARIABLES AND POSSIBLE VALUES

1. Dynamics: static, SUD, DUD;
2. Determinability: determinable, indeterminable;
3. Transiency: transient, intransient;
4. Access: random, controlled;
5. Linking: none, conditional, explicit;
6. User functions: interpretative, explorative, configurative;
7. Modalities: 1-5;
8. Autonomy: autonomous, data-driven;
9. Class: 1-4.

Data collected

We compiled a set of representative samples, collecting diverse approaches to procedural creation and focusing on visual arts and design. Besides a set of pieces of our own choosing, we collected an independent selection of works, trying to avoid a bias towards the model under development. The complete list of 54 works and the details of their analysis are to extensive to present in this article, but can be found in our previous works. [6] [7]

Analysis

After classifying the works according to the model, and still following Aarseth's methodology, we used the R environment for statistical computing and the CA package [9] to develop a Multiple Correspondence Analysis (MCA). The first synthetic variable achieved 54.1% inertia, but a plotting as a one-dimensional graph revealed the lack of indispensable information that was added by the extra 8.6% of data variation provided by the second synthetic variable. We therefore, opted for plotting the MCA as a two-dimensional graph describing 62.7% of the data variation.

Control Analysis

This model was developed with the purpose of allowing objective classifications and of minimizing subjective factors. Trying to test the definitions of the variables and our own analysis, we developed a control analysis, providing the list of systems and a description of the model to an independent analyzer.

The understanding of most of the variables was straightforward. The greatest challenge was found with modalities variable, especially with the classification of the procedural and haptic modalities. The control analysis tended to classify as haptic all those systems that allowed any degree of interaction, regardless of which devices were used in the process. Our analysis used different criteria: standard controllers (e.g. mice or keyboards) used in established ways (e.g. as in operating systems or productivity tools) were not classified as haptic; only works that used dedicated controllers or that employed standard controllers in non-conventional ways were considered to heighten haptic awareness and involvement. The control analysis also found the procedural modality in more instances, something that may be due to regarding the outputs of a work as being part of its system and not as independent artifacts, that may or may not be procedural or able to communicate procedurality. The procedural modality is tied to the perception, understanding or intuition of mathematics and logical structures. It is only when the outputs of a system present a minimum of clues for that understanding that this modality can be identified. In some cases this classification can be somewhat subjective, because it is historical, it deals with acquired knowledge and learning.

The control analysis revealed a divergence of 7.4% – 36 contrasting classifications in a total of 486. The divergence in the classification of modalities is not a sign of arbitrariness, but the effect of the false positives created by different understandings of the variables described above. We found that in a majority of cases, the divergence was explained by the extra classification of procedural (eight) or haptic (twelve) modalities in a work. Should we choose to disregard this effect, we could interpret the divergence in modalities as a much lower 5.5%, lowering the total divergence to 3.29%.

DIVERGENCES IN THE CONTROL ANALYSIS

1. Dynamics: 3 divergences, 5.55%;
2. Determinability: 0 divergences;
3. Transiency: 0 divergences;
4. Access: 0 divergences;
5. User Functions: 1 divergence, 1.85%;
6. Linking: 2 divergences, 3.7%;
7. Modalities: 23 divergences, 42.59%;
8. Autonomy: 0 divergences;
9. Class: 7 divergences, 12.96%.

Findings

Studying the plot of the MCA, we find that the periphery is taken by works that originally stood somewhat apart from the rest of the selection due to their contrasting physical characteristics. These are Christa Sommerer and Laurent Mignonneau's *A-Volve*(#4), Carvalhais, Tudela and Lia's *30x1* (#27) and

Andreas Muxel's *Connect* (#40). The work that is most isolated is Olia Lialina's *My Boyfriend Came Back From the War*(#6), which is also the only narrative hypertext, plotted logically and consistently.

In the east edge of the plot, we find a series of printed or otherwise static outputs, such as Roman Verostko's *Seven Sisters: The Pleiades* (#9) or Andy Huntington and Drew Allan's *Cylinder* (#16). The west area, in contrast, is predominantly populated by interactive systems. By circumscribing both areas, we find that there is no overlap and that two well-defined islands are created in the graph.

A closer look at the categories encompassed by the areas allows us to understand which values are more typically associated with them. In the eastern quadrant, we discover works that are mostly static, determinable, intransient, randomly accessible and with no linking. Deep unit dynamics, conditional linking and the explorative and configurative user functions characterize the interactive systems that also tend to concentrate more modalities and to develop higher computational classes.

The single book among the pieces, Raymond Queneau's *Cent Mille Milliards de Poèmes*(#1), is found in the middle of the non-interactive island, a placement that raises the question of whether books can ever be understood as interactive devices. Following Schubiger's definition [1] of interactive systems as supporting communication from user to the system and back, or Lippman's definition of interaction as a "mutual and simultaneous activity," [4] it becomes clear that regardless of any manual reconfigurations that may be developed, a printed book should never be classified as interactive. Although the configurative user function is involved, it does not follow that a cybernetic feedback loop can be established because the system is not able to act on its own. If we circumscribe the systems that produce computer-based outputs or real-time computations, we also find a clear division between two sets.

It is not possible to infer much about an eventual genre partitioning. We wondered whether this could be a shortcoming of the model or if traditional genres may be unsuitable to the description of computational media. If we study pieces plotted in coincident coordinates, we discover that traditional descriptions such as sculpture, painting or drawing, do not prove to be very useful. We can find two of the works most easily identifiable as sculptural – *Cylinder* (#16) and Andreas Nicolas Fischer's *A Week in the Life*(#39) – plotted very closely but still in different coordinates, sharing positions with systems that produce visual-only bidimensional outputs. We find linear videos plotted in neighboring positions, but still not necessarily in the same coordinates, something far more common among systems that produce printed outputs. It is also interesting to discover that two of the pieces where a strong directionality (and irreversibility) of time is patent – William Gibson's *Agrippa (a book of the dead)* (#3) and John F. Simon Jr.'s*Every Icon* (#7) – are plotted in the same position. Although, in an initial analysis, they may seem to be very different systems, belonging to different genres or artistic typologies, they share strong procedural traits, turning out to be much more similar than one would originally expect.

The coherent distribution of the classified artifacts that is found in the plot of the MCA contributes to a validation of the current state of the model. The analysis of clustering may eventually lead to the discovery of new genre descriptors.

Future research

This work studied systems that could broadly be classified as visual arts or communication design. Aarseth's previous analysis, from which some works were preserved, focused on pieces that could generally be classified as literary. In the future we expect to broaden our field of analysis, by increasing the

quantity and variety of works. The common characteristics discovered in this set of works lead us to believe that such a follow-up study needs to be developed, allowing us to refine the model and to further develop the study of the procedural and haptic modalities as better definitions of both are undoubtedly necessary.

A complementary path to follow is the approach to the 'perspective' variable from Aarseth's model, that focused on the text requiring the user to play a strategic role as a character in its diegesis, and that we did not succeed to integrate in the presented model. Artificial aesthetic systems are created from processes, and narrative aspects may be generated from procedurality and the procedural modality, from the user's desire to witness the unfolding of processes and from the simulations and predictions that are inevitably created. A complete study of procedural media must include their narrative properties without loosing sight of the remaining procedural aspects so far surveyed. Although a partition between the study of rule-based and story-based aspects of systems is certainly possible, we search for a dialectic model, where one is able to reintegrate perspective and understand how narrative emerges from rules.

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THE EPHEMERAL IN AUDIOVISUAL REALTIME PRACTICES: AN ANALYSIS INTO THE POSSIBILITIES FOR ITS DOCUMENTATION

Ana Carvalho

Realtime audiovisual performance is an art-moment defined as a unique narrative. By establishing a theoretical structure, grounded on a permanent process of becoming, the subject of documentation will come to the surface. The text aims at presenting references and considerations for the study of documentation of the ephemeral project towards the collective construction of practice's memory.

Systematic Illusion, 2010, Ana Carvalho, Video performance.

Situated between the moment and its memory, a document is evidence of an action. Ephemerality is a key feature of contemporary artistic practices happening at the point of convergence of digital technology and mobile communications through interdisciplinary discourses. The performative moment has a unique narrative that occurs in the present, which is no longer past, neither is future yet. The moment combines all that has preceded and re-arranges elements to constitute possible futures.

The interdisciplinary nature of realtime audiovisual performative practices permits related reflective thinking and theoretical discourse to be diffused and, therefore, associated and located within other disciplines . [1] For this reason, a discourse that is particular to audiovisual performance as a specific field of research is minute. In order to create the necessary theoretical arena to deal with the specificities of the practices in contemporary terms, descriptive documents are necessary to be identified.

In the generic landscape of digital ephemeral practices, the few projects related to documentation usually take empirical approaches, mainly aiming at the recovery and archiving of the past. Current reflection on the possibilities for documentation attempt to deal with the conflict between the temporal, immaterial and interactive essence of work developed within contemporary technological landscape by redefining the fixity that defines a document (with specific features, capable of constituting evidence for preservation). Within realtime audiovisual performance, this same conflict takes specific features as it deals with process, improvisation and identity, and has a unique potential through conversion of the tools of practice into the tools for crafting documentation.

This paper presents a set of references from where to think documentation towards its further empirical application.

Although specific within digital ephemeral practices, realtime audiovisual performance has under its umbrella several expressions differentiated by processes (more or less multidisciplinary, such as VJ/DJing), by context (in closer association with cinema: Live Cinema), by history (establishing a connection with musical composition: Visual Music). Moving away from nuances, differences and divergences, we define realtime audiovisual performance within the combination of two dialogical components: audio and moving image, in a unique, multisensory experience, centered around an audience. We establish a specific interest in the developments made by collectives, with emphasis on process.

We at first established a theoretical structure, through relationships rather than hierarchies, from where to look at realtime audiovisual performance. At its basis, in order for the relationship between process and event to be established, having in mind we are studying a time-based art form, the practice is divided into three moments: creative process, performative moment and community gathering moment.

We propose the performative moment, in itself the art expression, as a stable state within an interconnection of processes that encompass not only its own development but also the performer's body of work, as well as the practice itself as a whole (in its historical and contemporary dimensions). In this interconnection of processes, the time that directly precedes the occurrence of a performative moment will be its process of becoming, what we called the creative process, in terms of Gilbert Simondon's process of individuation . [2] Because there is no process of individuation without the individual, there is no creative process without performative moment. This process occurs in a chronological order. The first event of this order is the principle of individuation itself and the second are it in practice, in a process that results in individuation. At the third and final event is located the individual. Simondon´s individuation is "primordial, for it is this process that at once brings the individual into being and determines all the distinguishing characteristics of its development, organization and modalities." [3] By looking at the relationship between the elements (technology, methodologies, knowledge, and other) that constitute the creative process, we establish connections with Simondon's system of historical-cultural evolutionary complexity between humans and technology where man has the role of organizer and interpreter of the ensemble of open machines as expressed in *On the Mode of Existence of Technical Objects*. The audiovisual technical set-up, which allows artists to play live, is an ensemble or a technical object of genetic complexity that establishes a relationship between artist and technology in two ways. Firstly through the capacity to change and make specific, sometimes unique, technical set-ups from a combination of elements. Whether proprietary or customized, mutable technical setups for live performance are developed having in mind a specific performer or performance. Secondly, through the improvisational nature in the relationship between artist and technology, as expressed in a poetical way by Mark Amerika in the description of the persona of the VJ. [4] It is from the point of the performative moment that we propose a look at its process and therefore, to look at the documentation.

To document the process of individuation is to make visible concepts and plans that enable the performative moment with its uniqueness. We propose a look into Process Art to understand ways to deal with documentation of the process as well as to documentation and presentation of Software Art. Possibilities for documents may take the form of technical drawing, scores and registration of dialogues between artists. These will provide ways to describe and understand the performance during its process and its connections with technological developments.

The creative process is what makes each performance unique, even when the elements that constitute it are the same. Returning to Simondon, the process of individuation does not end with the pre individual but continues within a metastable regime, born and maintained by the individual who carries its inheritance of the pre individual environment. The same way, the performative moment will give way to another process and another performance. Following this line of comparison, the preindividual is a source for other metastable states to occur and other individuations to take place. This results in a complex affection between performer, performance and practice as a whole. The process of individuation is here considered being part of an ontogenic process of a larger entity.

The performative moment is constituted by connections between the artists and the projected image, diffused sound, between artists and between artists and audience. If audio and video outcomes and photographic evidence of the environment, resulting from the performance, constitute the most common form of documentation, other aspects are less likely to be looked at. We propose two other elements to be considered of relevance when documenting the performative moment: experience and fruition. Experience is resultant from the relationship established between the performer and work and dialogue with other performers. Fruition is the relationship established by the audience with the work, with each other and the performers. A look into methodos Fluxus artists recurred to in the documentation of their actions, acts, happening and performances, will provide indications of the impact on the ephemeral work that documented descriptions of the audience may have. As an example from the contemporary audiovisual context, the festival Cimatics in its 2007 edition, had a team dedicated to collecting experiences from both spectators and artists. From the edited footage videos were made available online. These videos provide glimpses into the performances and an insight into firsthand experience.

Performance is the moment from where to look into the future. The third moment is the community gathering moment that occurs in physical spaces. Community is a nucleus of those who actively participate in the creation, in critical and theoretical reflection, and experience and fruition of the audiovisual performance. It is composed by individuals from diverse locations and cultural backgrounds. As expressed by Manuel Castells, gatherings allow the community to strengthen the bonds by connecting individuals that come together in a physical location. As nodes of the community, collaborative projects are points of intersection which envisage the network of connections. Collaboration can be identified as the joint effort of two or more people in a dialogical process, grounded on experimenting with concepts, data and technology. To document the community gathering moment is, therefore, of major relevance to understand the practice as a whole as it encompasses all the previously mentioned moments as well as the new one, which is each community gathering moment.

The concept of what is a document has changed, compelled by the shift from art-object to art-moment. Contemporary documentation, moving away from a formula to preserve and exhibit, has a dynamic meaning, which describes a tool to reinstall an installation, or to re-enact a performance. Performances, as well as ephemeral installations, exist only within the context they are presented into the public. In storage (warehouse or database) they are mere materiality. Defined by its uniqueness, the moment is an artistic, ephemeral manifestation that documentation should not replace. From the thirty three case

studies that constitute the research project *Inside Installations* (www.insideinstallations.org) one is relevant to highlight as example. A series of performances with liquid crystals that took place between 1965–66, by the artist Gustav Metzger, were exhibited at the Tate in 2005. For its original format, a team was necessary to manage material and 12 projectors. For the exhibition, the artist, together with the museum's technical team, developed an installation version based on the original concept. A remix of the material was presented recurring to recent technologies. The installation exhibited is also documentation of the performance. The replacement of the realtime and the performative by an object creates a situation that is worth analysing. We take a different and more challenging path with a proposal to approach documentation in a way that not only makes possible to preserve the practice's features but reinforce them.

Which criteria should describe this documentation?

Radical actions, throughout avant-garde movements of the past century, gave way to possibilities of new concepts of making and experiencing art. It is within a conceptual frame that Fluxus can be understood as a community and as a philosophy rather than simply a historical movement [5]. It is through an interest in publication of documents that a concept emerged, but it was through a performance festival that Fluxus started as a network. The emphasis on the playful and ephemeral is visible in published objects related to Fluxus (*Flux Boxes*), but the opposite can be said about the performances, if we refer to their printed scores (*Fluxus Cookbook*). This affection of ephemeral on object and vice-versa is also true for individual artists. Allan Kaprow's writings referenced directly to his work. In fact, they constitute the part that is left of most of his work. Kaprow wrote scores, collected written recollections of himself and of members of the audience of his performances and published about his work under a pseudonym [6]. The intermedia, performative and participatory character of Fluxus took many shapes, for example in events, publications and films. It is the relationship between ephemeral and document in the work of the community as well as of the individuals, that is relevant. Fluxus is a great inspiration for looking at the possible shapes documentation can take in relationship to realtime audiovisual performance from the point of view of the practitioner, from the collective and from the community.

Without defining documenting as a set of rules, but drawing a trajectory for the possibilities of documenting as complementary to practice, an example can be presented. Being interested in the creative process, the collective Aether9 (http://aether9.org) explores the possibilities of realtime manipulation and transmission of audio and video. Geographically located in different points of the globe, the collective's members maintain communication and perform exclusively via the Internet. Documentation of their Skype meetings that happen during preparation and during the performance took the shape of (so far) two books published by Greyscale Press (http://greyscalepress.com). These books can be purchased through online print-on-demand Lulu (http://www.lulu.com). This way, the readers can be located in any place of the globe with Internet and postal access. Through this process of documentation, Aether9 provides non-descriptive layers of the performances which help understand them beyond their results, based on the interaction between artists during the process of development and final presentation.

This example contrast with another one provided by the DVD *Immersive Works* by Granular Synthesis. The DVD presents recordings of performances between 1991 and 2001. A distinctive feature of this work, when compared with general attempts to document audiovisual events, is its descriptive nature (as opposition to the promotional short version very common especially in social networks). It is for this feature that we consider as an example of a document that provide evidence of the group's work. WhileAether9's books detach the reader from the actual outcomes and presents creative process and

performative moment as an ongoing process, in the DVD by Granular Synthesis the focus is on the audiovisual experience of the performative moment. Both examples use individual, objectified documents, and none of them can be perceived as replacement of the performative moment.

To establish a theoretic structure, process oriented, from where to construct instruments to analyse and reflect on the contemporary audiovisual performative practice, is a proposal that comprehend both its ephameral and multidisciplinary nature. Parallel to the institutionalized procedures, documentation of the contemporary practice is a subject of the community's concern. From within, documentation can be considered as registration of a series of relationships and interconnected processes that constitute means to retain and re-experience (individually and collective) the art-moment. This registration can be developed recurring to tools, technologies and knowledge from within the practice. The documents, developed by the community, are a primary source for further study, research and memory construction. In sum, to document is also to contribute actively to the construction of identity and context. In the future, this focus on the community and the possibilities of its actions will likely provoke changes not only in the practice itself but also in the way it is perceived externally.

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NETWORKED PROXIMITIES

Margarida Carvalho

This paper undertakes a critical reflection on experiments with audience participation in artistic practices involving networked performance and cyberformance. The performativity of webcamming and, in a more general sense, the presentation of the self and participation in digital networks are considered in the context of the current intensification of self-surveillance and participatory surveillance on social networks.

In 1972, Robert Whitman, one of the founders of the famous artists and engineers' collective Experiments in Art and Technology (E.A.T) of the 1960s, conceived the performance *News*. Broadcast live from the New York radio station WBAI, *News* can now be considered as a forerunner not only of the participatory culture of digital media but also, more specifically, of contemporary artistic experimentation in the field of networked performance. In *News*, the participants were sent to particular pay phones in Manhattan and asked to move from phone to phone and to make a report at each one about what they saw when they made a call and got on the air. A network of voices was thereby woven, a kind of aural Twitter stream that juxtaposed prosaic reports and testimonies of everyday life marked by subjectivity and poetic description.

News laid the foundation for a series of subsequent performances in which the basic structure was repeated: thirty people located in different parts of a city telephone and describe what they see at that moment. The calls are broadcast live through the intervention of Robert Whitman, who ends the call when the participant creates a coherent image.

In *21st Century Happening*, which took place in Leeds in 2002, Whitman updated the performance technology making use of cell phones that allowed a more mobile narrative to be created. In *Local Report* (2005), the participants contributed audio calls and video clips (recorded on mobile phone cameras) of the places where they were. The voice and video calls came in separately but were played together during the performance. During the thirty minutes that the performance lasted, a 'cultural map of the quotidian' was composed in real time. The reports were streamed live to the project's website and subsequently screened at five shopping centers in New York, New Jersey, Pennsylvania, and Connecticut. The choice of shopping centers to present the visual and sound recordings that made up *Local Report* highlights the hybrid boundaries of the project, which approximates to the experience of the quotidian through repetition, fluidity and even a certain banality as well as a sense of openness and possibility.

Whitman's performances *News*, *21st Century Happening* and *Local Report* are based on media networks and also work the network from an expressive and conceptual point of view to the extent that they create an assemblage of sonic and visual fragments and because they invoke the rhizomatic, diffuse and imprecise experience of our memory.

Cyberformance: The project *cctvecstasy* by WebCam Operators

In 2004, Jo-Anne Green, Michelle Riel and Helen Thorington (who make up the publishing project *Networked_Performance*) defined the scope of networked performance as being that of "[...] any live event that is network enabled," including "any form of networking in which computational devices speak to each other and create a feedback loop." [1] For the authors, networked performances are therefore characterized by being live or experienced at the moment of creation or reception and their origins lie in mail art and fax, telephone or satellite art. Nowadays, the ubiquity, convergence and mobility of digital media enhance the intensification of the experience of telepresence that is entwined in the distributed nature of networked performance.

In parallel, the concept of cyberformance, as developed by Helen Varley Jamieson in *Adventures in Cyberformance: Experiments at the Interface of Theatre and the Internet,* presents clear affinities with that of the networked performance, although it is more specifically inscribed in the participatory world of the Internet. In Helen Varley Jamieson's words:

When I first coined the term cyberformance in 2000, I was struggling to find a way to describe this emerging form. I knew that two aspects at least were fundamental: location and liveness. The site for this new form was the Internet, or rather the overlapping and fluid spaces emerging between physical realities and the ethereal digital/electric space: a third space grafted from the real-time confluence of the stage and remote locations. [2]

We can therefore state that cyberformance is a subgenre of the vaster category of networked performance and it is precisely in the light of these concepts that we now analyze the project *cctvecstasy* by the collective WebCam Operators, which was developed in 2009 within the scope of the Radiator Festival in Nottingham. This cyberformance included participations by Paula Roush at the QUAD, Derby, Marie Josiane Agossou at South Bank University, London, Lina Jungergård at Area 10, London, Deej Fabyc at the Elastic Gallery, Sweden, Lara Morais and Maria Lusitano at the Malmo Academy of Art, Sweden, and Aaron de Montesse and Anne Overaa in their homes. Susana Mendes Silva was also a member of the collective but last-minute technical problems prevented her from participating.

The performance *cctvecstasy* can be considered a site-specific project to the extent that it took place at the online community WebCamNow.com, which establishes live webcam connections all over the world without the user needing to create a homepage or even a personal profile. The platform WebCamNow consists of a ready-made interface and is divided into two networks: the open area, which is licensed for adult content and is mainly used by participants seeking intimate experiences; and a second area, of family and friends, in which the participants know that their actions can be monitored. Unlike the more recent live streaming and social networks, which combine video streams and videologs, thus creating dynamic archives, the WebCamNow community does not make video files, images or messages available. Rather, it involves the use of webcams to broadcast live from intimate environments (webcamming). The WebCamNow interface includes video channels, text chat, and a bar that indicates who is connected to each video room, functioning as a popularity gauge similar to the life bars found in computer games.

Thus, after a period of research, the project *cctvecstasy* developed around a narrative suggested by the encounters between the performers and other participants in the community. The performances took

place on various video channels and questioned the conditions of reception and participation characteristic of the spectators and users of the WebCamNow platform. According to Paula Roush:

[In the open area of WebcamNow] a variety of hetero and LGBTQ (lesbian, gay, bisexual, transgender and queer) people operate their webcams, playing with multiple strategies: from the staged authenticity of those that set up the webcam in their rooms, placing their life under scrutiny, to others that masquerade into hyperstaged versions of femininity/masculinity and fetish, performing to a particular group of devotees. We used the webcamming and textual chat tools freely available to us to work synchronously across separate rooms and communicate with other videochat rooms. [3]

The performance took place online in front of a live audience at the QUAD Gallery in Derby, with seven performers on live streaming, while Paula Roush operated the transition between the various spaces. The audience itself was filmed and broadcast via a live feed to a video channel. We can therefore speak of a hybrid space at play in the cyberformance *cctvecstasy*. From chat room to chat room, the various performances in turn become the subject of intervention by the performer, who is in the physical space of the gallery, alongside the audience, manipulating the visibility of the actions and spaces in real time.

Thus, it must be stressed that contact zones and transitional movements are expanded in this project: they are the interactions and overlaps of the users of the platform; the diluted boundaries between the banality of the quotidian images and the intentionally performative element; the interventions of the participants of the WebCamNow community in the real-time performance via chat; and, finally, the cross-pollination between the remote physical spaces inhabited by the performers, the telematic space of the World Wide Web, and the space of the gallery where the live audience is located.

In this context, it is pertinent to mention Susan Broadhurst's concept of the 'liminal performance,' which "plays with the limit of the possible" and whose fundamental characteristics are "hybridisation, indetermination, the absence of 'aura' and the collapse of the hierarchical distinction between popular and high culture." [4] In parallel, the notion of the 'intermedial audience,' proposed by Helen Varley Jamieson, is equally relevant since it simultaneously covers both online and live audiences who become mentally and physically involved in multiple tasks by assuming various roles – namely, those of spectator, performer, author, reader, commentator, chatter and voyeur.

It is also worth drawing attention to the low-tech and D.I.Y. (Do-It-Yourself) aesthetic of the cyberformance *cctvecstasy* and the central role played by the webcam in creating an intimate, texture-laden space that awakens a desire to caress and hold the image, to pass to the other side and inhabit the space of the performer's body. The intimate gaze of the webcam is almost like the gaze that results from an amorous interlacing, in which we are too close to really see. [5]

Webcamming: The presentation of the self and participation in digital networks

In fact, the voyeurism associated with webcamming must be assessed in the light of this proximity, of the low-resolution of its image and the manipulation of its supposed aesthetic of authenticity. It is perhaps for this reason that masks are frequently used in cyberformance practices. The mask highlights the mercurial nature of online identity and the mixture of fiction and reality at play in the telepresence experience precipitated by the networked performance. Effectively, an ambiguous play between hiding and revealing, simulation and authenticity, and intimacy and voyeurism runs through the artistic practices that emerge from digital networks. In this respect, attention must be drawn to Annie Abrahams's

body of performance work in which 'communication' and 'intimacy,' in their myriad variations, become 'problems' in the Deleuzian sense of the term. [6]

It is also worth highlighting the fertile dialogue that has been established between other artistic practices based, for example, on video and photography and the performativity of webcamming and, in a more general sense, the presentation of the self and participation in digital networks. A particularly interesting case in this context is David Valentine's film *Computer Love* (2010), filmed entirely on webcams. This fiction dance-film reinterprets the famous balcony scene from *Romeo and Juliet* staging an adolescent couple who exchange messages in a chat room named Computer Love (a euphemism for cyber-sex as well as an allusion to Kraftwerk's song of the same name).

The audience observes the young couple's reactions through images captured by webcams on their computers placed alongside a chat window in which we see a version of Shakespeare's dialogues in the highly abbreviated, pared-down language that is characteristic of instant messaging. The protagonists express the intensity of their feelings through urban dance (choreographed by James Hall and Joe Livermore of the Methods of Movement collective) and the messages in the chat window are echoed by the voice-over that recites Shakespeare's original text.

The tiny space of the young people's bedrooms is reduced still further by the static, vigilant and fragmentary gaze of the webcams; while the use of the split screen intensifies the expression of desire as well as the cultural and racial boundaries between the two young lovers. The use of webcams as a staging and filming device questions our relations of attraction — particularly those of digital natives —, participation and captivity in social networks.

In this context, the work of the photographer Evan Baden is also relevant; in particular his series *Technically Intimate* (2009) and *The Illuminati* (2007), which invoke the way in which teenage privacy and intimacy are being redefined by the Internet and mobile phones. In *Technically Intimate*, Baden takes as a starting point videos and images with sexually explicit content that he has found online. In the text introducing the series *Technically Intimate*, Baden explains how, on the basis of this material, he selected an image and subsequently worked with participants who answered the request for collaborators that he posted on social networks. The models adopt provocative poses staged for their cameras (mobile phone or webcams) but their status as 'sex objects' is re-contextualized precisely by the retreat of the point of view (of the photographer's gaze), which, in 'opening up' the shot, allows the quotidian space to enter the frame – the bedrooms full of objects and adolescent passions – shifting the sexually explicit meaning of the image and confronting the spectator with the ambiguity and discomfort that it provokes.

In turn, in *The Illuminati* Baden creates a series of portraits of solitary young people whose faces, suspended, hypnotized and absorbed, are bathed in the light coming off the screens of the gadgets that they are touching. In these photographs, the light that reveals their faces captures the adolescents' fixed gaze at a screen and a communication that we spectators cannot access because it is turned away from us.

In the face of this ambivalent dissolving of limits, the various artistic projects invoked here examine the current intensification of the flow of personal narratives on Web 2.0 and the new practices of self-surveillance and participatory surveillance on social networks. Effectively, while the potential dangers of surveillance on the World Wide Web are well known (particularly, the invasion of privacy, mapping and the management of information relating to particular social groups, fraud and so forth), according to Anders Albrechtslund, participative surveillance practices could also be considered as forms of subjective,

relational, shared and mutual experimentation. [7] In our view, the various artistic works being analyzed here address the irresolvable multiplicity of dimensions that traverse our presence, identity and participation in the digital world.

Conclusion: The hybrid space

In this context, we would like to conclude by invoking the work *Tele_Trust* (2009 – underway) developed by the Dutch duo Karen Lancel and Herman Maat in collaboration with the V2_Lab. *Tele_Trust* consists of a networked performance and an installation that investigates the relations between surveillance, privacy and trust in the public space and on digital networks.

Lancel and Matt created a 'data veil' inspired by the robes of monks; which also calls to mind a burka or Darth Vader's cloak (*Star Wars*). The dark and opaque fabric of this veil is weaved in a network of sensors that transform it into an interactive communication membrane. The performance *Tele_Trust* involves several interlinked data-veils and takes place in public spaces where members of the audience are invited to participate. The veil functions like a second skin: when the participant touches it she does not feel the sensors but the warmth of her own body. However, when the cloak is caressed, voices are activated in the headset, which ask her questions centering on the idea of trust. These voices belong to other members of the audience, who use their smartphones to communicate with whoever is hidden under the cloak.

Before being covered, the participant is photographed with a webcam and her photograph is sent to an online project database. When the participant attains invisibility under the veil, the members of the audience, by interacting with her via their smartphones, reveal her face online. It appears on the website of the *Tele_Trust* project, on the public screens of the installation and on the screens of the mobile phones accompanied by the questions: "Do I need to see your eyes to trust you? Do I need to touch you? Who is looking at whom? Who is controlling whom?"

The project *Tele_Trust* thereby helps us to reflect on the way in which interfaces can create an experience of presence and trust in a world impregnated with technology and media in which face-to-face communication is becoming scarce. In parallel, the participatory dimension of this work must be examined in the light of the notion of the "[…] digital aesthetic as *transmedial* experience, in other words, an interactive action or effect that involves hopping from medium to medium across a patchwork that makes use of intertextuality and 'live' recombination." [8]

Questions, statements, short narratives about trust, intimacy and control created by the participants flow into the data veils that are active at that moment. All of the testimonies and contributions gathered during the public performances are available on the website of the project *Tele_Trust* and are activated and recombined when the data veils are used.

A mesh of stories generated by the users is interwoven, mediated by these sensitive and moving membranes which, in covering the wearers' bodies, reveal their faces, thereby invoking the paradoxical play of hiding, transparency, nomadism and capture that traverses the 'hybrid space' [9] of contemporary digital networks. *Tele_Trust*, and the other artistic projects analyzed here, address the shifting experience of the hybrid space, marked by a conflation of presence and distance and blurred boundaries between intimacy and publicness, poetically and politically re-imagining our experience in this multi-layered and intensive networked spatiality.

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The Body in Digital Space

Marco Cesario & Lena Hopsch

The aim of this paper is to investigate the perception of space in the context of digital architecture: if architectural and urban structures are designed for the experience of the body's motor faculties, does digital design, by modifying space-time categories of the lived-body and brain's treatment of spatial perceptions, open new paths of experience?
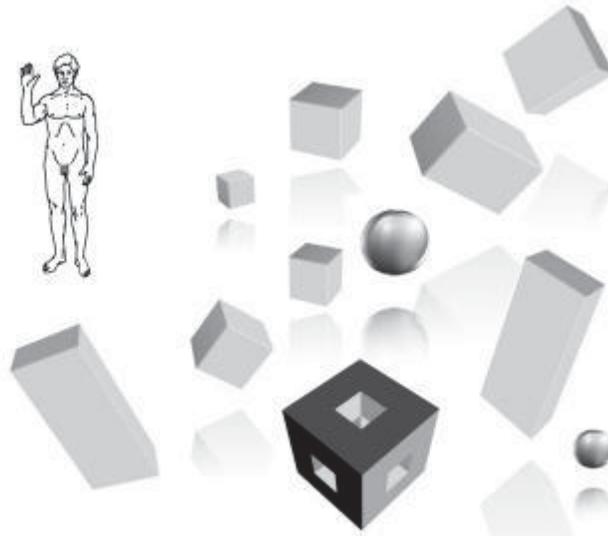
Fig 1. The Body in Digital Space © Marco Cesario
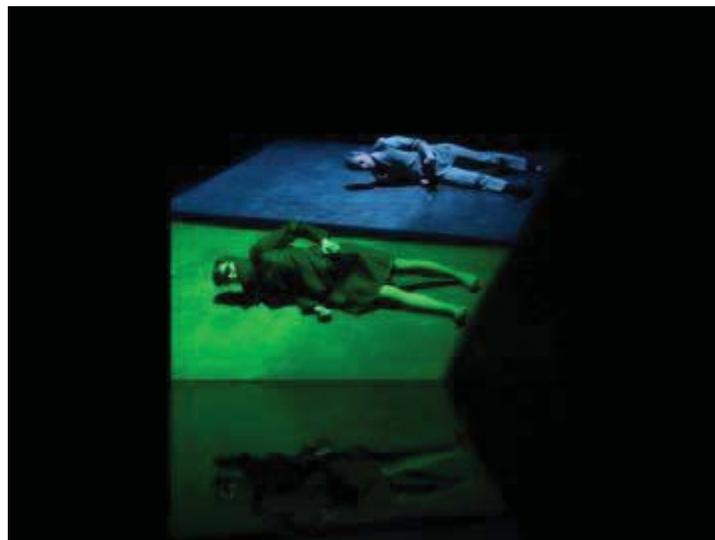
Fig 2. C'est bien d'être ailleurs aussi © Valeria Giuga

Flesh and Reversibility

In Merleau-Ponty's view the 'flesh' represents the continuity between a perceiving body and the perceived world. The flesh is the common element, the concrete emblem of a general manner of being including the subject and its environment; its meaningful expression is the 'chiasm' – the so-called reversibility - which is an immanent coincidence between the seeing and the visible, the touching and touched, the self and other selves. The body can touch and being touched, it can at the same time be the subject and the object of perception. Let us explore the idea of flesh further. The flesh represents the flesh of the world but also the flesh of the body which is self-sensing. The consciousness of our being-in-the-world take roots in this very original sort of primordial sensitivity for which we are included in a general self-sensing matter of the world. From this point of view there's an inner harmony between the external and the internal world and there's no categorical division between object and subject. When my right hand touches my left hand says Merleau-Ponty: "the 'touching subject passes over to the rank of the touched, descends into the things". The reversibility is a reciprocal relation not limited to the senses - to touching or seeing- but also to perception in general.

The Body in Space and Motility

In *The Phenomenology of Perception*, Merleau-Ponty, unveiling the primordial spatiality of the lived body and its original intentionality, disclose the fundamental relations between the body and space. At a first sight, the body's spatiality is external and the body is seen as an external object. In this perspective the spatiality of the body is a 'spatiality of position', related to an external, objective or intelligible space. The body is a mere object topographically located in a determinate position, occupying a portion of the objective space. In 1933 the Swiss psychiatrist Ludwig Binswanger, in his article *The Space Problem in Psychopathology*, explained the role of identification and orientation of the body in space through the study of mental illness. The spaces of our natural world are subdivided into the oriented human space and the homogeneous space of science, the tuned space.
The subjective experience of an 'attuned' space contrasts the scientist's oriented space characterized by the vertical and horizontal axis influenced by gravity. According to Binswanger space and time are constantly and subjectively assumed by the body. Space resides inside the subject and the consciousness is itself spatial. There's not one space and time but as many spaces and times as there are subjects. Instead of a 'spatiality of position', the perceptual experience of our lived body discloses a 'spatiality of situation', the situation of the body in face of its daily exploring tasks. Bodily space and external space form a system, the first being the background against which the objects as 'goals' of our actions 'come to light' and disclose themselves. Thanks to action and movement our body "is brought into being". When we analyze the body in movement we can fully understand how it inhabits the space because movement is not strictly submitted to space and time, it assumes them constantly through a here-and-now synthesis.

The Body's Posture and *Praktognosia*

Our primary link to the world takes root in space through an embodied consciousness which is motile/spatial. While moving in space, the body is able to incorporate direct spatial relations and make a dynamic and constantly-in-motion synthesis. According to the German psychiatrist and phenomenologist Erwin Straus, the human posture is a primary source of sensory awareness. Man's upright position

has an inner time consciousness of the world and the geometrical structure of reality becomes secondary to one's sense of time as duration in the world. Models of posture are consequentially projected onto changing spatial situations by the human body, whose position in space is constantly updated in order to interact with the environment. The communication between the body and the world takes place through a *praktognosia*, a practical and direct knowledge of the world. The body's posture is predictive because it assumes multiple or possible tasks and acts in an oriented-space connected with a historical time.

The intention of the body creates a space-time structure of here-and-now. The multiplicity of point of 'heres' constituted by the movement can be considered as a 'chain' of experiences in which each situation and perspective one and no more of them is presented in an objective way. Mathematically the movement - decomposed *ad libitum* - would open a *plethora* of spatial situations. The first access to the world is made through the movement of the body in space. This is the reason why we should consider the body's *praktognosia* not as a particular case of knowledge but as the original access to the world and the objects themselves.

Kinesthesia, the Sixth Sense

According to the French neurologist and phenomenologist Alain Berthoz beyond the five traditional senses – touch, sight, hearing, taste, and smell – we should consider the sense of movement – *kinesthesia* - a 'sixth sense'. The body has a double immediate perception while moving: self-orientation (the perception of where we are located in a determined space with respect to certain landmarks in the environment) and object-orientation (the perception where specific objects are located with respect to each other). The body's ability to interact with the environment depends on the interaction between the two. From the external world we receive inputs recorded by our external sensory organs (exteroceptors): eyes, nose, ears. At the same time we receive inputs from the internal sensory systems (interoceptors). A particular internal sensory system is proprioception, which is composed of receptors and nerves in our bodies monitoring constantly the positions of our muscles and joints. It is a complex system allowing the body to keep its own balance and prepare fluid and coordinate movements such as in dance performances. The ordinary space relations are suspended because new forms of spatiality are cut out through the body's movement. The dancer, for instance, can experience an enlarged time because his internal-time consciousness is modified by the 'arc' of the body's movement. Sensory receptors contribute to the sense of movement. We can definitely argue that the body has a kinesthetic consciousness of the world because the origins of human knowledge reside in the body's movement and action.

The Body and Architecture

We are surrounded by architecture and constantly included in an architectural context. The architectural environment opens determined spatial experiences and enlarges consciousness by exploiting the multiple possibilities of the body's kinesthesia. The architectural context seems to show a 'motile essence' in which the user is immediately absorbed. The 'sense' of architecture is to open a whole perceptive experience to the body's kinesthesia. The hall of a building, its stairs seem to be conceived to experience the body's motor faculties. Not only distance, length and depth is experienced by the body but also a 'general sense' of movement arising from the whole building. If we have a look at some contemporary buildings it seems that there's a slow, hidden and general movement of the whole structure and that all the elements of the building create a sense of direction, of a moving structure.

In a complex building my body becomes part of a wider interconnecting system involving me and the architectural elements composing the structure. That's because in architectural design the building is

conceived as from a mental representation of the body in space, as from the exploring sense of aware-
ness. While drawing, mind reproduces in scale the kinesthetic properties of a body moving in space.
Mental reasoning about spatial environments is strictly linked with spatio-analogical representation cri-
teria. In the architects drawing process his, mind tends to create and explore task-sensitive representa-
tions to achieve specified spatial situations for the human body.

The idea of space in architecture should be connected with the idea of a 'practiced space', in the sense
of how this space is experienced beyond the geometric perspective including other sensorial experi-
ences. The experience of a railway station by night for example: the wheels of an incoming train, far
voices from few passengers moving towards the exit, the low, orange light of night lampposts. Or the
experience of a park at dawn: birds, the faint, cold light settling on the buildings and the sound of the
wind in the trees. Those visible and audio traces can alter the experience of lived spaces. The experience
of space to be fully understood by the body should be total and include all the aspects of the senses.
Changing the relationships in a sequence of rooms, for example, produces important transformations of
the properties of space and in general has an impact on how intelligible people perceive them. There's a
strict relationship between the geometrical properties of space and how we tend to recognize it.

The Body in Digital Space

The perception of architectural spaces is nowadays connected with the rise of technology and virtual
reality produced by digital design. In the case of computer-aided architectural design - in which the ar-
chitect can manipulate visual representations - architectural spaces gain a new reality by supporting the
creation of new architectural objects. In this process, the constituting elements of a building become
technical networks of communicating nodes. Digital design becomes not only a way to create new ob-
jects but also a support for communicative and intersubjective platforms which could be considered
means of mediation between people. Every part of the model is individually defined and can be created
without referring to other parts of the model. In a computer model in which the architect presents a
building, we can easily use a specific coordinate of the building, a determined point, a node or an archi-
tectural object, to develop news plans or physical models and create a whole building from it. During the
design process every aspect of the model can be modified. This is the reason why we often have the per-
ception that the whole structure is constantly in movement.

By the development of computer technologies such as computer aided design (CAD), virtual environ-
ments (VE) and virtual reality (VR), architects have an endless number of possibilities of representation.
Designing in a digital environment allows the architect to shape and re-shape the design continuously
with less effort. But, as pointed out by Alicia Imperiale, the interest of architects is shifting from 'Der-
ridean deconstruction' to 'Deleuzian focus on smooth space, serial and dynamic process'. By the use of
different mathematical calculations the architect strives towards a surprising, innovative element in the
design process.

Imperial points out that nowadays in contemporary architecture, the interest is no longer focused on
designing spaces but entirely on the surface. In the new digital architecture the space as a proper object
of architecture is mainly neglected. Often, the interior of a building is simply the concave part of the
convex exterior surface, its internal opposite. Space becomes the residual part of the 'skin' or the 'mass'
of the objects. Space is not 'designed' specifically and doesn't seem to have properties or a specific ar-
chitectural nature but it becomes a derivative space, 'what remains' between different masses of the
architectural objects juxtaposed. If computer programs can aid and even contribute to the design of an
object what about the design of space and what impact on the body in digitally designed spaces?

In the virtual context of digital architecture the body oriented space is modified and the original move-
ment is replaced by an exploring virtual body projected by the mind inside a non-Euclidean and non-or-

thogonal context. The most perceivable information is mainly visual rather than auditory or tactile. Virtual environments surely provide benefits on all phases of architectural design process and digital 3D models – being similar to physical models but without its tactile qualities - improve the perception of designs and the whole spatial perception of a building. However those technologies provide feedback for only three of the five senses. If the visual, auditory or tactile senses are concerned, smell or tactility is not included in virtual environments. Above all, kinesthesia – the sixth sense that we discussed above – is totally cut out since digitally produced models often lack a sense of scale.

A space which is not assumed and experienced by the body and its movement remains an artificial space created ad hoc to be close-like to the body's reality and doesn't represent the whole multi-sensorial human experience. We are still in the homogenous space of the science; digital space has mathematical and geometrical properties but is yet not conceived to be experienced by the body's kinesthesia and could therefore be misleading. The objects created can be wonderfully realized and can constitute an original experience for humans but they are conceived as detached, opaque objects in which lived space is derivative and the body's movement is approximate, compelled secondary.

Conclusion

The sense of movement, as we demonstrated above, is crucial to provide access to the world. In conceptualizing space the cognitive theorists Lakoff & Johnsson points to how: "The body is not merely somehow involved in conceptualization but is shaping its very nature". The decisive role of the sensory-motor system for human understanding and perception of space is crucial. How we perceive spatiality and interpret space is the common denominator for both the cognitive and phenomenological perspective. While drawing the architect "thinks in drawing", his hand reproduces on the paper a symbolic world following an 'inner vision' - the mental representation of an achieved building. In a virtual environment the process of creating through 3D software creates an alternative reality in which the Demiurge-Architect has endless possibilities to create and manipulate objects and in which aestheticism becomes the priority rather than the laws of gravity. An 'inner vision' is replaced by software defying the laws of physics. The body is no longer the centre of the architectural project. While drawing, the mind creates spaces according to a bodily consciousness – the experiences of the body in physical space. Mental representations of those experiences can support the creation of new artificial spaces.

However, in a virtual environment, the space is not conceived to be experienced by the human body and the attention is no longer focused on the impact of the achieved building on the environment or on human lives. From this point of view digital architecture – whose main purpose seems to be the design in itself and not the concrete architecture - appears 'detached' from human life and devoid of any link to the concrete existence. Bodily space should be the core of the process of architectural design because any structure will be experienced, lived daily by humans. From this point of view, architecture shouldn't simply manipulate or juxtapose architectural objects without any link to the physical existence. The structure of buildings should reflect our being-in-the-world. Putting the human body and its sense of movement in the centre of digital architecture would be a new frontier for exploring the multiple nature of human perception. A 'spatiality of situation' should guide the work of the architect rather than a 'spatiality of position'. Therefore we need to consider the context of the 'flesh' – the intertwining between the body and perceived world – the fundamental ground in order to grasp the intimate nature of space.

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Photography, Reality and Digital Expression

Orhan Cem Çetin

Photography is a superficial representation of the human experience and it is shocking and surreal compared to reality. Since photography is a dramatic abstraction, going further is not a diversion from its nature. I have been using the digital media for full creativity and ways of integrating into the image further aspects of human experience of the moment, while the image is still a photograph with strong ties with reality.

Fig 1. Untitled, from the Renkarnasyon series, 1993, (c) Orhan Cem Çetin

Fig 2. Untitled, from the Renkarnasyon series, 1993, (c) Orhan Cem Çetin

Fig 3. Untitled, from the Renkarnasyon series, 1993, (c) Orhan Cem Çetin

Coexistence of a variety of art disciplines implies that each discipline is very powerful in unique ways while lacking or extremely weak in others. Hence, there is no omnipotent art form. However, artists from different disciplines tend to believe that their own areas of practice have greater potential of expression over others.

Photographers are no exception.

The powers of the photographic image are probably obvious to a photographer. What is not so obvious are its shortcomings and limitations.

How well can a photographic image represent human visual experience? Can the strong ties with reality in certain cases work against the photographer?

The photographic image is an extremely subjective, in fact a shocking and distant representation of reality. It is impossible to avoid the subjectivity and vagueness inherent in the photographic process.

Breaking the assumed link between reality and photography will provide the photographer with further freedom, creativity and self-expression. Use of experimental techniques enables the photographer to highlight his/her personal touch. Traditional photography yields images with extreme visual resemblance since similar cameras, lenses, printing processes etc. are used.

I made two critical decisions about my artistic work in photography:

- The overall technical quality of a photograph must be only as much as required. No more, no less.
- I do not strive to represent reality. I strive to represent how reality appears to me.

Experimenting with early digital imaging techniques made me realize the potential of:

- Unlimited trial and error.
- Instant feedback.
- Huge room for serendipity.
- Total responsibility over the result, as I could have altered it but did not.
- More options for developing a personal style.
- Being able to drift further away from the sense of reality while keeping the photographic characteristics in the image.
- Working on an image turns into a performance as one can improvise on the go.

Presentation includes examples from my following series:

Earliest digital work: **Renkarnasyon** / 1993, Hand scanned prints, digitally altered, colored and exposed back on photographic film.

Stolen Dreams / 1995, Flatbed scanned prints, digitally combined, colored and exposed on color negative film to produce c-prints.

Ticket / 2001, Scanned negatives / transparencies, digitally colored and pigment printed.

And recent work, back to gross experimentation: **Press** / 2011, Digital camera images manipulated in image processing software, Pigment or Lambda c-prints.

Privacy in the house of the future

Aleksandar Cetkovic

How will the architecture of our most private of all places, our home, change when the Ubiquitous House, with its ubiquitous sensors and activators to control all kind of daily functionalities, gets hooked to the net and its information about us, placed at disposal of large companies? Will we take different roles in real life, in order not to give away our real identity? Or will the notion of privacy, as we know it, simply disappear?

The house of the future is usually portrayed as the Ubiquitous House. Derived from Ubiquitous Computing and House the term describes a house in which its technologies are interlinked (LAN, Wireless) and communicate with each other to create a smart environment and control the different functionalities of the house. The main focus of such an environment is the inhabitant. The scanners observe the inhabitants in order to control the different aspects of space, including lighting, air conditioning, heating, humidity etc. The development efforts go into the direction of creating an intelligent house – intelligent in the sense that it learns by observing the user's reactions to specific situations or deploys resources intelligently. This might sound very sophisticated and reasonable but at the same time, it means that the privacy of the user is analyzed and digitally stored. If the gathered data stays in the user's possession it is not an issue, but could become very troubling if it gets into wrong hands.

The subject of privacy in a ubiquitous house has been intensely debated, being crucial for the general acceptance of the whole idea in the private realm. In this paper, I do not intend to add to any of the technological solutions already provided or proposed to keep the collected data private; instead I want to analyze the social and architectural aspects of the idea and to compare them with some of the privacy issues on the Internet.

Privacy

We all understand the term privacy, yet when discussing privacy there are different definitions and views depending on the discipline and the context in which the term is used. Merriam's Dictionary defines privacy as: "the quality or state of being apart from company or observation: seclusion," but the dictionary definition seems vague.

For computer science and ubiquitous computing privacy is all about storing personal information in digital form and who has access to it and when. As Katie Shilton puts it: "Privacy – the ability to understand, choose, and control what personal information you share, with whom, and for how long." [1]

Then again, for the architect, privacy is all about the place of intimacy and where we can express our private selves. As discussed in Juhani Pallasmaa's *Phenomenology of the Home*:

We have private and social personalities, and home is the realm of the former […] The secrecy of private lives concealed from the public eye structures our social life. Home is the place of intimacy where we hide our secrets and express our private selves. Home is our place of dreaming and resting in safety. [2]

Therefore, the debate around privacy is not only about the home being a private place, but also about the consciousness of being in a private area, where we can express ourselves as we are.

"Privacy is necessary for people to become properly moral thinkers and persons. We need to reflect on the things we want to do, and the space for reflection is typically private." [3]

The question arises if the awareness of being observed by different gadgets in our own four walls still makes us feel 'at home' or will we be more careful about the way we express ourselves?

Another aspect of privacy or the notion of private space is that the interpretation may change over time, depending on factors such as culture, crowding, context or amount of room around us, as Edward Hall pointed out in his classic *The Hidden Dimension*. [4]

Architecture and Ubiquitous Computing

The future technology involved in the Ubiquitous House will be difficult to grasp as a phenomenon. Most probably, it will not enter our homes as one all-embracing product, but gradually, in small portions, in form of distinct systems that control different aspects of our house. The sum of all these systems will build up to constitute the Ubiquitous House. Even if the systems will not communicate with each other (probably at the beginning), the objective of their surveillance and analysis will be the same – the user in the home.

In the Ubiquitous House, the user needs to be surveyed to accommodate and automate his needs and wishes; the house is supposed to become a machine anticipating desires. To achieve this, the technical environment measures every movement and action, embeds the situation in an environmental description of the moment, and stores the data together with the intentions of the user (in the form of activated functions) to analyze them over time and predict future needs and actions. The combination of all the collected and combined data creates a digital image of the user, a digital alter ego corresponding to the measured actions he or she repeats over time in the house.

What is disturbing is that this digital representation is omnipresent and very intimate in its nature. Each recording (for example, turning on and off the light, entering a room, opening a window) might be harmless and trivial when singular, as it describes only the activation of certain functions. However, in the combination of different recordings and spread over time it provides a picture of our habits.

On the one hand, they could give a fascinating picture of us, our everyday practices, and personal and cultural conventions by which we live; on the other hand, however, expose our irrational acts, reveal unconscious personalities or even unveil oddities and eccentricities. In its objectivity, the recordings would not be too picky about the details. The house could help us control our health, pre-empt diseases, calculate and order food and household goods. It could even listen to our interpersonal conversations to interpret our intentions, moods and social interaction to be able to intervene appropriately (dim the light, turn on soft music in case of a romantic mood, or shut the windows and doors if a loud discussion is not intended for the ears of the neighbors).

What is interesting is that not only our habits or our conversations can be analyzed but also our behavior can be predicted. Researchers analyzing social habits in social networks, such as Facebook, MySpace, LinkedIn and so forth, were able to predict which individuals were to become couples by observing how intensely one person was checking another person's profile. [5] Social networks have become a popular source for Sociology and Social Psychology. Collecting data in the house would provide even more comprehensive measurements of homo sapiens. Masses of data, allow us not only to analyze the individual,

but can even lead to define patterns of behavior attributed to social groups or even mankind in general. The user becomes fully transparent (der gläserne Mensch) when the recordings in the house are combined with the digitalized thoughts, interests and discussions of the individual on the Internet. The general behavioral patterns discovered by the researchers, allow then interpreting the behavior of the individual more easily.

It is precisely this kind of information that the researchers hope to reveal and to adapt the house and its technology to our needs and predict our desires: the house of total comfort, ease and no-brainer.

On the other side, it reveals our private side. There would be no hidden sides that we could live out in private, irregularities that make us different, no intimacy. Privacy as we know it would disappear.

Our reaction today to such a radical cut in our privacy is uncertainty, fear, distrust and rejection of any such system. Of course, nobody plans to take away our privacy or break into the serenity of our home. Most of the researchers and visionaries in the field of ubiquitous computing are also confident that the data collected would stay private. Beside the research on how to realize the Ubiquitous House, there is a consensus that this could be only achieved by keeping the data private; research to make such systems intrusion-free is in progress. Apart from traditional security measures denying access to digital data, different strategies for keeping data secret have been presented: anonymizing data; introducing special personal access keys; [6] storing relative as opposed to absolute data; [7] determining privacy settings that can be negotiated with the sensors. [8]

Many aspects of the technology will make it inevitable in our houses. In Japan, which is confronted with a demographic problem of over aging, huge efforts have been invested in Gerontechnology – the use of technology for the aid of the elderly. Many fascinating ideas have been produced, proving that introducing ubiquitous computing in the house is worthwhile, like the iPot, [9] a kettle for the elderly living alone, that sends out signals how often it is used, thus telling the relatives indirectly that all is well. It is a good example of combining cultural aspects, such as the continuous use of hot water in Japanese households, with a discrete but aware element of surveillance.

The changing patterns of human-technology interaction have an influence on how the built environment is perceived, especially in a surveyed environment that interacts to our needs and environmental conditions. Even the term privacy and what can be labeled as private is undergoing a dramatic change.

This shift in the understanding of privacy can partially also be seen in architecture.

Architecture and Privacy

In his book *The Un-Private House* [10] Terence Riley analyzes the changes recently undertaken in the private house. Examples he gives describe the new tendency of the residents to expose themselves to the public, as displayed in different strategies of housing. For instance the public gaze can enter more or less unobstructed in the house (Michael Bell's *Glass House*, Shigeru Ban's *Curtain Wall House*, Neil Denari's *Massey House*), the public is mediated in the house (Lupo/Rowen's *Lipschutz/Jones Apartment*, Herzog & de Meuron's *Kramlich Residence*, Hariri & Hariri's *Digital House*) or the house is designed as a reception for the public (Michael Maltzan's *Hergott Shepard Residence*). These are only some examples in a trend of opening the house to the public.

Modern architecture has provided us with lofty and open rooms; glazed facades that let the light in and at the same time open the inner life to the gazes outside. Winy Maas from the architecture and design practice MVRDV said:

Putting the inside, even your own, on display seems a very modern topic. It might be perverse but it has similarities with the mixture of privacy and publicness these days: walking on the zebra crossing and listening to the love conversation of the neighbor who is phoning his girlfriend, the way people show their privacy on the television in order to attract attention. In such a condition the ancient limitations between privacy and publicity seem to be irrelevant.

With new media, television and radio, the telephone and especially the computer, the public has entered the home. The interconnectivity with the computer has made the far-away present in the house more than ever, with the web-cam allowing the presence of a public that in physical sense would never have been able to fit in the home. There are individuals that expose their private sphere readily 24/7 on the Net; the first and quite well-known was jennycam (Jennifer Ringley) who attracted a large community that consumed this sort of exhibitionism.

Privacy and Internet

The discussion about private and public has long left the focus of the house/street discussion and shifted to the Internet. Yet, this shift allows us to observe the way private data is harvested on the Internet, to give a glimpse of strategies that could be used to collect digital personal data, for different reasons, in the real world. There is an ongoing debate on the ethical and juristic consequences of collecting data in the public – where most of us believe that an individual disappears in the masses or is hard to trace in the amount of data produced. However, the latest developments in surveillance technology have shown that to stay anonymous in public, precautions have to be made.

Internet strategies – such as those of large companies offering free mail accounts, free chat and VOIP-communication in return for data such as addresses, links, opinions and other information that can be extruded out of Internet habits – could be shifted towards information harvesting in the city and its buildings. Already big companies such as Google, Apple and Microsoft collect information based on our location and what actions are linked to that place – for what purpose is yet to be seen. The studies on Internet privacy [11, 12, 13] are not as much intrigued with how privacy is carelessly exposed, but to what extent it is willingly given. There is, of course, much ignorance, disbelief or just plain naivety in respect of the capabilities of consumer companies to collect information about individuals or their capabilities to harvest such details out of the sheer flood of data. The existence of companies that just handle – not collect – data on the Internet contributed to people or companies show the extent of development in this field. Experts are already discussing the market of such data, data-banks and exchange markets (like stock markets) for such collections of data as the next big expansion-possibility once the money-markets get more regulated. [14]

However, what is really surprising about diminishing privacy on the Net is the behavior of certain parts of the new generation, which has grown up with the Internet. On the Net we find individuals who see their private-data as a value or means to exchange for online-services. For instance, individuals who use the Internet to propagate themselves: in the run to avoid the trivial and anonymity, all aspects of life get published. Thus, not only to impress the (virtual-) friends, but also in the hope to become famous: the Net sieves the information to find some poignant and exciting aspect that is worth propagating. That

this strategy can backfire is one of the lessons yet to be learned, as the Internet will not forget, even if we as individuals might change over time.

Internet strategies applied to the Ubiquitous House

In a thought experiment, I would like to employ strategies from the Internet for collecting user data in the Ubiquitous House.

Big food companies could offer household appliances such as free fridges in return for our consumption information. Whenever milk, butter or eggs would be used up, the company would automatically deliver the goods directly to the fridge. This would bring the advantage of time-saving and continuously fresh supplies for the consumer and for the company the guarantee of consumer-loyalty/dependency relation and ease of just-in-time logistics of food supplies through availability of consumer data. Furthermore, the collected data of user behavior can be sold on the information market. Combining different information sources, allow creating a precise user profile. The consumer habits in the house can be combined with search information and order habits from the Internet. This profile could be used to create new marketing strategies and produce product desires tailored specifically for the user. Moreover, new services that would make life easier in the house would be provided to the user, again 'free' of charge, so that the user gets tempted to deliver more crucial information about his or her behavior. Life in the house becomes a commodity. Our actions, our consumption habits (material but also energy, free-time, social and other immaterial habits) our cultural and religious habits, even our health-data – all can be swapped for seemingly free services that would allow companies to design products tailored to our needs.

The role of architecture in privacy of a ubiquitous house

As Katie Shilton appealed to the designers of ubiquitous technologies not to abuse the privacy of the user and to store only relative data, I think it is up to the designers and architects designing ubiquitous houses to provide the users with a choice by showing the possibilities of the ubiquitous environment through transparent design. Maybe 'surveyed areas' and surveyed objects have to be distinguished, so people are aware of being registered by what sensor. Something like work by the artist group "made," who painted surfaces in public areas which were surveyed by CCTV cameras; distinguishing scanned areas so as to allow the public to choose if they wish to be registered or if they want to stay out. This visualization of the surveyed spaces and uncovering of the gadgets involved is clearly opposing the vision of ubiquitous computing in the house as originally defined by Mark Weiser, [15] who envisioned gadgets being pervasive but out of sight. I would state that uncovering or making sensors visible and areas that are observed obvious, would make the user feel more in control of what he is giving away and when; thus more at ease.

Another possibility is to create rooms or surfaces that are surveillance free, giving the user the certitude of private areas, and other parts of the home where the user is conscious of the possibility of being observed. Just like the modern open apartments where the dweller is conscious of the possibility of being observed in the living room by the odd passer-by and at the same time having the confidence of being unobserved if the blinds are pulled down. It is up to the user to choose.

Conclusion

With the paper I wanted to state that the problem of privacy in the Ubiquitous House is not necessarily only a technological one but could also be seen as a phenomenological problem. Looking at the strategies of data harvesting on the Internet today, it is more probable that the user of the Ubiquitous House would be giving parts of private data voluntarily as opposed to them being collected illegally, however the combination of different sources of data could then be quite revealing.

In contrast to conscious providing of information on the Internet, we don't know what is revealed in the Ubiquitous House as the data is produced through (unconscious) actions of everyday life. Awareness of the omnipresence of scanners in a house changes the role of the home for its user. If we cannot perceive the technology around us, but are nonetheless aware of it by registering the reactions to our presence or our actions, inevitably we will ask: "What information is being collected, when, and what happens with all the information?" Seeing where the sensors are and apperceiving the causality of reactions in the house to users actions, would not only propagate a sense of control but would probably allow creative interaction, turning the ubiquitous technology into a real tool.

Thus the option of integrating the visibility and awareness of surveillance in the design of the home of the future and giving the possibility to stay unobserved when desired are important parts of gaining the confidence of the user in the abilities of the Ubiquitous House and providing privacy in the house.

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Elephant : The Construction of Contemporary Representation Images

Rattapol Chaiyarat

In contemporary culture, the surface of information is thoughtfully constructed; it contains visual material that symbolizes nature and artifact. The work demonstrates the reality of how we view elephants and relate with the different representations informed by contemporary and cultural environments.

Fig 1. Stonework, 2004, Rattapol Chaiyarat, Digital Image.

Fig 2. Untitled 2, 2009, Rattapol Chaiyarat, Digital Image printed on photographic paper, 60 x 60cm.

Fig 3. Untitled 3, 2009, Rattapol Chaiyarat, Digital Image printed on photographic paper, 60 x 85cm.

Introduction

This research is aimed at constructing and creating a body of work that communicates, in digital imagery, key issues around the contemporary representation of Asian elephants. To develop this work I will investigate the changing role of the elephant in Thai culture both in historic and contemporary terms. A significant direct interest in this research is the power and effect of "visual culture." [1] My artwork is a fabricated simulation, created and constructed from image material. The animal images are digitally manipulated into illusions and investigate how humans experience nature through visual contemporary culture. In this way, I relate with different kinds of visual representation for their specific forms and effects.

Objectives:

1. To investigate the construction of image and representation of elephants in contemporary life.
2. To create a body of artwork that communicates in digital images, and an expressive commentary on the contemporary representation.

Contemporary context: Cultural Representation

As Stuart Hall asserts in his book *Representation: Cultural Representation and Signifying Practices*, "It is us – in society, within human cultures – who make things mean, who signify." He adds,

Meanings, consequently, will always change, from one culture or period to another. There is no guarantee that every object in one culture will have an equivalent meaning in another, precisely because cultures differ, sometimes radically, from one another in their codes – the ways they carve up, classify and assign meaning to the world. [2]

The process of creating meaning is complicated and each culture has its own way to construct and communicate through signs and representations. However, in recent years, the globalization of the Internet has been increasing and it is not unusual for us to be able to experience contemporary signs and representation from different cultures.

As Nick Lacey writes:

Saussure's description of signs, […] is important in Media Studies because it emphasizes that they are social constructs; they do not possess inherent meaning. Once this is understood, the task of analysis is to deconstruct not individual sign, but sign systems to show how meaning is created. [3]

We have been experiencing – and probably creating and contributing – new meanings and representations to our society for quite some time since through our global social media network. People across the globe are able to exchange experiences and ideas through new media and learn about each other through culture. Artists are able to present their works through these new media channels; they can express their creations through signs and representations. In *The Concept of Representation,* Hanna Fenichel Pitkin writes that:

The artist "represents" his object as something, or as having certain characteristics when he depicts it, makes allegations about its appearance. [...] When he represents something by a symbol, that symbol

may well be a recognizable object, but it need not be and usually is not a representation of what it sym-
bolizes." [4]

Representation can be constructed by using a set of objects or symbols, and it can be interpreted by linking specific facts of each symbol together to create meanings. "In the *constructionist perspective*, representation involves making meaning by forging links between three different orders of a thing, [...] and the signs, arranged into languages, which 'stand for' or communicate these concepts." [5]

In contemporary art practice, representations of animals are therefore not only about the reality of the animal itself but also the associated symbolism and cultural values that we attach to animals. The material appearance of Olly and Suzi's *Cheetahs* (Namibia 1998), [6] for example, collaboratively create a painting on location. The photograph presents a painting of cheetahs that is surrounded by the animals themselves in their natural habitat. The work is focused on environmentalism and the conservation of endangered species. There are some others artists, such as Sue Coe, Frank Noelker, and Britta Jaschinski, who have used their art to address the confinement or mistreatment of animals. [7]

Research Methodology

This current research is focused on the construction of representations of elephants by using visual methodologies to explore contemporary images of elephants and the consequent impact on perception; aimed at creating a body of work that communicates its findings through digital imagery. To develop this work I will investigate the visual material in terms of cultural significance and social practices.

The Construction of Contemporary Representation Images

I use photographs as tools to generate digital images and create new meanings by combining surface information that represents the animal in contemporary life. Digital manipulation allows me to combine different images which contain several symbolic meanings together. *Stonework* (2004), for example (Fig. 1) is a natural raw material that retains its qualities even when crafted and manipulated by humans to become a more meaningful artifact; therefore, it symbolizes human civilization and cultural heritage.

In *Untitled 2*, 2009 (Fig. 2), the brickstones connect the elephants with ancient man-made structures and traditional heritage. Centuries have passed by, but the stones are still there with the trapped animal, suggesting the core of our culture continues on. Brick by brick, block of stone after block of stone, we shaped them up into whatever we would like them to be. The image perhaps reflects how humans have tried to occupy and colonize the powerful raw materials of nature.

Untitled 3 (Fig 3.) represents the way humans view animals in captivity through bars, fences and boundaries, which are completely changed in appearance to an invisible enclosure. An elephant is merged with leaves and branches; its skin is almost blended together with the captive environment.

In captive environments that are open to the public, such as zoos, visitors are not only viewing the actual animals but also the visual material that represents their natural habitat. The enclosures effectively stimulate viewers' reactions actively relating them in the process of experiencing nature.

The images also demonstrate the animals on display in contemporary society. We love to look at them and appreciate the greatest living figures. We place them in our society and celebrate our triumph over

nature. The work is another example of reconstruction and exploration of visual representations from different materials.

Conclusion

My works *demonstrate the construction of contemporary representational images of elephants. The visual culture that surrounds our everyday lives has a huge effect on how we construct and interpret our experiences.* I often use the animal identity and its environment; representing them as a metaphor for issues and concepts affecting contemporary culture. Images of the animal itself form a very important solid layer of information for my work because it already deals very effectively with something that has an everyday existence as well as social and cultural associations because of its history and relationships with mankind and the natural environment.

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Digitaterial Gestures – Action-Driven Stererolithography.

James Charlton

Attempting to reconcile a digital sensibility with sculptural materiality steeped in the modernist legacy of "truth to materials," we can conceive of a form that is generated outward from its central core. Reflecting on the theoretical implications of the generative process this paper explores the nature of digital materiality as a heterotopian space comprising of and uniting artist, material and process.

1. FORMø/12, James Charlton, thermoplastic extrusion, Copyright James Charlton.
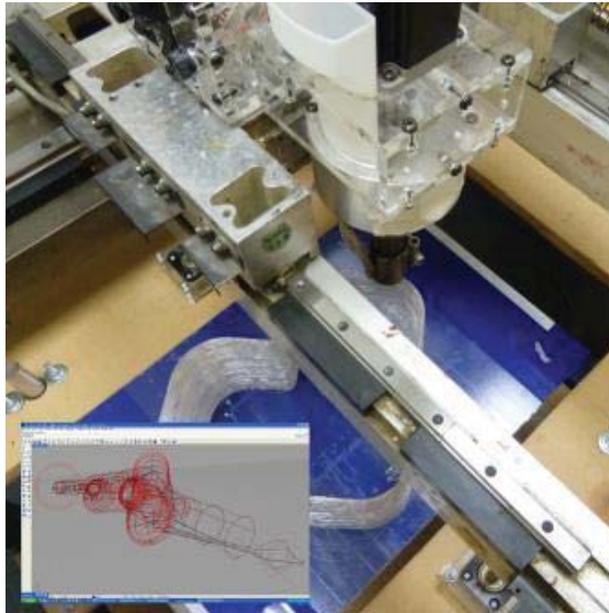
2. FORMø: 3D Printer and Generative Software, Olaf Diegel, photographic documentation, Copyright Olaf Diegel.

3. FORMø: Process Documentation, James Charlton, stills from video, Copyright James Charlton.

Through what passes as a high-speed network in New Zealand I SHIFT/CLICK/ZOOM through the Quick Time Virtual Reality (QTVR) of Brancusi's studio in the Centre Pompidou. [1] Here, in this carefully manicured space, I can indulge my voyeuristic urges – rummage around the private inner sanctum of the artist's 'creative' process, lingering on every (contrived) residue, every 'casually' placed prop that poses as a creative artifact.

It is at the tool bench the artist's presence is most visceral: hand-worn tools and other signifiers of the making process litter the bench. Every 'discarded' shaving is given new import by the museum handrail that even in this virtual space asserts credibility. Here, surely, is the authentic act – the point of closest communion not simply between artist and audience but between artist and product.

It is in seeking this point of contact between the maker and the made, the making and the maker that the project FORMø will be discussed.

FORMø is an interdisciplinary collaboration between artist James Charlton and engineers Olaf Deigle, Sarat Singamneni and B. Huang. Working within the Creative Industries Research Institute (CIRI) at Auckland University of Technology, the project received Smash Palace funding under the partnership program between the Ministry of Research Science and Technology and Creative New Zealand. [2] The fund supports collaborative projects between teams comprised of loosely defined New Zealand scientists and artists. The emphasis of the fund is on the cross-disciplinary sharing of knowledge and exploration of methodology rather than applied outcome.

The project developed out of the dialogue between Design Engineer Olaf Deigle and Artist James Charlton in 2008 around the use of rapid prototyping technologies in creative practice. From this exchange Charlton produced a number of works that laid the foundation for this project, for instance *16:sec*, in which sixteen seconds of video was used to generate a series of rapid prototyped forms.

In Charlton's writing about this work, we find the concerns that have driven the conceptual direction of Digiterial Gestures: *16:sec* "explores the construction and perception of time-based events by examining the ability of static objects to encapsulate temporal information. It aims to question our relationship with physical objects and the static concreteness that we assume of them, [...]." [3]

The relationship between Diegle and Charlton at this stage was not fully collaborative in nature. Deigle's expertise in rapid prototyping was being applied by Charlton in order to realize his ideas. What developed from that dialogue was an exchange of ideas about form, materiality and time in the context of fused deposition modeling and the authored gesture.

From this point of convergence, FORMø proposed to realize a system through which the performative gestures of the artist are translated into concrete form by integrating motion capture technology with real time 3D printing.

The approach was to develop a concept machine made by modifying an X-Y axis system from an electronic pick-and-place machine that allowed for a print area of approximately 600mm cubed. The completed platform provides an X-Y axis that moves the print head along the vector print path and a Z axis which moves the build platform down by a unit of measure. The motor control system consists of four stepper motors (one for each axis, and one for the extrusion head), a Xylotec XS-3525/8S-4 Stepper Motor Driver Board, and an Olimex LPC-H2148 Microcontroller Board allowing for simple control of the 3D printer through a PC-based CNC machine control program called Mach 3 CNC. A custom-made thermoplastic extrusion head allows for granules, powder, or plastic to be extruded. (This system served the development phases of the project; it has subsequently been replaced by a Mitsubishi MoveMaster-EX five-axis robotic arm. This system is still under development at the time of writing.)

Initially, print data was generated using an OptiTrak V100:R2 six-camera motion capture system and Arena motion capture software. Even in this simple six-camera set-up the limitations of software designed specifically for animation purposes became evident and the motion capture equipment was quickly left behind in favour of a customized motion detection software system.

Experiments using color tracking proved much less cumbersome and more manageable but still required controlled lighting and trackable color markers that worked as an interface barrier separating the artist's hand from the digital expression of form, and theatricalizing the work. By switching to a Kinect depth map camera system and defining the sample space depth, accurate motion capture of hand gestures provides clean data for the printer.

The Kinect was hacked using MAX/MSP to extrapolate data for XYZ and direction for two hands to send to the Rhino plug-in Grasshopper for real-time form visualization and compilation. The flexibility of this approach using graphic programming interfaces to process the raw data enabled the team to experiment with and conceive of algorithmic methods of generating forms from the spatial data.

Put simply, instead of thinking that a hand moving in space would correspond to a similar movement by the printer, multiple points on the body could be combined to determine the position of the deposition head.

Through this train of thought, it became clear that the project was not thinking simply about virtual drawing in space but was attempting to understand how the artist's actions could interact with digital material. The notion of digital material is perhaps paradoxical. [4] Perhaps there is not even such a thing, or if there is it refers to things arising from a digital process – an image, a document or a 3D-print. As I attempt to explore this notion of digital materiality it will become clearer that what I am really speaking to is the non-material being of the media without manifestation – media as a concept in relationship to process.

This paper seeks to frame the project in these terms – as an attempt to reconcile spaces within a heterogeneous space that might constitute a new understanding of the materiality of the digital.

Collapsed Spaces.

Unlike the rarified and idealized modernist studio where singularity of discipline, intent and technique assume one source (the artist), FORMø operates across spatial, modal, disciplinary and temporal sites.

In practical terms, there exist two primary sites: the site of production and the site of reproduction – in this case the artist and the 3D printer. Initially the challenge at this practical level seemed simply to eliminate the latency between these sites, bringing them together as one event. This might be thought of in traditional terms as seeking the same immediacy that the sculptor's hand has on a lump of clay or the painter's brush on a canvas, but is also evident in contemporary digital media practices such as video production, where the artist's gaze carves its way through time, or in some forms of installation and performance work. (I don't want to labor historical metaphors here but it is useful to ground the ideas in physicality of media when trying to understand the materiality of the digital.)

I am then suggesting that in direct manipulation of media – the visceral effect of the artist's body on materials – a synthesis of space is achieved by collapsing the spaces of the body and the spaces of the material into a heterotopia - a place "outside of all places," and removed from that which constructs it. [5]

Returning to Brancusi's studio for a moment we see that there are present at least three utopias – the artist's hand (as distinct from the artist's consciousness), the material studio (in this case both tools, materials and finished works) and the museum (acknowledged in the introduction by the handrail).

This collapsed space of action and event (with implicit inclusion of author and outcome) is the space long identified in artistic practices. In its many interpretations we see investigations and experiments of Ruskin's "truth to materials," [6] in modernist sculptural work (most obviously the work of Henry Moore and minimalists Eva Hesse and Richard Serra) and in the emergence of performance works in the 1960s and 70s in which "sculpture is re-contextualised within an action." [7] More recently, the work and strategies of practitioners like Tino Sehgal have become exemplars of a type of practice that synthesizes production and product.

It is perhaps not surprising that digital art practice with its distributed nature, obsession with the screen and contestable authenticity is less concerned with materiality "as being 'hyper,' 'virtual,' and 'cyber' –

that is, outside of the known materiality, existing independently of the usual material constraints and determinants [...]." [8]

However, in technologies such as rapid prototyping we can see practices emerging that exploit the notion of the digital as a material with its own 'material truth.'

In the collapsed space of the computation process that developed in this project, the 'material truth' is one that originates not in the artist's body, the tools of production or the physical materials but a heterotopian space that is distinct from all three – the space of the digitaterial. (It's important here to distinguish the Digitatrial from digitality. Negroponte's (1995) treatment of digitality separates the world into "bits and atoms" whereas the notion of digitaterial space collapses the physical and the digital into a common space in which the digital has materiality.)

Rather than visualizing the outcomes that might be produced, what must be conceived of is what the process itself delivers. Rather than imposing subject matter for technology to execute, the relationship between the artistic gesture and technology should be seen as subject matter itself in a manner that is part of the continuum of "truth to materials" in sculptural practice.

Traditionally additive manufacturing processes estrange the act of production from the act of generation as files are worked on in isolation from the material reality of the 3D printer. In fact this has been the goal of these technologies – not only to allow predefined designs to be realized as proto-types, remote from the tooling and mass production, but to remove the designer from the constraints of the materials and the preconception of form.

As Ann-Sophie Lenmann puts it: "New media have led to the formation of new creative spaces; spaces that seem to have caused a dislocation of materiality of the traditional working space." [9]

Here we might identify both the promise and failure of not only additive manufacturing but, perhaps, our general approach to the digital. In liberating the artist from the constraints of the physical we define a media whose intrinsic materiality strives to go unrecognized or to pass as the real rather than the imitation of the real. "[...T]he very process of making is rendered invisible by the medium itself." [10]

The digitaterial space is then defined as being the heterotopian space comprising and uniting artist, material and process – a space in which materiality and form are defined from within.

Ironically enough we find this endlessly thrown up to us in demonstrations of the marvel of 3D printing where the very tired Klein bottle is once again the standard. This impossible form – without boundary and in which notions of left and right remain illusive – has become the Escher of rapid prototyping as it exemplifies the dilemma of digital materiality.

This is the space of the impossibly perfect contour, the surface model that denies its own existence, as opposed to the space that has no form other than that which it itself defines.

The point I am making here is simple enough: that the digital, freed from representation, is not without material qualities. In and of itself it has characteristics that are as compelling as the block of wood or lump of clay in Brancusi's studio.

Yet to sculpt them, to form them, is akin to modeling air. In the most literal sense this is the experience of making these forms.

One's hands become disembodied. No longer the property of the artist they defer to the material of the digital that, as it twists, bends and rotates appears more in control of the artist's body that s/he is.

No longer calling to another site, this collapsed digitaterial now looks within to the locally defined gestural source for its sense of material truth.

The artist's actions are thus sublimated into the digital, his/her body controlled by the material logic of the medium. Rather than manipulating it s/he is party to it both inside and outside.

Slices of Time.

The sequential layering approach of conventional rapid prototyping systems imposes a structural logic on form that is alien to its own inherent structural logic. The computation of slices that provide the freedom to generate impossible Klein-like forms is one of the liberating attractions of 3D printing. Yet, even in structural terms it presents a weakness. Unlike a branch that's grain is indicative of its form, adding a strength to it that is an inseparable part of its materiality, the slice approach is externally defined.

Using the analogy to wood-grain we can conceive of a system in which the printer head follows the contour of a form, possessing its own material logic. However, this places further conceptual considerations before us.

Diegle's work on curved layer deposition follows this logic and looks to the form itself as the referent for its deposition structure. By analyzing the contour of a surface, layers can be deposited along the curvature of the shape, increasing the structural integrity of the build.

Instead of sequential layering's external slicing up of time, in curved layer deposition time exists relative to the form of the material. Form is not conceived of with a logic outside of its own generation; rather, the space and time of the form are "constructed locally." [11]

The imposition of an externally defined time based construction of form has the inevitable effect of producing a lag between generation and realization. Reducing or eliminating latency has been the ambition of many developments and experiments in digital media. Explorative investigation of direct manipulation such as those conducted by Willis et al, cite latency as a problem to be solved, as a temporary technical obstacle to achieving material immediacy. However, if time is seen as a material feature of the digital as discussed, then immediacy is inherently resolved. The goal of reducing latency in digital media processes is then a misguided attempt to make the digital 'real' – immediate in the here and now.

If, as suggested earlier, direct manipulation can be achieved by collapsing the space of the body and the space of the material, and that time is a dimension of the material instead of producer, then the imperative of reducing or eliminating latency between generation and deposition becomes obsolete. Instead of seeing latency as a technical/mechanical failing to be overcome, the gap between production and produced simply no longer exists.

The Workbench of the Digital.

Unlike Brancusi's studio the workbench of digitaterial is not a space cluttered with tools or littered with shavings any more than it is the SHIFT/CLICK/ZOOM of the mouse or the software interface. The digitaterial workbench is the disembodied space map of my hands as they reach out and dissolve in the Kinect's vision.

Perhaps instead of obsessing about making the digital 'real' by seeking to impose ever-greater control over its ability to be 'real' (or, more accurately, to conform to existing notions of the material real) we can approach an understanding of digital materiality by collapsing into the space that is "absolutely different from" that which defines and generates it. [3] The digitaterial is that which is released from our grasp as we embrace it.

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Stereo Animated Pictorial Space: Le Phénomène Atmosphérique

Ina Conradi Chavez

How can artists influence new technological initiatives and push the expressive capabilities of animation and 3D stereoscopy towards a new pictorial space? How can we create fully immersive paintings where large scale moving paint marks and textures would appear to exist in real space? Written at the starting point of this research, this paper will try to describe it, with emphasis on the first art works produced.
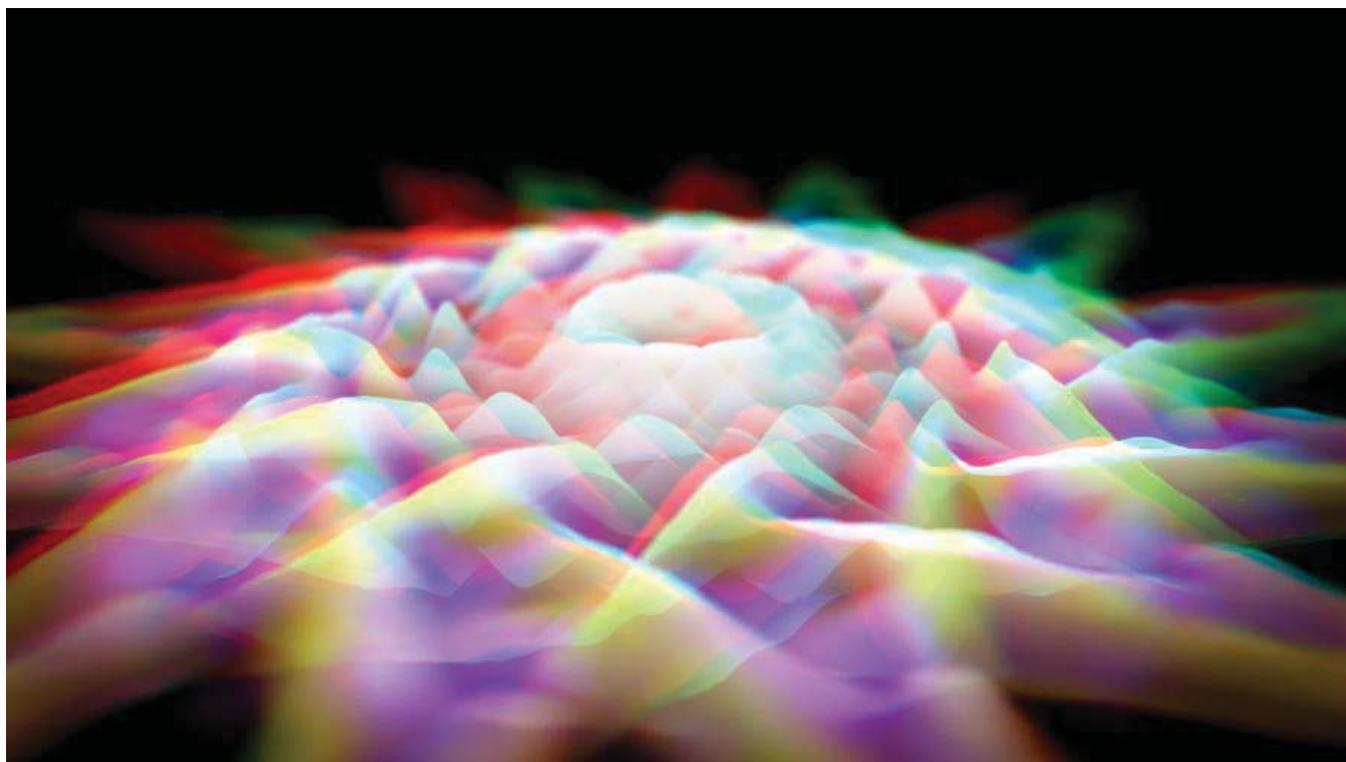
Fig.1. Le Phénomène Atmosphérique: Aurora, 2011, Ina Conradi and Yoon Wan Cheong Davier, Still from 3D stereo Digital Animation, © 2011 Ina Conradi. 3D red-cyan glasses are recommended to view this image correctly.
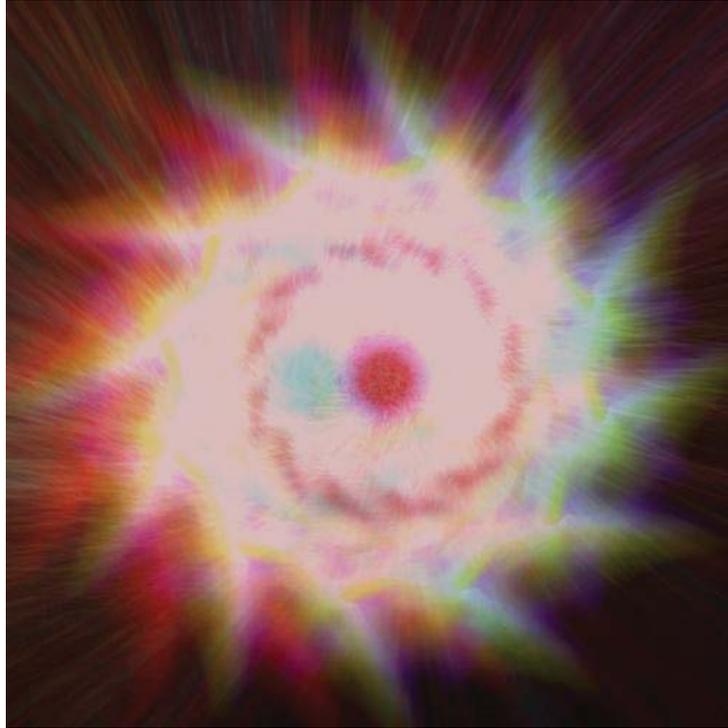
Fig.2 Le Phénomène Atmosphérique: Glories, 2011, by Ina Conradi and Yoon Wan Cheong Davier Still from 3D stereo Digital Animation, © 2011 Ina Conradi. 3Dred-cyan glasses are recommended to view this image correctly.
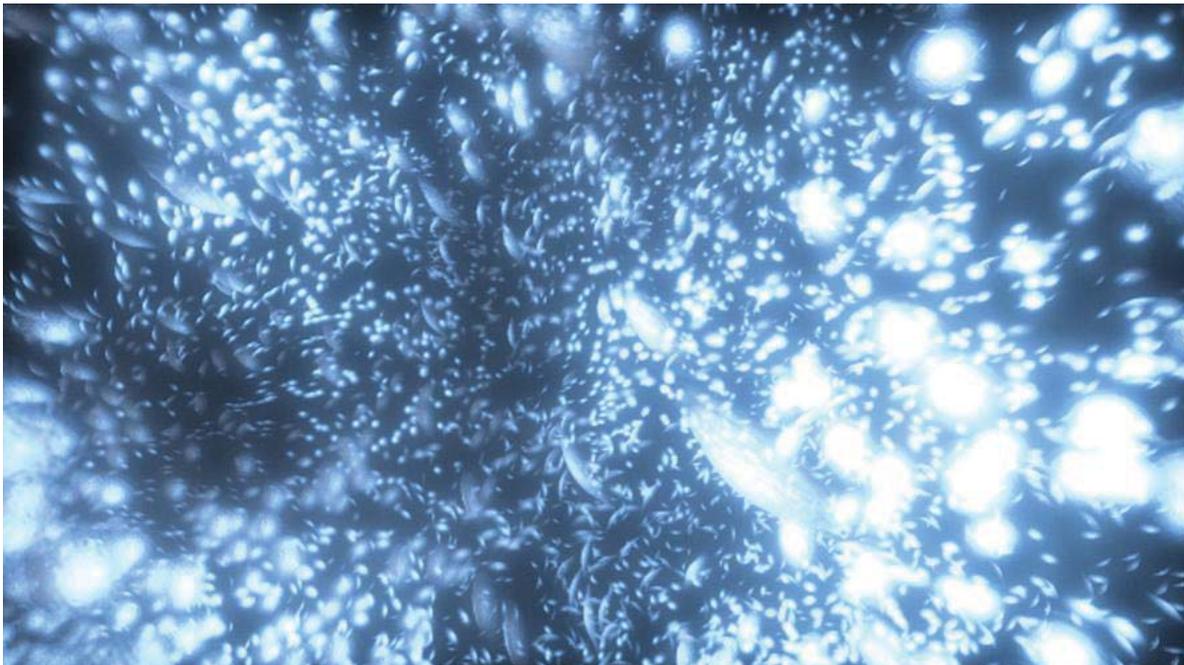
Fig.3. Le Phénomène Atmosphérique: Precipitation, 2011, by Ina Conradi and Yoon Wai Cheong Davier, Still from 3D stereo digital animation, © 2011 Ina Conradi.

Introduction

Recently started research within the Institute of Media Innovation, and continued as part of the Academic Research Fund (AcRF) TIER 1, at the School of Art, Design and Media, at the Nanyang Technological University, opened an original field of explorations into inventive applications of 3D stereoscopy and artistic digital media expression. This writing occupies a potentially contradictory place in relation to the actual art piece, an animated film *Le Phénomène Atmosphérique,* which will accompany the presentation of this paper at ISEA 2011 Istanbul.

In *Le Phénomène Atmosphérique,* the argument of the research project will be made visually. This experimental 3D stereo animated amalgam, with heightened senses of emotion and immersion, aims to create a pictorial experience that is dimensionally composed in virtual and real space. Sixteen short sequences of painted and animated atmospheric optical phenomena will be juxtaposed without a great deal of verbal explanation. However, here they appear as a reproduction, flat and printed as anaglyph composites. The print visual results in poor color fidelity as it is viewed with passive red/cyan glasses, but when experienced in person as a fusion of visuals, sound and movement, it is meant to reveal a quite different feeling. Moreover, a text will try to articulate the notion of painting as one that is based precisely on its resistance to language, and is fueled by the immediacy of a sensory enhanced illusion of depth; and therefore is expanding its pictorial space. The sole write up on stereo design methodology carries a risk of standing in opposition to the actual viewing experience. My feeling, however, is that, during the visual presentation, the two will stand as balanced complements. At the same time both the art works and the write up actively embrace the contradiction. On one side, there is the frustration to clearly define painting, and how it relates to the prolific chaos of popular digital image making methodologies; in particular, visual effects in cinema. On the other, continuing pleasure in painting and being so completely motivated by pictorial qualities, makes these works very close to the spirit and intention of twentieth century abstract painting practice. As American abstract painter, Ad Reinhardt put it: "If I were to say that I am making the last paintings, I do not mean that painting is dying. You go back to the beginning all the time anyway." [1]

'Cyclops Eye'

Roger Ferrgallo points to Charles Wheatstone's 1838 discovery of the psycho-optical consequences of our binocular vision of reality – where one sees that this reality is the product of our two spaced-out eyes, rendering two different retinal views of forms in the visual field, so called stereopsis – as a discovery that caused great excitement in the arts. To quote Ferrgallo's enthusiasm from his *Manifesto*:

Painting is reborn. Enter the new awareness of stereo space and a new aesthetics in painting. The century's long conquest of plastic forms within a monoscopic pictorial space may be at the end. A new powerful illusion of the three- dimensional space-field is possible. It asks nothing more than the trance-like stare of the middle eye to waken *Cyclops* from his 35,000-year sleep. This primeval giants reward will be the sudden revelation and witness to the dematerialization of the picture surface into an aesthetics of pure space where visible forms will materialize and release themselves—forms that are suspended, floating, hovering, poised, driving backward and forward, near enough to touch and far enough away to escape into the void. So now, enter a new aesthetic empathy, meditation, subjective intensity and an unparalleled form-space generation and communication. All of this exciting injunction could have been declared 134 years ago had it not been for the invention of photography. However, at that time, 1838,

the full investigation of form within the limits of the monoscopic surface had not yet been fully realized: the genius of Cezanne, Picasso, Braque, Duchamp, Balla, Mondrian, Kandinsky, Moholy-Nagy, Pollock, and Escher lay ahead. Awaiting the future, too, would be the subjection of the picture plane to the forces of sculpture. [2]

To what extent did the recent surge in 3D, stereo media inspire the desire to alter the viewer's experience of the painted surface? It was left to the advancements in visual effects and image manipulation to influence artists to definitively break with easel painting and to account finally and determinedly for the emergent binocular vision of 20th century abstraction. [3] The influence of cinema alone with the surprise and marvel at the magical trick of 3D stereo illusion is addictive, as the spectator wants to immerse oneself in the 'optical fantasies.' Paradoxically, when used in arts, 3D stereo technology generates complaints. [4] The inevitable threat of danger continues in crossing the boundaries between popular media and traditional painting media. Consequently, in the 21st century painting practice continues dancing in circles with technology, while the physical materiality of the still, flat canvas, and the magic of projected animated visuals are chasing each other's tail. [3] Anne McCauley, in her essay on *Realism and its Detractors*, states:

The undeniable commercial success of stereoscopic views was met by charges that the stereo images appealed to the young and ignorant, enticed the masses with the objects beyond their means, undermined the taste for the ideal, and encouraged idleness. The contemplation of images, particularly those that seem to dissolve their mode of creation into the transparency of nature when it is confronted directly, has always been fraught with danger: the danger of confounding the icon with its unknowable referent, the danger of desiring things of the world, the danger of being fooled into thinking that the illusory is real. Yet, at the same time, the production of images that go further and further in recreating the effects of lived experience reveals how widespread is the public's willingness to succumb to phantoms, dreams, *simulacra*, where the body vaporizes into pure visuality and effortlessly travels in space and time. Nowhere can this conflict between the popular craving for visual thrills and the condemnation of such desires be better observed then in responses to stereographic arts – photography and moving image. [4]

McCauley illustrated popular beliefs that 3D stereo invention carried apocalyptic predictions of 'the end of creativity' for the traditional fine arts. Today, however, all practices can benefit from each other. The 'chaos of connections' in new media, science, and traditional painterly approaches could be used to gain advantages towards helping painting to expand into new space. [5]

Rebuilding Abstraction

Abstraction in painting is putting too much emphasis on the materiality of pigments and immediate random gestures. In fear of any figuration and illusionism, pictorial space is being reduced to a thin, shallow, and inert one; threatening to disappear all together. In addition, regardless of if it is figurative or non-figurative, the appearance of things in paintings has very little to do with the way one actually sees things and how they are represented on the surface. Moreover, it is nearly impossible to attempt to make things look in painting the way they look when one perceives or experiences them. 3D stereo space is a fragile illusion, however it is able to restore pictorial space, by converging not only the renaissance notion of measurable space, but also of the void and pure spaces of Malevich's white square; and of Irwin's experiences of the fourth dimension. There is a thrill to be given such an exciting opportunity to explore how stereo immersion can keep the concept of painting fresh. In fine arts, human perception plays a central role in establishing a channel between the artist and his audience over which emotions,

feelings and ideas may be communicated. Our intellectual experience complements spatially and formally, the optical phenomenon perceived by the eye and renders them into a comprehensible whole, while photographic cameras reproduces the purely optical picture.

In painting, some of the monocular depth cues (light and shade, relative size, interposition, textural gradient, aerial perspective, motion parallax, linear perspective) have been vastly exploited and exaggerated to compensate for the absence of binocular depth cues (binocular disparity and convergence). [6] Binocular depth cues are provided by the two retinal images perceived by our left and right eyes. In the presence of binocular depth cues, the human visual system is able to evaluate and appreciate depth information. [7]

When stereo pairs of images are created and presented to each eye, care must be taken to properly reproduce these cues; otherwise, the viewer will experience discomfort. The challenge is in creating the 'miracle balance' with proper use of interaxial separation. Interaxial separation and zero parallax settings are key to getting the desired stereo effect. Setting the right values is crucial as it could result in a good stereoscopy with convincing spatial depth or one that is painful to watch. Interaxial separation determines the distance between two cameras; in real world scale, it would be set to a value of 6.0 to 6.5 cm (2.4" to 2.6"), to simulate the average distance between the human eyes. In these experimental works, which do not simulate in a representational and realistic manner, the right value had to be generated via trial and error by preview. In this project, the preview was done using 3D 120Hz LCD technology with active shutter glasses, where composites of the left and right eye images are presented on alternating frames. Each eye is still seeing a full 60Hz signal equivalent to the refresh rate on the LCD monitor. From tests, it is apparent that the Interaxial Separation value is inversely proportional to the apparent size of the 3D object. A large value would make the object appear bigger and closer, while a smaller value would make the object appear smaller and farther.

Painting as emerging and expanding space

Le Phénomène Atmosphérique, is a 3D stereo animated film inspired by the works of Olafur Eliasson and his on-site constructions of nature, as well as the Light and Space Movement associated with figures such as Robert Irwin and James Turrell; and their works in Southern California during the 1960s and 1970s. *Le Phénomène Atmosphérique*, is not an homage to these works but rather an attempt to continue to elaborate on the possible role of heightened spatial displacement; and how we experience depth, space and color. It is continuing justification that any new and worthwhile development in painting must be founded by extending the 'working space' of painting into virtual space. In this case, the painting space is the one that will be integrating Stereo/3D animation and projection, motion and sound. The main motivation behind the featured artwork is to break away from two- dimensional easel painting and towards 'freedom of materiality' and 'pictorial expansiveness.' [3] The film made use of the Next Limit Technologies, Real Flow and Real Wave software, which create unique fluids and physical body dynamics for realistic water simulations in visual effects industries. The scenes were composed in 3D stereo to create a general feeling of atmospheric optical phenomena and weather formations such as airglow, aurora, clouds, precipitation, rain, and windstorm. To highlight the distinctive beauty and unpredictability when water and light work together, various caustics were generated. Almost every shot in this film has been derived directly or indirectly from a caustic image sequence. The visual effect is seen when light is reflected off a specular or reflective surface, or focused through a refractive surface, so that it indirectly illuminates other surfaces with focused light patterns. In 3D graphics, caustics are rendered as a type of global illumination, using raytracing techniques. The notion that we 'see' the precipitation*,* as a quietly turbulent atmospheric water phenomena, sometimes on the screen surface and

sometimes floating in front of it, leaves the space and voids surrounding the water vapor with an ambiguous but strangely compelling set of coordinates. The 3D volume illusion is only serving as an armature to support the image's crumbling materiality. What is learned in this film is that relying on 3D stereo alone to create new perceptual experience is not enough. Energy of created 3D volume and mass has to be accompanied with the proper handling of stereo composition, color, light, and rhythm. They are the main anchors for the lightweight atmosphere of shallow moving surfaces.

Utopians of the image

The suggestive phrase 'utopians of the image,' is used by Ray Zone, in his article on 3D stereography. He said that the discovery of stereography preceded the invention of photography as well as motion pictures:

In fact, the realism of the very first stereo view cards drove the invention of motion pictures. These inventors looked through the stereoscopes and a saw a 3D image, and asked themselves, 'What's missing?' Well, motion was missing, so as utopians of the image, they set out to add not just motion, but sound, and color, and depth.[8]

The artist painters and filmmakers are continuing to create experiences that are not simply mimicking reality. In fact, they are embracing the ways that works of art are different from reality. [9] In today's hybrid mixed media artworks, depth is still a very powerful perception tool. To arrive at "the painting which shall not be distinguished in the mind from the object itself," [10] is becoming easier with the improvement in 3D stereo, where forms can be made to exist synthetically in a binocular space; a field that is itself consonant with reality. For this research, the focus will remain on providing a means for resurgence in dynamic painting practices through beauty, vision and sensibility of innovative stereo animated content, but at the same time initiate a potential of new developments in 3D stereo technologies. Drawing on the ideas of recent technological initiatives in S3D technologies and the renaissance in stereoscopic cinema, this project is an exciting opportunity to continue to explore the innovative convergence of art and technology.

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《Super Will＞ Super Share》

Yueh Hsiu Giffen Cheng

《Super Will＞Super Share》 does not focus on the result from the traditional prediction, but the phenomenon of the combination of folk couture and digital culture, particularly how people's behavior have changed throughout the hi-tech era. Hence, when people visit 《Super Will＞Super Share》, they are experiencing a combinational culture between traditional and digital media, a contribution for collaborative creation.

Interactive installation of "Super Will>Super Share", photo by Yueh Hsiu Giffen Cheng.

《Super Will＞Super Share》 does not focus on the result from the traditional prediction, but the phenomenon of the combination of folk couture and digital culture, particularly how people's behavior have changed throughout the hi-tech era. Hence, when people visit 《Super Will＞Super Share》, they are experiencing a combinational culture between traditional and digital media, a contribution for collaborative creation. 《Super Will＞Super Share》 presents a phenomenon of recombination and decentralization from Post- Deconstruction.

The concept of 《Super Will＞Super Share》 is based on an idea of the ancient Chinese folk ritual called Villain Hitting, with a purpose of connecting both elements, the conflict and the opposing, the virtuality and the entity, the digital technology and the traditional cultural phenomenon. The hi-tech age has brought us a digital space where full of imagination and over the rule from the nature; it has enhanced artist's creativity, especially for artist who uses computer as creative medium or platform. As for Villain Hitting, it is a kind of old ritual or behavior of the

mankind since ancient time, and still existing and continuing at the present days in the modern society. Thus, the hi–tech and the tradition have formed a contradictive social phenomenon. 《Super Will＞Super Share》 does not focus on the result from the traditional prediction, but the phenomenon of the combination of folk couture and digital culture, particularly how people's behavior have changed throughout the hi-tech era. Hence, when people visit 《Super Will＞Super Share》, they are experiencing a combinational culture between traditional and digital media, a contribution for collaborative creation. 《Super Will＞Super Share》 presents a phenomenon of recombination and decentralization from Post- Deconstruction.

Villain hitting, is a folk sorcery, popular in the Guangdong area of China including Hong Kong. Its purpose is to curse one's enemies using magic. Villain hitting is often considered a humble career, and the ceremony is often performed by older ladies. The period for villain hitting is different among temples, but Jingzhe is the most popular date. According to some folklore, Jingzhe is the date when the whole of creation is awakened by thunder. As a result, different kinds of foul spirits including byakko and villains become active.

The concept of "villain" is divided into two types: specific villain and general villain. Specific villains are individuals cursed by the villain hitter due to the hatred of their enemies who employ the hitter. A villain could be a famous person hated by the public such as a politician or could be an enemy known personally, such as when the request is to curse a love rival. Villain hitters may help their clients curse a general villain: a group of people potentially harmful to the clients. Dualism is a mainstream in the traditional Chinese world view, and many different kinds of folk sorcery beliefs derived from this view. The concept of Villain and Gui Ren (people who will do something good to the clients) developed as a result of this yin and yang world view.

In Hong Kong, Villain hitting does not only perform on the day of Jingzhe, every time when people encounter difficulties from job, investment, health, love, gambling, or any kind of problems from their life, people will go for Villain hitting service- to hit the bad luck out from their Fortune, in order to pray for blessings and help from Gui Ren (people who will do something good to the clients). Although Villain hitting seems a superstitious behavior, it applies to a form of Psychology theory. The Time magazine has detailed the story of Villain hitting last April, and commented that, Villain hitting is a kind of spiritual therapy, which is beneficial for mankind.

On September 15, 2008, when the Lehman Brothers Holdings declared bankruptcy, the whole global stock market was affected by it and went down in the twinkling of an eye. Predictions from stock experts were malfunctioned, precise formulas for stock analysis had failed to operate. Thus, people started approaching a traditional way to comfort their souls, in an attempt to find a faith from the traditional folk culture which has disappeared in the hi-tech era. The idea of 《Super Will＞Super Share》 is to convert the ritual of Villain hitting into a game-based artistic project, and transform the traditional culture into a digital technology platform. It shows the value of folk culture in the hi-tech age, and the social status between its close but estranged relationship.

《Super Will＞Super Share》 is a collaborative creation project based on the ritual of Villain hitting, using Taiwan's stock market index as its data, allowing investors to imitate the ritual of Villain hitting, in order to strengthen people's collective wills, and to make their favor shares increase. Therefore, the stock market index in the 《Super Will＞Super Share》 presented a virtual data from its participants' collective contributions. With more participants doing Villain hitting on the same share, the higher index the share will be. Consequently, when people are participating in the 《Super Will＞Super Share》 project, they are also experiencing the collaborative creation at the same time. Hence, there is a metaphor to draw support from the combination of tradition digital hi-tech in a progressive tense of society.

Operation introduction for 《Super Will＞Super Share》 :

1. Key in 2 sentences as your wish context into the computer system.
2. Select 1 share from the listing data, which is the one that you wish it will go up.
3. Concentrated on hitting the share from the projected image through a physical hammer.
4. A sensor of dynamometer is built inside the hammer, it transfers the strength of each hit by the participants into a digit, and responding with the appropriate format of data to a graphic pattern.
5. The pattern appears on the projected image represents a virtual value of the stock share, which accumulated from every participant's strength of hitting the stock share at the first step.

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INVISIBLE PERFORMANCE IN THE CONTROL ROOM: THE RESONANCE BETWEEN THE PERFORMANCE AND THE TECHNICAL PARTICIPANT

Suk Chon & Joonsung Yoon

Recently, media technologies pervade stages for performing arts. It is also a very interesting phenomenon as itself. Just as the independence of the musical from the opera, those cases might be a precursor for the birth of a new performance. In the timing of these changes, new requirements are needed as new roles, we believe.

Technical Rehearsal of Sympathy (PANSORI & SAMULNORI), 2010, Suk Seon An & Duck Su Kim / group PERFORMATIVE, performance media, Copyright group PERFORMATIVE.

INTRODUCTION

In ISEA2009, the creative group, PERFORMATIVE has presented the performance combining dance and technology. Major topic was the real-time connectivity between dancers and visual images. In ISEA 2011, we would like to introduce the inter-relationship between the performance and the action of inspired people by the performance. In September 12th, 2010, Korean maestro in the traditional performance, Duksoo Kim played 'Samul nori' with the creative group, PERFORMATIVE which accomplished technological parts. There were two stages. One is an ensemble of big and small drums. The other is variations of 4 different types of percussion instruments. We used an interactive real-time visualization system generated by the rhythm of percussion instruments in the performance.

KOREAN TRADITIONAL PERFORMANCE 'SAMUL NORI'

Korean traditional performance, 'Samul Nori' is composed of four percussion instruments, 'Kkwaenggwari (a small gong, the role of thunder),' 'Jing (a larger gong, the role of wind),' 'Janggu (an hourglass-shaped drum, the role of rain)' and 'Buk (a barrel drum similar to the bass drum, the role of cloud)'. Its

root is farmers' music which is a Korean folk genre comprising music, acrobatics, folk dance, and rituals. This performance is characterized by strong, accented rhythms, vibrant body movements and an energetic spirit. It is an improvisational performance using patterns of ancient rhythms, and the audiences will feel the 'Shin Myoung' which means a combination of enjoyment and commitment in Korean. This condition is similar to the possession of a spirit in the ancient ritual.

TECHNICAL ISSUE

Our technological issue was to produce live images according to the sound of performance. Originally, we wanted to use various input sound factors like pitch, melody and rage in the system. During the simulation, we, however, found out that too many input factors made too tacky results. Therefore, we chose the rhythm only, which makes the most dramatic result as the major factor. Then, it was possible to analyze real-time sound of performance. We unpacked various sounds of instruments through the FFT (Fast Fourier Transform), and could assort the dynamics of whole sounds.

Finally, we generated images and visual effects on the stage with Flash program through those input data. And, we programmed that the volume and the speed of the performing piece could affect the size and the visual effect of the image. Besides, we added real-time operation function which could make more various images for the performance. Fortunately, this change was more effective in the performance than the original plan.

UNEXPECTED RESULT

At the performance, the most interesting situation has occurred in the control room. During the performance, the visual operator was immersed in the rhythm of percussion instruments. And he began to manipulate the operating system in improvisation without his cognizance. This inspired control was highly synchronized and conformed to the performance. The Operator was getting into the percussion's rhythm and controlling the system at the same time. He created interesting and colorful images than the existing plan. It was unexpected result at the rehearsal.

At the rehearsal, every control and operation was planned for the corresponding director's instruction, because it was needed to check the technical system and to direct the script in a short time. But the performance began, those tensions gradually disappeared. And the visual operator was excited and inspired, that is, he was in 'Shin Myoung.' He manipulated the keyboard and the mouse powerfully and dramatically as if he played a big drum on the stage. When he heard the resonance in a big drum, he was transmitting more dynamic images.

As a result, the accidental link was able to express the feature of music just like the originally planned one. The visual operator's response and action were very considerable and interesting, while these actions occurred in the place that the audience could not see. Even though the performance is for a performance on the stage, we would note that the operator's inspired control provokes and produces another invisible performance at the back stage. 'Shin Myoung' has worked for the audience and the supporting group members as well.

RESONANCE OF 'SIN MYOUNG'

The resonance of 'Shin Myoung' would be embedded in the cold and logical area of control room too, and we need to reconsider the relationships between the artwork and the audience, and the artwork and its technical staffs in terms of the performer. We need to expand the concept of performer in performing arts at this moment, and to include players in the backstage. The inclusion can be explained by its traditional in-the-show and after-show event. At the Korean traditional performing arts, the audience usually does not stay calm, but provides and interrupt the performance by spitting out admiration or exclamation, that is, 'Chuim-se." Also, there is a ceremony altogether with the audience and the performer after the official performance. They call it, 'Dwit-pul-yi.' Intermingling with performers, audiences jump into the stage and freely dance and singing together. In the traditional attitude, the whole inclusion has been done for a long time. These two traditional forms have usually been meant the viable communication of a performance and its response. If we dare extend the meaning in terms of the inclusion, it might be a sharing of dynamics and emotions.

CONCLUSION

Recently, media technologies pervade stages for performing arts. It is also a very interesting phenomenon as itself. Just as the independence of the musical from the opera, those cases might be a precursor for the birth of a new performance. In the timing of these changes, new requirements are needed as new roles, we believe. After our performance, our focus on a performer on the stage has transformed into the technical controller. These participating staffs do not simply control automated technologies. They are participating in the performance by involving directly in real-time performance, and their responses are based on high and deep empathy. Under these circumstances, how should we consider these active participants rather than simply supporting staffs?

They should not be considered as just technical staffs, but a part of the performance. In particular, if we apply forms and attitudes in the Korean traditional performance, there might be a juxtaposition of sharing and embracing aspects for the whole inclusion. The utilization of media technology in performing arts will be expanded gradually. Fortunately, media technologies have a distinct characteristic of interactivity, which might be applied to performing arts. The interaction is limited to a system and the performer so far. What we have to research furthermore would be the interaction among the performance, the audience and the supporting members beyond between the performance and the performer.

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DIFFERENT POINT OF VIEW ON THE COPYRIGHT OF ARTWORK BETWEEN ARTIST AND ENGINEER

Suk Chon, Bang Jae-Won, Hohyun Lee & Joonsung Yoon

Recently, collaboration between the artists and engineers is very common in new media art project, and they may think differently on the ownership and right of the produced work. I think general interpretation of the copyright may not solve this complex problem. Therefore, I'd like to propose that we should understand the situation and think of the best alternative measures on this issue.
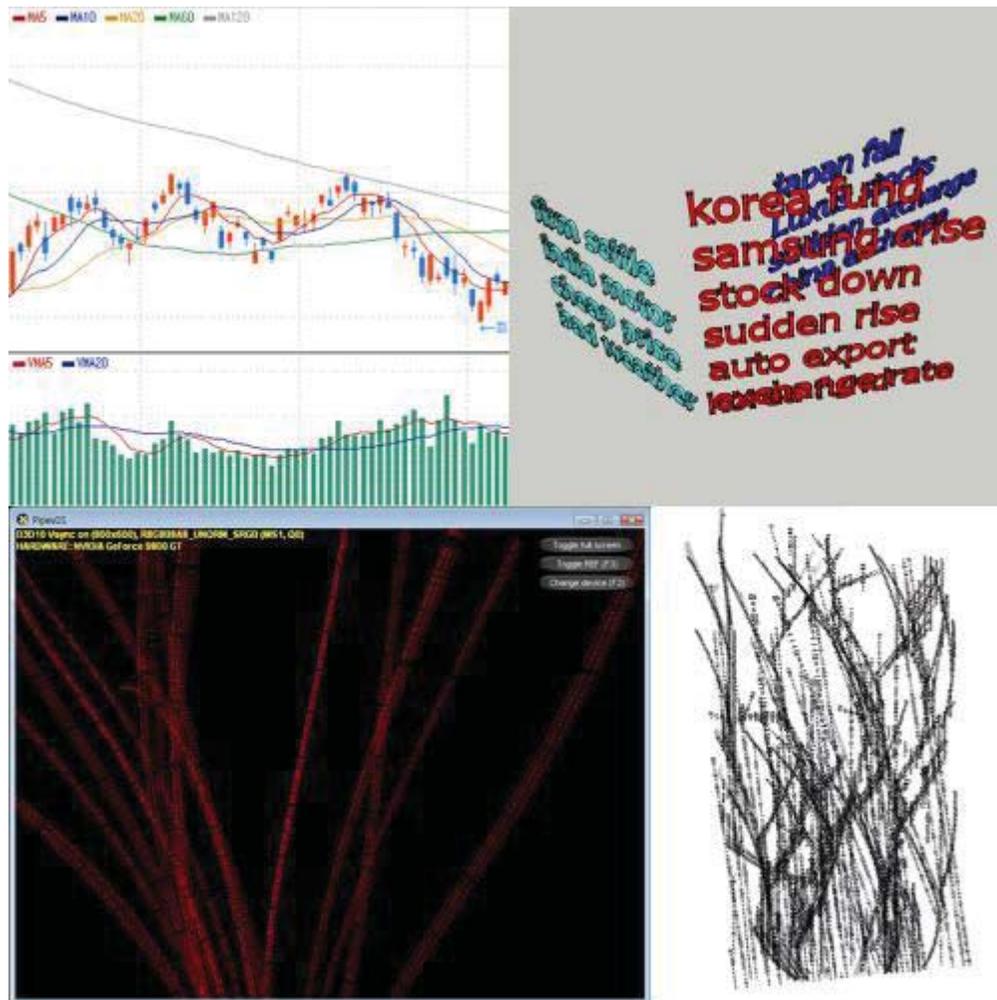
Development Process: Information Visualization Project 'Contingent Rule (type stocks v0.1)', 2009, Artist MIOON / Coworker PERFORMATIVE, Real-time Interactive Video Installation, Copyright PERFORMATIVE

INTRODUCTION

I have been working in PERFORMATIVE, an art group, with people from various fields in liberal art, science and art. It makes art works based on digital technology. As an engineer, I have been taking

charge of technical part when creating art works in collaboration with performers, video artists, and fine artists.

In 2009 summer, our group created collaborative project about information visualization with artist. The main method of the project was displaying images and movie clips on the screen through analyzing data of stock market. From the first phase, there were a lot of discussion among researchers, artists and engineers. Through this way, we created great effect based on difficult skills like data crawling and mining. And we self-developed 'Shader Code' for visualization. By the combination of images and techniques, the project succeeded in creating artwork.

It is a very interesting process to create art works by discussing with artists and using various technological issues. However, it is not that a simple matter to determine who has the copyright of produced works. So began a complex problem.

PROBLEM DEFINITION

The first conflict occurred in the third exhibition. The artists promoted project for another exhibition, which was is very similar with 'the project' in concept and technical element. PERFORMATIVE raised about this problem but was not accepted. The artists insisted their ownership of the new artwork's copyright because it is completely 'new' piece produced with other engineer. On the other hand, PERFORMATIVE asserted both sides have the copyright for the collaboration from the beginning. In fact, the new artwork was also technically the same structure.

Actually, this kind of problem does arise in Korea. 'Does an engineer lose his/her right on the art work produced with the artists collaboratively if the work is reproduced with another engineer?' or 'Does an artist lose his/her right of the art work if an engineer changes images with same technology they created?' We think it was the wrong approach.

As collaboration between the artists and engineers is becoming more common in these days, they may have the different view of this problem. The collaboration between different fields will be increased in the future, and the right of the work will also be a very important issue. However, the existing interpretation of the copyright law may not enough for collaborated art works. We need to think of the alternative measure on this issue is.

THE RIGHT OF ART PROJECT

The Copyright take effect when the contents are created. The copyright could exist on incomplete one, if it has special artistic value or attributes of cultural heritage. Copyright is formed without any procedure. It is not an adjective law like a patent, a utility model and trademark rights.

Korean law sets copyright of artwork is painting, calligraphy, sculpture, crafts and applied fine arts. This is declaratory rule. So, even if we don't have said above, originative artwork is protected by copyright law. There are two rights for protection through the copyright of artwork in Korea. One is property rights for economic income. The other is the rights of ownership for honor of artist. All things considered, the artists were infringing on the copyright protection. And they ignored PERFORMATIVE's

contribution of collaborative project. Even they violated integrity right protected by using same contents, methods and titles.

There are two solutions about infringement of copyright. First, we can charge them with a crime. Second, we can request to control at system for copyright dispute. The copyright committee mediates arguments to agreement or compromise. By the way, indeed these legal elements in the digital age could protect properly the rights of creators? Moreover, if the work that created through the collaboration of many people is more difficult to protect.

Many people are creating wonderful, interesting and interactive works with various digital elements and technology. Digital process easily can be converted into an anything as someone expected. So, it is easy to reproduce art work if someone put their mind to it. Therefore, this problem which is reproduced the program on same art works or changed images on same program often appear in Korea.

OPEN SOURCE

Noticeable cases occur in Computing Science. 'Open source' have been performed to protect copyright and expand the software in Computing Science. 'Open source' is the project which open the source code corresponding to design of the software for the public free. So, anyone is able to redistribute and improve it. If you know the code, you can create something similar to it or change it as you wish. The Authoring tool like as 'Processing' or 'VVVV' is commonly used in media art work because they created based on 'Open source' concept.

Many artists and engineers create wonderful works using them. However, it is hard to say the 'open source' concept is completely fit for media artworks because it is for effective software development. On the other hand, creating artworks is expression of individuality and creativity. So, indiscriminate sharing and openness can damage an artist's identity.

ALTERNATIVE MEASURES

I suggest, with caution, that we should introduce 'CCL (Creative Commons License)' for guarantee that rights of creator. In the near future, we need the specific standards for role and rights between engineers and artists for media artwork dealing. It may similar with standardization in technology industry filed.

'Creative Commons (CC)' is the concept that your creation make to the common heritage of human beings through the self sign of sharing. Of course, CC is carried out only by creators' free will. Therefore, if you don't want to share your work or it created sponsored by commercials, CC doesn't insist unconditional openness and sharing. It makes an effort to support creators and introduce many creations to people.

Artist and engineer who create art works in collaboration publish each works and combined artworks using CCL. Copyright laws place restrictions on the publication and use of another person's creative work, while CCL could make you use it freely as you follow some terms which creators set up.

CONCLUSION

We need the first step for creating more specific standards and lower disharmony. CCL could be the alternative measure that is more collaborative and open than Copyright law as a tool to resolve disputes. It will lead to cooperate with artists and engineers.

Through attempt of CCL application, we could settle an open paradigm with them together. When they overcome the difference of view and practice creation and sharing, we could make more abundant and healthier media art. Furthermore, the collaboration of art project to become more actively and smoothly.

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VIRTUAL INSTRUMENTALITY : EXPLORING EMBODIMENT IN ARTISTIC INSTALLATIONS

Maria Christou, Olivier Tache, Annie Luciani & Daniel Bartelemy

In this paper we study the question of interaction with digital technologies by exploring the cognitive mechanisms of embodiment in the context of multisensory artistic installations. In order to test our hypothesis we observed visits to an experimental installation, which provides conceptual and technological consistency. Our first observations suggest that these conditions result in a strong embodiment for the proposed interactions.
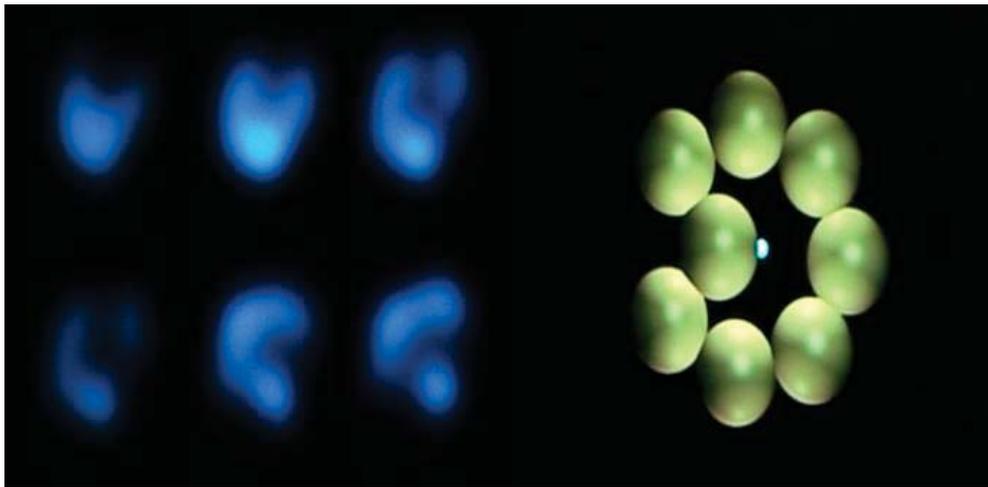
Fig. 1. The two visualisations: On the left a sequence of the "blurry"; and on the right the "ball-like".

Version	1	2	3	4	5	6
Contacts	Hard	Soft	Hard	Soft	Hard	Hard
Visualization	No	No	Blurry	Blurry	Ball-like	Ball-like
Force feedback	Yes	Yes	Yes	Yes	No	Yes

Fig. 2. Upper side: Coordinator and visitor while exploring the installation. Lower side: Summary table of the experimental sessions.

Introduction

Digital technologies for creation free us from physical constraints, but at the same time might lead to the loss of instrumentality, that is the very specific, rich and nearly intimate physical relationship between a human being and an object used to perform actions on the environment. [1] Yet the computer, programmed according to certain rules and linked to the man by the appropriate interface, may offer new forms of instrumentality and be considered as the locus of all instrumentalities. [2] We study the cognitive mechanisms of instrumentality in the context of multisensory art installations, inspired by the hypothesis that conceptual and technological consistency of the composing elements of a multisensory virtual environment is important to the instrumentality of the experience, which should result in a strong embodiment of the proposed interfaces and interactions.

Enacting Digital Matter is an art installation based on the simulation of virtual scenes, addressing the visual, auditory and haptic senses; proposing a form of virtual instrumentality based on physical modeling and force-feedback interfaces. It was presented at the European School of Visual Arts (Poitiers, France) in February 2010. Through this installation, most visitors experienced for the first time a multisensory interaction with physically consistent virtual objects; i.e. simulated objects that behave according to Newton's laws of motion. However, the visitors were presented with sensory paradoxes and unusual situations, such as the possibility to discover an object only by touch, or together with a visual representation apparently conflicting with haptic sensations. Thus, visitors were lead to experience aesthetic and emotional 'shocks' and to question their senses, which is the opportunity to collect essential information about the way our sensory-cognitive system works in an artistic multisensory situation. The installation was designed to capture these unique moments, allowing for further analysis in search of evidences of embodiment.

The Installation

Experiencing the virtual scenes, as well as the consequent commentaries of the visitors, were part of the installation, which was more a performance than a material setup. The aesthetic objects considered were not the force-feedback device, the simulated scenes, nor the resulting sounds and images, but the moments of discovery, exploration and expression by the visitor.

The installation consisted of two simulation stations, each one equipped with a screen, a loudspeaker and an Ergon_X force-feedback interface from Ergos Technologies, which allowed visitors to interact with the virtual scenes through hand and arm gestures. Each scene was based on a physical model created and simulated with the CORDIS-ANIMA system. [3] The sensory consistency of the installation was ensured by the fact that a single physical model produced the audio, visual and haptic signals through a synchronous simulation engine. Each station was also equipped with two video cameras and microphones, so that every visit could be recorded in good conditions for further analysis. This equipment was visible and each visitor was asked to give his or her permission to be filmed and recorded. At the entrance of the installation, a monitor screen displayed what was going on inside through one of the installed cameras.

The Model

Each visitor was offered the possibility to explore one or two scenes among the three available ones: "Pebble Box," "Friction" and "Approach and Retract." Each scene corresponded to six different versions that were presented successively. For a given scene, the six versions were based on the same physical model but differed by the presence or absence of one of the sensory channels and by the visual representation. For example, a scene could be presented only with visual feedback in one version (no sound nor force feedback) and with all three sensory channels in another one. In the following, the time spent by a visitor on one version will be called a 'session.'

In this article, we will focus on the Pebble Box scene. [4] The underlying physical model is composed of eight circular masses enclosed in a flat, circular area (see Fig. 1). Using a force-feedback joystick, the visitor directly moves another, smaller mass in the box. Force feedback gives a haptic feeling of the scene: through his or her hands, the visitor can feel the contact between the manipulated masses and the other ones or the border of the box. The interaction between the masses, including the one manipulated by the visitor, is an elastic collision, whose stiffness is high for some versions of the scene and very low for others, giving respectively hard and soft contacts between the masses. Two visualizations were proposed: a 'blurry' one, which gives the impression of a nearly continuous medium, and a 'ball-like' one, which represents the masses and the limits of the box in a clear, non-ambiguous way. The table on the lower side of Fig. 2 summarizes the different parameters of each version. The order of presentation was the same for all visitors, from version 1 to version 6.

The Pebble Box scene did not have audio output. However, the motors of the Ergon_X interface emit sounds – particularly during hard collisions – which some visitors have remarked on and interpreted (see Results).

Methodology

Realism is well known to be a factor of embodiment and immersion, so it could have interfered with the other factors we wanted to observe through the installation; i.e. the consistency of the sensory sensations and the presence of haptic feedback. Consequently, we gave simple and quite abstract visual representations to the scenes. Visual abstractness was also intended to help the evocation process since no straightforward interpretation of the scenes is given. In the same perspective, the experience proposed to the visitors didn't include any scenario, so as to focus them on the interaction with the simulated objects.

As mentioned previously, the installation explicitly included the fact that visitors could express the sensations and feelings elicited by their interaction with the virtual scenes. To stimulate expression, a coordinator accompanied the visitor in order to facilitate his or her reactions, through an open interview addressing; (1) the felt sense of the experience, (2) how it was felt, and (3) what it felt like. The coordinator encouraged the visitors to go beyond superficial descriptions and comments about what they liked or disliked in the situation. He or she helped them talk about their haptic sensations, which is known to be difficult for many people. The scenes were not presented as being a representation of any existing situation: they were only designated through numbers (e.g. "Scene 1") and the coordinators did not make any suggestions that could lead the visitor to a particular interpretation. As a consequence, the resulting subjective descriptions were expected to access deeper levels of consciousness related to the felt experience, for example through 'forgotten' memories or evocative thoughts.

Six visits to the Pebble Box scene have been recorded (see Fig. 2). The visitors were all men, aged from 20 to 55 years old, most of them having an artistic background. We will refer to them with an arbitrary number (e.g. "Visitor 1"), which is not related to the order in which they visited the installation. The visits lasted approximately one hour.

Results

We focus here on three main observations that suggest the connection between consistent sensory signals and embodiment, or, in other words, what we call virtual instrumentality. Instrumentality in the virtual world is the result of an embodied interaction, which enables the human capabilities to incorporate the new situation. The instrument becomes an extension of the hand, and can be used fluidly and intuitively to explore the given possibilities of the virtual world. In the Pebble Box scene, the instrument considered is a hybrid system constituted of the force-feedback device (real-world part) and the simulated mass that is connected to it (virtual part). The structure of the process towards instrumentality is here explored in three constituents:

EMBODIED MEMORIES

In order to explain the newly felt sensations, visitors were suggested to employ a strategy of transposing them to another experience, felt in the past. The experiences they chose in order to describe their sensations were characterized by a strong embodied quality. They were about sensations from their daily routine, or deep-anchored senses of their past. These felt memories came to explain the actual haptic situation.

Here is how Visitor 1 describes his sensations when exploring the scene in the first session (no visualization, hard contacts):

The images that come to my mind are situations where, sometimes, I wake up in the morning, on my bedside table, there is a glass of tea, my glasses, stacked books, the alarm clock, handkerchief packs, and things like that, and I try to catch my glasses to check what time it is and so I grope around saying to myself 'I'm going to try not to knock anything over...' and then suddenly you put your eyes at your fingertips.

During the first session too, Visitor 2 explains that the haptic sensation he experiences is actually familiar and he can remember it from another situation: "I know from experience, I've done this before, I can remember that sensation... when I was riding a bike, the friction of the brake on the front wheel."

SPATIAL REPRESENTATIONS THROUGH HAPTIC FEEDBACK

The sensation of a space, opening up at the haptic sense, has been described during most sessions and by most visitors. For example, during the first session, even though there is no visualization, Visitor 3 said:

I think there are still constraints, that is to say... places, places... For example I have the impression that I feel a kind of ball, a kind of place where I am below. [...] I'm navigating around a space, into a space [...]

there are empty places, there are full and empty spaces... Well, I really see it as a plane, [A/N: a flat surface] it's on a plane.

The description of the virtual space gained in subtleness during the third session, when a visualization of the scene, the blurry one, is given for the first time. It became instantly clear for all participants that the image was the graphic representation of the virtual space they had explored haptically. Visitor 3 declared: "Yes, this is the graphical representation of this space!"

Visitor 3, recognized the image as a graphical representation while continuing to manipulate the haptic device. The connection between gesture and graphics came as the result of doing. An image coming as a verification of the haptic sense has also been discussed in the paper of David Prytherch and Bob Jerrard. [5]

In addition to that, Visitor 2 describes how he was able to refine the characteristics of this space: "I think there are several stages with the joystick. All around, well... there is nothing acting. Then, there is a resistance appearing around, when moving towards the center of the joystick, there is a resistance that comes in."

Visitor 3 also described with more details the virtual space: "It's as if there was a ... a circular constraint, in the center, a ring, and I can go either outside or inside it. Now I'm in the inner ring, and if I force a bit I move to the outer ring."

During the fourth session (blurry visualization, soft objects), visitors talked about sensing a curved space, a feeling that can be due to the succession of repulsion and contraction forces. Here is what Visitor 4 said: "I have a space which is rather curved. A haptic space."

During the sixth session (ball-like visualization, rigid objects), all of the participants talked about how the virtual space they felt before was finally revealed to them. They were able to identify the haptic sensations they experienced during the previous sessions and felt the connection between the mental representation of the space they had constructed and the visual space presented to them during this final session. Visitor 3 expresses this connection between the visual and haptic channels in a particularly strong manner: "There, this is what I wanted from the start!"

This quotation suggests that the mental representation of the scene elicited by the haptic channel was strong enough to call for a specific visualization, which corresponds to the ball-like one. Notice also how most of the visitors use first person expressions to describe the sensations. This point is really important to us because it indicates clearly an effective implication and immersion into the virtual scene. It seems that visitors were projecting themselves in the scene through the instrument instead of considering it as an intermediate between them: the instrument was, at least partially, incorporated. This tendency was probably reinforced by the fact that they didn't clearly see what they where actually manipulating until the fifth session.

All these remarks indicate that it is possible to create a strong representation of the virtual space with haptic sensations as the main input. However, during the second (no visualization, soft contacts) and fifth (ball-like visualization, hard contacts, no haptic feedback) sessions, it is really remarkable that none of the visitors talked about space. On the contrary, when strong force feedback was there, the feeling of touching the space was present, and even augmented by visual representations of the scene.

THE MACHINE EMBODIES AN INDEPENDENT LIVING AGENT

The haptic device of the installation takes on a life of its own, it becomes an autonomous entity, with its own will and personality. The visitors interpret its feedback and reaction as well as the mechanic sounds, as a dialog between them and the machine. They ascribed mystic ways to its performance.

"She [A/N: the machine] doesn't want me to reach the central position."

"When I pivot, I feel that it kind of stands up to me."

"I like the sound of the machine... you know... its way of conversing too [...] I don't know if it's a dialog... Well yes it is, it's a dialog [...] if we say that this is a reactive entity, maybe a living entity, I don't know, it's... this movement to make it feel good, or bad... according to its reaction."

We observed differences in the degree people experienced it in different situations. On one hand, in the first session, the machine's reaction was perceived as stubbornness, as a resistance to the visitor's intention to manipulate it.

On the other hand, in the third situation, visitors softened their expression and tended to interpret the machine's reaction more as a way of communication between them and the image, an agent who reacts to their gestures. In both cases the haptic feedback was the same, what changed is that in the first situation the only sensory feedback came from the haptic device, and in the second there was an image which reacted correspondingly to their gestures. So, a second sensory feedback cue helps in the understanding of the interaction. People were no longer confronting the machine, but rather cooperating with it.

"Anytime I move, it's full of tiny different sounds, as if it was a language." (Visitor 2)

"Actually, it's a response to the gesture I make." (Visitor 2, talking about what happens on the screen)

"Without the image, well it's true that I feel something but, there, on the screen, I'm conscious that there is something facing me." (Visitor 6)

"What is curious is that, suddenly, I feel like there is someone else who wasn't there [...] Until now, I had the feeling that I was in a kind of dialog and now... now we are three." (Visitor 1)

Finally, in the forth session (blurry visualization, soft contacts), the feeling of being in a dialog persists but this time the entity is considered less reactive:

"I think it was given some anesthetic." (Visitor 3)

Conclusions

Our method has proved to be a valuable way to collect rich information about the visitors' experience, providing insights into the sensory-cognitive process. We identified three dimensions that characterize creative interaction with the virtual scene depending on the degree of multisensoriality. Enactive situa-

tions awake embodied memories in order to create the adequate conditions to translate the virtual experience to an embodied one. Developing haptic feedback enables spatial representations of the virtual world and subsequently helps in building a better coupling of action-interaction, a necessary condition for creative interaction. Finally, the that fact to recognize the machine as an equal co-player by attributing it agency couldn't conclude better our hypothesis for creative instrumentality in virtual artistic environments.

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RECOMBINANT FICTION THEORETICAL PAPER AND MANIFESTO.

Paolo Cirio

Recombinant Fiction defines a unique transmedia storytelling genre able to drive tactical activism and dramatic purposes.

Recombinant Fiction Introduction

In previous ages, mediums for narrating fiction such as theater, literature, cinema and television have defined languages, models and formats; each media development provided an expressive shift in forms of storytelling. Nowadays, media are multiplying, hybridizing, and mutating. The way they are used alters continually, potentially creating new ways of producing fiction and spectacle.

Networked digital media merge as a productive vehicle to create new forms of fiction. In fact, the rise of forms of storytelling such as 'Transmedia Storytelling,' 'Alternative Reality Games,' 'Transfiction,' 'Dispersed Fiction' and 'Viral and Guerrilla Marketing' is a clear sign of an important revolution in ways to tell stories.

Recombinant Fiction emerges as a political and aesthetic fiction genre of this new immersive and participative form of art. By identifying valuable, distinctive characteristics and objectives, Recombinant Fiction defines a unique genre able to drive tactical activism and dramatic purposes.

Our contemporary media environment era is characterized by the explosion of Personal Media [1] (devices with platforms for email, instant messenger, blogs, photo and video sharing services, etc.) resulting in new modes of personal expression and interpersonal relations. Nonetheless, Mass Media continues to grow as well. Networked media generates new channels and interconnected devices for consuming entertainment and news (proprietary web platforms, digital TV, portable video/reader players, screen billboard, etc.). This results in the deregulation of advertising restrictions and privacy policies by the corporate media complex to boost the flux of information. Additionally, networked digital technologies accelerate and facilitate the production of offline and analog spaces of information (print-on-demand, production of manufactures, organization of public assembly, mapping public spaces, etc.). This results in a new mass of active prosumers, and a general increase of information in interior and urban landscapes.

All of the above listed media are digital in origin, and therefore easily reproducible and transmissible through networks (Internet, GSM, Wi-Fi, etc.). Networked digital media generate an intensification of flux, interactions and processes of communication. The informative environment, created by all those media that broadcast messages, is defined as the Infosphere. [2] This conceptual sphere is the space in which modern society is immersed; where people express themselves, build their own realities and manage societal organization.

In this context, a modern form of fiction should be narrated by networked media and staged in the Infosphere, which can be used as the medium to dramatize reality and find a way to change it by a dramatic representation, as humanity has always done.

Manifesto:

1) The fiction is told through traditional news media, online social media and public space interventions. The pieces of the fiction converge and evolve in one rhizomatic stage, synchronized and organized by networked digital media.

2) The fiction has conflicts and resolutions amongst characters with engaging personalities. There are no challenges or gaming aims for the audience, it must be pure fiction and its nature should be obscured but not hidden.

3) The fiction penetrates reality by including real entities in the narrative. The created fictional reality is made from contemporary real-world patterns, which are semiologically relinked and mutable in the narrative elements.

4) The fiction is interactive and participative. It is unfolded with the active interaction of an audience that can participate in it by creating characters and reshaping the storyline through their personal media and by public interventions.

5) The fiction has activist and educational qualities to achieve social change goals, by spotting controversial identities or organizations, or by increasing awareness of real world plights. It must at all times be without commercial or promotional purposes.

Theory for practicing Recombinant Fiction:

Recombinant Fiction is composed of layered mediums, spaces, identities and modes, which can be seen as formally interconnected as a rhizome. [3] The rhizome reflects the abstract network structure, the configuration of the Infosphere. The fiction is told through the convergence [4] of narratives broadcast by networked media. Organized and synchronized, these media create a rhizomatic space of narrative information that audiences can unfold and participate with.

Stage

The convergence of narrative elements broadcast by the media is facilitated by the semiological links that can be created among them. Each media of the rhizome is directed organically to broadcast narrative elements of the story that refer to each other. The networked convergence of scenographic elements creates a rhizomatic totality, recognizable as single stage, where the story is told and evolves. This stage embodies the Infosphere, denoted by the media that broadcast messages and by the messages themselves. The broadcast narrative signs are linked together in a network of signifiers, which constitutes the rhizome in which all the signs used in the narrative build the environment of the fiction. As in semiotization [5] in theater, in the Infosphere, signs present in the narrative rhizome became functional to the construction of the fiction.

The fiction is unfolded by links that refer to each other, creating a semiotic, networked storyline within which the audience can be actively surrounded. This unfoldment should not have challenges or ludic elements. Instead, it should simply be easy to interact with and readable by the audience.

Furthermore, this process of semiotization through linking, quoting and cloning signs of reality is thought to integrate real entities into the fiction, transforming real-world patterns into fictional ones, and vice versa, fictional patterns of the story can be perceivable as real.

Characters

Characters in Recombinant Fiction use networked media to enter into dialog and articulate their messages. Characters show their digitally created masks and tell their stories through the disseminated media of the Infosphere that fit   and build their personalities.

General identities and entities are made by pieces of information broadcast; which build their existences in the Infosphere and influence directly their presence in the ordinary physical world. The informational body that is broadcast in the Infosphere through media can materialize the representation of the self, a general agency and any activity. This state of being empowers the characters of the fiction to enact their roles with masks that appear realistic and familiar to the audience. Hence, the way characters use these media reveals personality traits and intensifies the emphatic effect on audiences.

Considering the audiences present in the rhizomatic stage of the fiction, they are able to unfold the story and follow the characters' revelations with immediate ease, because characters and audience members share the same tools of expression and communication. This enables the audience to participate in stories by converging their mediated identities of the Infosphere into the rhizomatic narrative stage through their Personal Media (or other media of the Infosphere) and by having direct conversations with the main characters – or even creating new characters - and adding new elements to the dynamic storyline.

The audiences know how to have control over their own characters, since they build their identities and related relationships with others through networked digital media in everyday life. Often the projection of the self onto the Infosphere is characterized by the attempt to appeal to others. This sort of internalization of the spectacularization of representation of the self facilitates the personal reinvention for the performative acting in the fiction.

Through their participation, audiences turn into characters of the fiction. As they develop their personas and create new narrative aspects, the storyline takes shape and opens to new dramatic concepts. In their new participatory role, the audience consciously performs a responsible act in the fiction's dual being, which is both inside the actual social reality and in the fictional story. As the audience shapes the story, they become aware of its fictitious double identity.

Drama

The fiction uses variable forms of dramaturgical structures with interweaved situations among characters. The story is told with dialogs, statements, monologs, public interventions and actions about a fictional scenario that take place in a storyline over the Infosphere's stage.

Characters tell of discoveries, conflicts, reversal, resolution and twists of their existences, through background dramas of interior feelings and foreground plots of public fights. The fiction should trigger the original aims of dramatization of the human condition for cathartic functions, representation of possibilities, and escapism from daily pressures through engaging stories.

In the first person narrative voice, main and minor characters communicate their experiences and claims directly to the audience with their masks. Characters' voices are broadcast over social and any media functional to the expression of the characters. Concurrently other media broadcast information to build the scenography and the atmosphere of the drama.

The fiction is broadcast live. Narrative situations happen in real time. Narrative information is communicated simultaneously with the characters' declarations and dialogs, creating a spectacle that occurs during a concentrated span of time. Audiences permeate the story as they find themselves engaged with the progress of fiction or as they attend scheduled dramatic events.

The action line oscillates on a variable mutable timeline. Multiple references among situations and characters on the timeline make it unbroken and comprehensible as a complete reticulated sequence of narrative occurrences. After the live broadcast, the final documentation of all the narrative elements allows audiences to browse the fiction permanently.

The drama is set in the present, with scenarios contextual to the contemporary society and scripts similar to the ordinary behaviors of the audience. In order to thoroughly penetrate reality with an active fiction, the topic of the main conflict in the fiction should be a real world social matter familiar to the audience and engaged with mainstream media content.

The fictional nature is declared; the audience must notice or perceive to attend at a fictional drama, through narrative patterns blurred with real patterns, to involve the audience in an immersive fiction. Real and illusory events come to inform each other. Memory and associative processes are subtly moving and shifting at all times in relation to the present context.

Tactical functions of the fiction

Over the course of human history, stories have always been used to understand and interpret reality, from religions to ideologies, beliefs and identifications in large narratives have defined civilizations. However, it is in our mediated society that stories replace realities in creating fragmented artificial worlds and capturing people's minds and imaginations within them. Reality continues to be redefined not only by its narrated image as fabricated by the entertainment and media industries, but recently also by the single individual who thinks and produces his/her own image to fit the artificial worlds.

Only by dramatizing the artificial reality of the Infosphere can audiences understand and then change their physical reality, over which they have recently lost control. Recombinant Fiction is about staging a drama inside the hyper-reality and spectacularization of society to engage participants in a process as political agents.

The endeavor toward an efficient modern drama with effective outcomes requires strategy on stages and mediums as well as the employment of a language and aesthetic that speaks to the mindset of an individualized audience. The educational, informative and transformative purposes of the dramatic actions should be developed for motivating and transforming audiences usually indifferent to social issues and for mobilizing victims of oppression. This can be accomplished by infiltrating the audience's language and environments with stories and characters that tempt the attention and interest of the target. Through identification with the characters' dilemmas and public claims, Recombinant Fiction becomes a useful tool to reach new and large audiences whilst creating concern for social issues.

Tactical Recombinant Fiction is a powerful art form to exchange in human consciousness, demystify absurd beliefs, undermining unethical powers and inform on social problems.

Theories that have inspired Recombinant Fiction:

"Recombinant Theatre" by Critical Art Ensemble
"Invisible and Forum Theatre" by Augusto Boal
"TransMedia Storytelling" and "Convergence Culture" by Henry Jenkins
"Dispersed Fiction" by Jason Nelson
"TransFiction" by Alok Nandi

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1. *"The digitalization and personal use of media technologies have destabilized the traditional dichotomization between mass communication and interpersonal communication, and therefore between mass media and personal media."*
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2. *"The infosphere denotes the whole informational environment constituted by all informational entities (thus including informational agents as well), their properties, interactions, processes and mutual relations."*
   Luciano Floridi, "Ethics in the Infosphere," in The Philosophers' Magazine 6 (2001): 18 - 19.
3. *Related to the theory of Rhizome as "Principles of connection and heterogeneity: any point of a rhizome can be connected to anything other, and must be."*
   Giles Deleuze, Felix Guattari, A thousand plateaus: capitalism and schizophrenia (London: Continuum International Publishing Group, 2004).
4. *"'Convergence' must be understood as a process that has several different manifestations." Henry Jenkins, "Convergence? I diverge." MIT Technology Review, June 21, 2001, http://www.technologyreview.com/article/401042/convergence-i-diverge/.*
5. *"The semiotization of an element of performance occurs when it appears clearly as the sign of something. Within the framework of the stage or the theatrical event, all that is presented to the audience becomes a sign that 'wishes' to communicate a signified."*
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CORDON OFF THE CONTEMPT IN A WORD COMPARTMENT

(AND OTHER WHISPERING MOMENTS)

Joshua Kit Clayton

A video-directed group exercise/meditation/conversation, "Cordon Off the Contempt in a Word Compartment (and Other Whispering Moments)" investigates the uses and values of contempt, hygiene, language, and importantly, of whispering as a means of containment, paradoxically, through the process of propagation

Cordon Off the Contempt in a Word Compartment (and Other Whispering Moments), 2010, Joshua Kit Clayton. Video/Performance. Documentation of performance at Southern Exposure, San Francisco, USA. Copyright 2010 Joshua Kit Clayton.

CONTEMPT

Contempt. Contempt lives and breathes inside each of us. To deny it would be to deny something essential to the human condition, our relationship to the world around us, and ultimately, our survival. It's no accident our species is filled with such bounty. It spews forth in all directions, externally and internally: Upwards contempt to regain our agency in the face of authority; to fight oppression, injustice, or dominant systems. Downwards contempt to boost our self-image; to morally justify crimes against those we believe to be inferior. Lateral contempt to individuate, defend, and aggress in our struggle with our peers; to form communities around certain ideals. Self-contempt to combat the parts of ourselves we cannot accept; to maintain the fantasies that keep us alive.

Voice of morality; motivation for change; face of justice (and of justification); protective shell; vicious spear; it is all these things and more. It is anger, but anger combined with valuation. And how do we live without values? It is survival. And we would suffocate without its razor-edged embrace. Not only as individuals, but society as a whole. Contempt is an integral part of our emotional and social eco-system. Obviously, contempt has its problems; its dangers. And you might think that we should only talk about how to eradicate it--contempt for contempt? But, let's put that aside for the time being and celebrate contempt's undeniable existence, its functions, and our reliance upon it.

You, yourself, might be swimming in it right now. Most likely you are. Perhaps it's the contempt for those around you. Perhaps for a situation you just left. Perhaps for your parents, your siblings, your children, yourself. Perhaps for the rambling of some egotistical pundit, whose arrogant words you can't shake. Perhaps for the politicians he was condemning. Perhaps for the bourgeois scum. Perhaps for your local drug dealer. Perhaps for global petroleum addiction. Perhaps for your endless indecision. Perhaps for that tragically catchy pop song that still circles in your head, or the brand markings that adorn your wardrobe, or the spam that ceaselessly pours into your email account, or those fucking obnoxious…

Perhaps it is the contempt you feel for this cursed artwork, or the whole of art in general, and the elitist cabal that operates the levers behind the machine. Perhaps that is art's gift: to present itself as an object worthy of contempt. To be generous in providing something around which people can commiserate as to its arrogance. In which people can assert their own identity in the face of this presumed authority. As they say, "The greatest gift you can give is something to complain about". Well complaint is but the pedestrian face of pure unadulterated contempt!

I digress. Regardless, it's not implausible to assume there's some contempt brewing inside of you. Maybe it's deeper than the surface, but if you take a minute to think, and dig, and poke your way through your inner muck, a golden kernel of contempt will reveal itself to you.

Take a minute to look inwards, and investigate. I can wait. Don't worry about getting your hands dirty. You'll have plenty of time to clean yourself later.

Hold on to that, but for a brief moment, put it aside. Scan the room. Surely you see someone who you don't know very well, but you think you can confide in. Walk to them. Don't be shy. Now that you've found them, and you have found them, haven't you? Hurry up. Okay. Now that you've found them. Sit if you like. Stand if you prefer. This is your shining moment. Where you can let it all out. In vitriolic indignation, or shameless sniveling, or breathless exasperation. Don't hesitate. Speak. Listen. Don't worry. There are no mistakes. Share it with your confidant.

Contempt. Raw and unfiltered contempt. Let it sweep you away.

(five to ten minutes of people talking/reflecting)

HYGIENE

Now that wasn't so bad now, was it? Okay, well maybe it was. Consider it a gift. Now the thing about contempt, is that like I mentioned, you can get dirty. Horribly, terribly, dirty. Filth, infection, and contagion can take over. For all the important uses that contempt does serve, it is extremely dangerous. I apologize for not giving you much warning.

Yes, contempt can take over. Dripping from your mouth, across your face, and down across your entire body. Sliding under your skin, through your sinews, around your bones, back up your spine, inside your mind, and back out again. Wiggle your fingers and toes. Can you feel it the contempt squishing about? Can you smell it? Can you taste it? It's all over you. And not just yourself either, but those around you. It is an infection. An insidious, invasive, infection! And you are the one spreading it.

And so, it makes perfect sense that we often don't voice our contempt. For fear of harming those around us. Those close to us. Those we hold dear. The thought of being responsible for their demise sickens us. Of turning them into loathing contemptuous monsters. But, what about ourselves?

Surely, we don't want to seem to be such monsters either. But, in refraining from sharing, we keep the vermin festering inside of us. And eventually, they will lash out, in unconscious actions, with unforeseen consequences. We must let the contempt out somehow, but what are the means to tame this beast, so that it doesn't demolish everything in its path?

In order to protect ourselves, and those around us, we must cordon off the contempt in a word compartment. Cordon off the contempt in a word compartment. They cannot just be any words, however. We must choose them wisely and meticulously to form a prophylactic barrier to the contempt they contain. But we must also choose them in such a way that the contempt demands. We do not wish to undermine either the contempt itself, or the release we are striving to accomplish.

It is a problem of managed risk. There is no such thing as total safety, only best efforts. And inaction is not an option. Now think back on the words you thought or spoke in the call for "unfiltered contempt". Did your words consider the following criteria? What the contempt itself requires. Your hygiene. The hygiene of those around you. Was it in fact unfiltered? Was it even contempt? Don't feel bad. It can be difficult to synthesize emotion on command. I understand, but I will demand it all the same.

If you are still here, try it again. This time with a consideration of hygiene, and a meticulous choice of words. You can speak with the same person as before, or someone new, or, if you absolutely cannot bring yourself to share this danger with those around you, simply imagine the words that you would say. Or speak aloud to yourself. I won't mind.

(five to ten minutes of people talking/reflecting)

WHISPER

Good. I can already sense the difference. Can you? Reflect upon your consideration, connection, transmission.What happened to your words? What happened to your voice? What happened to your face? What happened to your body? Was it safe? Was it safe enough? Did it contain the contempt? Did it respect the contempt? Was it just the same infectious gripe-fest as before? Do you feel dirty?

Hmmm… I suppose it was not enough. To carefully choose words alone, is not enough. We must also be incredibly attentive to the voice, and the structure the voice forms as it passes between persons. Voice can be a minimal conduit, a vast amphitheater, or a winding maze for the message it contains. The volume, tone, and timbre all provide detailed context. And it too must be carefully chosen, as you work to build this container.

Upward, downward, and neutral inflection. Resonant in your skull, or in your body. Sharpness. Softness. Rhythm. Pauses: why and where. Not only the voices spoken aloud, but the ones inside your mind. The ones that only you can hear. They have their own forms of internal transmission and diffusion.

What can one do to even further contain the contempt, and at the same time respect it, in a supple, non-aggressive form? Like a light misty breeze rolling through you and out into the world.

Yes, a light misty breeze rolling though you and out into the world. The whisper: unpitched, neutralizer of tone; vehicle of confession; quiet, ephemeral, but so present! And again, I will ask you to speak about and/or reflect on these ideas. Contempt. Disease. Words as containers. Respect. The whisper. Voice as structure. Or whatever you like. But whatever you do, do so in a whisper. Even in your thoughts. A whisper.

(five to ten minutes of people talking/reflecting)

PROXIMITY

We are still here. And with the whisper: What happened to your words? What happened to your voice? Where was the contempt? Is it now a secret? What is the function of a secret? Are you trying to keep a secret from me? What is it you are afraid I'll hear? What happened to your face? What happened to your body? Yes, your body. And those around you.

Proximity. The proximity of your body to the bodies of others. Maybe you were able to divert the painful glances of the eyes, as perhaps you whisper in another's ear, but the whisper demands a physical proximity. When was the last time you recall whispering in someone's ear? Who was it you whispered to? What was it you were whispering? Why don't you whisper more often? What are the dangers involved? What if you were to imagine your whispering words, but not say them? Would this be a secret? Would your body show it? And what happens when you touch another body? What happens?

The touch. Again, danger. Respect. Infection. Hygiene. Proximity. Managing risks at every turn. The biggest danger, your hands.What if you were touching someone near you? Perhaps you are already. How would you do so without involving your hands? Specifically, the grasp.

Consider your body against another body without any grasp. No open palm. No way to pull the person towards you. It is a crucial difference. Arm. Elbow. Knee. Calf. Feet. Shoulder. Spine. Head. Chest. Hip.

One last time before we part ways, look around the room, and find someone, or just find yourself. Stand, sit, lie. Contempt, hygiene, whisper, proximity, and touching without grasping. You'll know what to do.

(five to ten minutes of people talking/reflecting/touching)

ROBOTS AS SOCIAL ACTORS: AUDIENCE PERCEPTION OF AGENCY, EMOTION AND INTENTIONALITY IN ROBOTIC PERFORMERS

Kathy Cleland

This paper looks at the different ways audiences perceive and respond to anthropomorphic and bio-mimetic qualities in robotic characters, specifically their perceptions of agency, emotion and intentionality. The author argues that it is audience perception rather than the innate qualities of the robot that determines successful robot-audience interactions.

Analyzing Robotic Performance

This paper analyzes robots as performative entities that create themselves in the moment of their performance and also looks at how audiences perceive and interpret those performances through observation and interaction. Interactions between humans and robots take place in a variety of different contexts. Some of these contexts are explicitly performative or theatrical, including Honda's ASIMO conducting the Detroit Symphony Orchestra, Hiroshi Ishiguro's female android Geminoid-F acting in the Japanese play *Sayonara* and Louis-Philippe Demers's robotic performers in Australian Dance Theatre's (ADT) *Devolution*. These performances are all tightly scripted and rehearsed. Other human-robot interactions take place in more open environments, such as art galleries and museums where audiences can interact with robots in unscripted interactive encounters. Nevertheless, I would argue that there is a theatrical performative element to all public displays of robots. All robots are in essence performers: they are designed to act and interact in the world and are programmed (scripted) to perform in particular ways.

How then can we best analyze the performances of robots across both theatrical and non-theatrical environments? Moreover, how do audiences respond to these robotic performances? While there are a growing number of studies analyzing robots as performers, particularly from the domain of performance studies, [1] [2] [3] [4] it is the work of sociologist Erving Goffman that proves to be particularly useful in analyzing robotic performances and interactions with humans across both theatrical and non-theatrical contexts, such as art galleries and museums.

In *The Presentation of Self in Everyday Life*, Goffman views all human social interaction as a type of acting. We don't have to be on a literal theatrical stage to act, we are all actors who craft and perform different versions of ourselves in our everyday lives depending on which social situations we are in and who we are interacting with. Goffman uses the metaphor of the theater to describe how we move between back stage and front stage arenas using various techniques of "impression management" such as selecting different modes of dress, speech and behavior to perform these different presentations of self to our different audiences. [5]

Using Goffman's theatrical framework, we can analyze the physical appearance and behavior of the robot along with its staging and theatrical mise-en-scène to see how these all play a part in framing the robotic performance and how it is perceived and interpreted by audiences. The back stage preparation of the robot's appearance and behavior includes its design, fabrication and assembly, as well as more conventional types of costuming and dressing up. How the robot is then presented to an audience,

whether this is in a theater, gallery, museum or trade show, also contributes to the overall impression the robot will make.

We can break down these aspects as follows:

- Appearance (robot morphology, for example machinic, biomorphic, zoomorphic, anthropomorphic, and costuming)
- Behavior (the robot's movement and actions including its interaction with its environment and with other actors)
- Context (this includes the environment within which the performance takes place and aspects of theatrical mise-en-scène such as setting, props and lighting)

Goffman's description of back stage and front stage arenas and the team efforts frequently involved in these everyday presentations of self marries itself very well to the production context of robotic performance, which typically includes the artist as well as literal teams of technologists, assistants and handlers who work behind the scenes in the presentation of the robotic artwork. In this team effort, the agency of the performance may be distributed in a variety of different ways between the members of the team and the robot itself. The robot may perform completely autonomously and have its own emergent agency and behaviors (albeit programmed by the artist/technical team) or it may be controlled in more direct ways through automated performance scripts or teleoperation.

Some Case Studies

WADE MARYNOWSKY, *THE DISCREET CHARM OF THE BOURGEOISIE ROBOT* (2008)

There is something of a camp aesthetics evident in Wade Marynowsky's cross-dressing robot Boris in *The Discreet Charm Of The Bourgeoisie Robot*. Although Boris playfully references human attributes in his voice, clothing and behavior, he is still clearly a robot, he is not trying to pass as human. The robot is dressed in an old-fashioned Victorian black dress trimmed with lace but his glass-domed head with its camera eye clearly proclaims his identity as a robot — a robot playing dress-ups. As gallery visitors enter the space Boris whirls in circles and engages them in conversation. Marynowsky's robot is reminiscent of the robot in *Lost in Space*, the Daleks in *Doctor Who* and Robbie the Robot in *Forbidden Planet*, but its historical lineage also includes the famous chess playing Turk, an automaton built by Wolfgang von Kempelen in the late 18th century. Von Kempelen's automaton astounded its audiences with its uncanny chess playing ability until it was revealed that the Turk's prowess was in fact attributable to unseen human operators hiding in the stand that housed its mechanism. Marynowsky's robot is controlled by similar sleight of hand — in this case it is an unseen human operator (the artist) who remotely observes the actions of gallery participants and direct Boris' movements and speech via the Internet.

The mise-en-scène of the performance — the lace-trimmed black dress and the old-fashioned gramophone horns lining the gallery walls — combined with the robot's uncanny whirling when visitors enter his space evokes the feeling of a Victorian séance; especially combined with the spirit possession inherent in his channeling of his master's voice through the Internet.

SIMON PENNY - *PETIT MAL* (1989-2006)

There is nothing human-like in the appearance of Simon Penny's *Petit Mal*. The robot is completely machinic in appearance. It sits on two bicycle wheels joined by an axis with an upright pole supporting three ultrasonic sensors and three pyroelectric (bodyheat) sensors in the front and a fourth ultrasonic at the back. However, although not ostensibly anthropomorphic or zoomorphic in appearance, the constellation of sensors nevertheless acts as a sort of 'head.' A colorful vinyl print covers some of the metal tubing which acts as a counterpoint to the utilitarian machinic appearance of the robot and gives it a more playful and frivolous appearance.

The robot moves around the gallery performance space generally avoiding walls but sometimes lightly glancing off them. It rocks back and forwards on its base as it pursues and reacts to people in its performance environment. It will approach audience members who are directly in front of it up to a distance of about 60cm and try to maintain this front-facing position and distance as its audience interactor moves. If the person comes closer than around 60cm, *Petit Mal* will retreat. However, the robot's behavior can become confused if there are multiple people in the performance area or if it gets cornered. The appearance and gently erratic movement and behavior of the robot contribute to its playful demeanor. The robot's name derives from a neurological term that describes a momentary loss of control or consciousness. The naming of the robot provides its behavior with a psychological frame. Is this robot out of control? Is it psychologically disturbed?

Petit Mal has appeared in many gallery performance environments, sometimes in an open gallery space and sometimes in specially constructed enclosures. The robot (when it was exhibited at Transmediale 2006 in Berlin) performs in a rectangular arena enclosed on all sides by hip-high white walls. This performance area is reminiscent of a zoo enclosure with the audience standing behind the wall to watch the actions of this strange creature. The robot is contained in this space with no other objects or props but audience members are able to enter the space to interact with the robot.

Audience perception of robotic performers

We can conduct a rigorous semiotic analysis of a robot's appearance and behavior and the staging of its presentation as I have done above but this is only part of the equation. The key question remains: how do humans understand and interpret the performance of robots?

In his analysis of the everyday presentation of self, Goffman also places particular emphasis on the role of the audience in receiving and judging the performance. A successful performance is one where the audience views the actor as he or she wants to be viewed. We all test and judge each other's performances. If robots successfully perform the behavioral signifiers of animacy, agency, emotion and intelligence, audiences will respond to those cues. However, the intention of the performer and the intended meaning of the performance is not necessarily what will be received by the audience. Both human and robotic performers are subject to performance mistakes and unintended behaviors. These gestures and behaviors (for example, the jerky movement of a robot or responses that are too fast or too slow) even if they are not an intentional part of the performance will be interpreted as meaningful by the audience and become part of the performance effect.

As Byron Reeves and Clifford Nass [6] have shown, human responses to computers and virtual characters are informed by deeply ingrained physiological and behavioral tendencies and habits. These instinctive physiological responses (such as reacting to facial expressions, body language and movement) and

social responses (such as a tendency to be polite) are carried over from the physical world into our interaction with robots.

When robots display machinic, bio-mimetic or anthropomorphic characteristics, these performative signifiers (sign-systems) are measured against the audience's own experience of other similar entities (human, animal, insect, machine, art) that they are familiar with. The robot's movement and behavior are just as important, perhaps even more important, as its physical appearance in this regard. What the robot does, how it does it, and how it responds to its environment and other entities including audience members are key factors in how it is perceived.

Behaviors that look too controlled and automated can appear machinic and unexpressive. Unpredictable behaviors by the robot in response to its environment and to other objects/people in that environment give an appearance of agency, personality and even emotion. Hesitations, frailties and inconsistencies make the robot appear more like a living organism than a programmed machine. The active interpretive role of the audience is a key factor here. It is the audience's projection of their own meanings onto the performance that generates much of the expressiveness of the robotic performance. This, after all, is how audiences read and respond to the performances of human actors. We interpret each other's performances including perceived intentions and emotions through reference to our own experience and emotions.

In this scenario, whether the robotic performer is intelligent and has emotions or not is not the key issue, it is whether we can tell the difference or not. Human perception and emotional and cognitive responses are more important than epistemological ontologies when it comes to robotic performance. The successful performance of the robot, judged from the audience's point of view, is determined by what the audience can directly perceive in the robot's appearance and behavior rather than by the intrinsic qualities and abilities of the robot (for example, whether the robot is 'truly' aware, intelligent and socially responsive).

As Sherry Turkle comments in her book *Alone Together*, "Computers 'understand' as little as ever about human experience […] They do, however, perform understanding better than ever." [7] Robots may not be truly alive, but according to Turkle, they are becoming "alive enough" for humans to have relationships with.

The intrinsic qualities of the robot including the sophistication of its manufacture, its sensing systems and Artificial Intelligence (AI) programming are only relevant to the audience to the extent that they impact on the robot's observable behavior and performance. These factors may be highly relevant to scientific robotic research and robotic development but in terms of audience response, careful staging, programming and even trickery may be just as important factors in achieving an effective performance for the audience. Robotic performances may be completely autonomous or assisted by human operators. From the audience's point of view, it may be difficult to tell the difference. Creative staging and showmanship along with elements of deception and trickery have a long history in machine performance, as in Von Kempelen's chess-playing automaton. Wade Marynowsky's Boris has automated sequences and is also teleoperated by the artist and other guest operators, making the robot appear to be much more intelligent and aware of its audience. This hi-tech puppetry and remote operation of robotic performers is also the case with Hiroshi Ishiguro's teleoperated Geminoid robots, which are controlled by the humans operating them rather than acting as autonomous performers. In this process, agency and social intelligence is transferred and delegated from the artist/operator to the robot even though

from the audience's point of view, the intelligence and awareness appears to be coming from the robot performer itself.

Successful acting is all about simulation and making what is unreal appear real. For a robot, this is the ability to persuasively simulate or pass as human, or alive, or intelligent. Alan Turing's famous test used to determine machine intelligence and social performance is essentially an acting test. It measures not whether a computer is intelligent or can think like a human, but whether it can perform as if it is human, or at least whether it can perform well enough to fool a human audience. Turing set out this test for machine intelligence in his influential 1950 essay *Computing Machinery and Intelligence* [8] where he describes the scenario for an 'imitation game' to test whether a computer can successfully imitate a human being. Turing based his test on an earlier game where an interrogator tries to guess the gender of two participants (one male and one female) by asking them questions and assessing their typewritten replies. In Turing's version of the game, he replaces one of the human participants with a computer and suggests that if the interrogator cannot tell the difference between the human and the computer purely from their answers, then the computer can be said to be intelligent. In this way intelligence becomes a functional attribute achieved through persuasive simulation or 'passing' rather than an inherent attribute.

'Passing' or successful simulation means getting it 'just right,' but over-performance and under-performance are more common features of machine performance. Over-performance and under-performance may be perceived in a variety of different ways and can have both entertaining and unsettling effects on audiences. Exaggerated appearance and behavior, including over-emphasized facial features, expressions, gestures and movement are common features of cartoon animation and animated films, where these techniques are successfully used for comic effect and to enhance emotion and drama. More unsettling are the uncanny responses evoked by robots and digitally animated characters that are 'almost but not quite' human in their appearance and behaviour; these responses have been described by Japanese roboticist Masahiro Mori as the 'uncanny valley' phenomenon. [9] [10] These unsettling effects occur when the mimetic aspiration of the work falls just short of achieving a perfect simulation. While audiences generally find lifelike or human-like characteristics in a more abstracted form appealing and empathetic, when these characteristics become more realistic (but not quite right), audiences tend to focus more on the disparities and what is not working about the simulation. The human brain perceives these imperfect simulations as defective versions of the real thing.

As we have seen, audiences judge robotic performances in the same way as they judge any other type of performance interaction whether they occur in everyday social settings or in more staged theatrical environments. The success of the robotic performance depends on two key factors, the *intended performance*, the robot's appearance and its ability to enact or simulate behavior, movement and interactive responses (to its environment and other entities/actors) and the *perceived performance*, the audience's perception and interpretation of the robot's appearance, behavior and interactive responses.

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TOWARDS A TRANSNATIONAL 'CAMPO'

Cecelia Cmielewski

The *Large Screens and the Transnational Public Sphere* research project explores the exchange of information and interactive content between cities identified as media 'hubs' and the impact on the formation of a regional public sphere. This project currently links screens between Federation Square, Melbourne and those managed by Art Center Nabi, Seoul.

Fig 1. "sms_origins", Leon Cmielewski and Josephine Starrs, Federation Square, Australia 2009. Photo: Leon Cmielewski

Fig 2. "Value @Tomorrow City", Seung Joon Choi, Songdo, Korea, 2009. Image courtesy of ART CENTER NABI

The *Large Screens and the Transnational Public Sphere* research project explores the exchange of information and interactive content between cities identified as media 'hubs', and the potential for the formation of a regional public sphere, in this case, the Asian region.

Public screens could become sites to incubate innovative artistic and communication modes that revitalize public space and public interaction. Networked public screens could also function as a nexus for new forms of cross-cultural exchange. Transmitting artwork on a large screen between two cities with public interactive dimensions requires an innovative approach in curatorial techniques, artistic content production. Our approach emphasizes social and cultural values above commercialization of the screens and squares.

Artists' investigations, the changing role of the curator, interaction with audiences, the overcoming of technological differences and financial imperatives, will be described in the context of the issues faced in trying to generate a 'sense of belonging' in many contemporary civic public spaces.

Begun in 2009, research for *Large Screens and the Transnational Public Sphere* will continue until mid 2013 developing interactive realtime artistic events between Melbourne and Seoul to explore the capabilities of different art practices that inspire and bridge communities across two cities.

Our program of cross-cultural exchange and empirical analysis of public interactions around large screens, aims to inform media, cultural and urban planning policy. Our culturally and organisationally diverse team members include theorists, administrators, technicians, artists and curators, from the Art Center Nabi, Seoul, South Korea, Federation Square PL, University of Melbourne, University of Sydney. Funding comes from the Australian Research Council and the Australia Council for the Arts. [1]

THE SCREEN AS TRANSNATIONAL 'CAMPO'

Can recently 'created' public spaces become places of civic engagement - can they become a transnational 'campo'?

The hypothesis being tested is that real-time, interactive artwork presented between nations, on large public screens can have a positive impact on how we engage with one other and, in a broader sense, affect our civic lives.

Our aim is to inform media, cultural and urban planning policy to revitalize public space and public interaction by increasing risk- taking and creative opportunities.

 Current urban planning policy in Australia, for example, treats electronic screens in much the same way as static billboards. This underestimates the possibilities for public screens to be sites that incubate innovative artistic and communication modes. Current policy also ignores the potential for networked public screens to function as a nexus for new forms of cross-cultural exchange.

The tendency is to regulate the scale and location of public screens based on the assumption that the primary use will be advertising or passive programming. Urban policy needs to address the resulting paucity of civic engagement when screens only support centrally regulated content that treats viewers

as passive spectators. To provide informed urban planning guidelines, we need a clearer understanding of the spectrum of potential uses of public screens and address the common perception that content produced by artists is free. Artist's development and production time should be allocated during budget development and allocation as a part of civic forward programming.

The aim of the *Large Screens and the Transnational Public Sphere* project is to show what an interactive city can be or should be. We envision the city as a living organism that expresses in real time its emotional and physical states. We dream of a new collectivity based on diversity. This is possible with today's media. The large screen works as a window to other cultures, airing cultural and artistic contents from around the world. But as cities develop and their populations expand, it becomes clearer that public art should also be able to question our notion of the 'civic', reflecting on it, asking if there are any holes, rather than conforming to it. The term 'civic' can be refined and redefined by good public art. In the end, it is a process of cultural negotiation. Through this project, we are proposing both new modes of experience to share with and between people, delivered by a new *template* for content delivery — across countries, across screens. Mediated by technology, but inherently live.

THE ARTISTS

Artists can seek to encourage subtle shifts in how public's think of themselves and each other. This is particularly so, when the work being presented requires the public to interact with it in real time, and, therefore have a crucial role in realising and performing the work.

THE FIRST TWO ARTWORKS

In August 2009, two artworks were presented simultaneously on the Incheon (South Korea) and Federation Square (Australia) networked screens, with the public invited in both places to interact with the work and with one another. These projects related in a delicate way with each other, both articulating identity in some way, beginning what is becoming a poetic transnational creative dialogue.

sms_origins uses the large screen as a public sms graffiti board. Leon Cmielewski and Josephine Starrs conceived and designed the piece working closely with programmer Adam Hinshaw. A phone number is displayed on a large screen in a public space along with the instruction "sms the name of the country you come from.". When participants sms their (and/or parents or grandparents) country of origin a curved vector is added to the map of the world displayed on the large screen, which updates in realtime as it receives texts. The map of the globe then becomes a platform for a more dynamic understanding of the people with whom we are sharing that public space. The purposefully innocuous design of the screen becomes geographically alive to share our personal heritages. *sms_origins* reinforces concepts of global citizenship and multicultural societies. Importantly, this work provides an entré for the less extrovert, leading to a greater sense of participation and shared histories. The work is designed with a simple appearance, although the programming is far from simple. The complexity of global migration is revealed and, in a very undemanding manner, provides a collective platform that generates a sense of the evenness of our demographic histories.

The concept, design and programming by Seung Joon Choi in *<Value>* explores what is important to people. A word sent via sms responding to the question "what is valuable to you" generates a text and data flow. The wordcloud expands depending on how importantly people value each word. The words may

be 'love'/'networking'/ 'home'/ 'joy'.*<Value>* expresses what any particular group, in that time and across space, wish to emphasize. Choi says that 'pursuing or choosing values in our lives can lead to vital decisions at times'. *<Value>* suggests that we take a step back and lightheartedly explore whether it is possible to harmonise different values. We are familiar with this tool now (in 2011) as information clouds, but this remains important work, as it still not commonplace for data on group values to be collected and displayed in this way.

Both projects set and achieved very ambitious aims – working cross culturally and transnationally in a real-time public interaction bridging two urban screens. We are building on this initial experiment to develop a range of artworks that include live performance, interactive sound, simple gestural and imaging based on the specific sites. All this, and the overarching aim to investigate how best to foster a sense of community, makes for fascinating dynamics.

THE CURATORS

Traditionally a curator acts as a carer, someone who is meant to minister to the immediate needs and longterm survival of artworks. Over the past fifty years or so, the curator has also been charged with caring for artists and for the events that tend to transpire around artists. Indeed, with the rise of 'participant' cultural phenomena such as performance art, relational aesthetics, interactive and emergent installations, the curator has become a kind of behind-the-scenes producer as well as a creative diplomat.

The intention of socially engaged practice challenges or sometimes blithely ignores the gallery context of the artworld. There are many for whom the 'outside world' is now the relevant domain for artistic encounters. Where the rules are wider and wilder in this boisterous world of vernacular experience.

Our aim is to effectively curate interactive and emergent artworks that are specifically designed for large public screens.   However, the legal and technological context of public screens run counter to conventional artistic development and presentation. The screens are 'public' because they carry their sound and image streams into the civic domain. When we add the additional possibilities of public engagement there is a potential for the kind of spontaneous response not normally associated with the gallery system with the hope that this may engender the (re)democratisation of civic spaces.

But we are not quite there yet! The corporate entities who manage the screens require a cohesiveness of the programming as well as a predictable 'behaviour' of the public. Adopting the familiar template of the television broadcast, reduces the risk of an unplanned empty screen, a failure to be avoided at all costs. Turning over the technology to artists to test out their ideas first is often a hard-won negotiation. The artist wants to be able use these screens and spaces to play and experiment - to see what happens and to explore the creative questions that arise. Again, not every artist can leave their egos at the pavement to transition into experimenting in these uncertain public spaces. Conventional training certainly has not helped them in this kind of public risk taking endeavour either. These are artists who have developed a publically engaged practice through experience. Part of the curators role is to find the common ground for sharing the aspirations that are sincerely driving presenters and producers, and to figure in the engagement with the public.

THE AUDIENCE

The first audience evaluation for this project was conducted in August 2009 during the live telematic broadcast of *sms_origins* and *<value>*. A survey was conducted at the Tomorrow City's Plaza, Incheon, and the same survey was trialled simultaneously at Federation Square. Evaluations from Korean responses revealed a high rate of participation with the interactive art works on the large screen. More than three quarters of the audience engaged with the new media art using text messages, and considered such interactions successful in forging cross-cultural ties. Many also expressed enchantment towards the new art forms shown on the large screen. These experiences of enchantment and shock reflected the high modernity of the megacity, as envisioned by the Incheon City planners. Although audiences were acutely aware of the top-down urban regeneration of Incheon, their responses revealed how the networked screen could potentially create a transcultural space mediated by their individual experiences of media consumption. [2]

The second audience evaluation was held across three months from September to December 2010 at Federation Square during further screenings of *sms_origins*. The broader political climate in Australia at this time was marked by rising racial anxiety. Issues of migration dominated public discourse. SMS responses to the work showed that the participants were themselves migrants or had family members who had experienced migration. In analyzing these participants' responses, it appeared that most embraced the ideology of a multicultural Australia — the idea of Australia as a country of migrants — as most reacted positively to the diverse ethnographic demographic of users in the square.

At the Songdo event, respondents were predominantly urban Seoul dwellers in the age group between twenty and forty. Older people and those from the surrounding rural province of Songdo did not participate. From the production cycle of curating and technological networking, to the consumption of its practice as an event, such exchanges highlight the politics of access and distribution that underpins the mobilities proffered by the large screen.

"HELLO" PROJECT

The next experiment will be presented in early October 2011. We aim to present an alternative that resiles from the necessary approach adopted in 2009. In particular, we aim for the artists to experience a more playful ambience and be able move away from "broadcasting" methodology. *"HELLO"* is a performative work based on gestures gathered from a range of multicultural groups in Seoul and Melbourne.

The evolution of this project is worth outlining as its gestation covers the kinds of interactions involved in this research.

The idea, based on the practice of Australian choreographer, Becky Hilton, in collaboration with Korean choreographer, Soon-Ho Park, is that gestures are gathered from various groups, five gestures are subsequently selected to form a choreographed sequence. These are then exchanged one-on-one between participants to produce an unanticipated dance.

The concept has been through several iterations, and at one point the thought was to include public organisations such as the Korean army, folkdancing troupes and the volunteer fire brigade. The idea is now distilled into a more secretive and seductive 'Chinese Whispers" where, in a tent or temporary enclosure in both sites, one dancer shows another the movements, who then repeats their memory of the moves to a new performer. The crowd outside only sees the participant that receives the gesture being passed on. The final reveal to the public is the combined results of all the gestured "movement-whispers." This

iteration of the idea stems directly from the transnational aspects of the project as it addresses the concerns of the Korean partners about individual reticence to spontaneously perform in public. In turn, the Australian ideas of multiculturalism were taken up by the Korean choreographer with gusto, providing a way in for them to workshop with local multicultural organisations for the first time.

Because of our enthusiasm, the project had quickly and imaginatively leapt into the paradigm of the 'big event'. This in turn fed the paradigm of the 'high production broadcast' and unwanted pressure on the part of the artists and participants. We needed to scale-down to maintain a simple approach while keeping the role of the artist and the core concept at the heart of the project. The resulting new approach does this and aims to extend the technological uses of ready to hand programs such as Skype. Engaging the public in this scenario now becomes the main challenge. We hope people will begin to replicate the movements themselves in a spontaneous response to what they are seeing on the screen, creating yet another version of this contemporary "folk dance."

Throughout, the curators have found that the primary discussion, which needs reinforcing all too frequently, is to keep the artist at the core of the project. And all the while, investment in maintaining good will from all the partners is paramount. It is where most of the energy of this project has been expended — with excellent results in navigating and developing the transnational relationships over the course of this chapter in the research.

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REMOTE INTERVENTIONS

CECELIA CMIELEWSKI

Australia may be one of the most urbanised and coast-dwelling populations in the world. However, our imagined and projected national and self-images also tend towards the expanses of the interior and the 'bush'. I will explore some examples of what 'remote' means in the context of an imagined Australia and transnationalism.

Fig 1. "BirndiWirndi – Worlds Apart", Sohan Ariel Hayes and Michael Woodley, Roebourne, Western Australia, 2010. Image courtesy of IASKA Spaced.

Fig 2. "CrayVox&", Nigel Helyer, Post Office Island, Houtman Abrolhos, Western Australia, 2011. Photo: Nigel Helyer.

Australia may be one of the most urbanised and coast-dwelling populations in the world as more than 80 per cent of Australians live within 100 kilometres of the coast. [1] However, our imagined and projected national and self-images also tend towards the expanses of the interior and the 'bush'.

I will explore some examples of what 'remote' means in the context of an imagined Australia and transnationalism. This means we can bring issues of working across cultures, landscapes and nations into the discussion and presents an opportunity to discuss how many of the more interesting art works stem from their collaborative forms.

Two Australian arts organisations that work consistently in remote Australian communities are IASKA and Darwin Community Arts.

IASKA *SPACED*

IASKA (formerly International Art Space Kellerberrin Australia) has a long history of fostering innovative art projects in regional and remote areas and is regarded as among the most interesting art organisations to have emerged in Australia in the past decade.

Spaced is a Global/Local Community Exchange Through Art and Technology.

Conceived and organized by IASKA (*International Art Space Kellerberrin Australia),*Spaced is a new biennial visual arts project that links local communities throughout rural Western Australia as well as several overseas locations. Spaced forms a multi-voice but unified project that explores the relationship between local identity and the social, cultural, environmental and economic effects of globalisation. The projects draw on art and digital technology to implement cultural exchange between geographically and culturally distant communities. It features residencies, exhibitions, site specific works, educational and mentoring activities, a web-based forum and a publication. [2] The first iteration of the biennial will be held at Fremantle Art Centre in February 2012.

The methodology of Spaced is to partner with local community groups who invite professional artists to stay with them for substantial periods of time and produce artworks that articulate the specificities of these remote communities. Frequently there will be particular issues that are already explicit, but as frequently the issues may take some time to filter through to the stage of articulation. The artists who are most successful in these endeavours will have developed this ability to work within a community setting to realise high-quality artworks.

Marco Marcon, the director of Spaced and co-founder of IASKA, explains:

Spaced offered another innovative curatorial approach that involves the direct and active participation of a network of partner organisations and communities. It involves visual and media arts projects created by artists working on-site with a wide range of local social and environmental situations. Spaced centres on contemporary art practices with a strong social focus; it comprises context-responsive projects, international exchanges and a multi-purpose online hub. [3]

BIRNDIWIRNDI – WORLDS APART

One such project, *BirndiWirndi – Worlds Apart*, formed part of the 'work-in-progress' phase for what has now become the Spaced biennial. In late 2010 Sohan Ariel Hayes spent two months in Roebourne working on a collaborative project with Michael Woodley from the Juluwarlu Aboriginal Corporation.

Roebourne is located 1563km north of Perth in Western Australia's Pilbara region. IASKA's project partner, Juluwarlu Aboriginal Corporation, is an Indigenous organisation dedicated to the recording, preservation and maintenance of Yindjibarndi language and culture. Juluwarlu professionally collects, records, documents and broadcasts the language, culture, history and the contemporary lives of the local Indigenous people. Sohan is an award-winning animator and visual artist who works across media.

Sohan works closely with Michael and the community on a number of projects including outdoor projections at community gatherings and a series of editing and filmmaking workshops to assist Juluwarlu to achieve its goals. *BirndiWirndi – Worlds Apart* is a video-based work depicting the hearts, minds and spirits of the Yindjibarndi who, despite the enormous forces of the mining boom, still stand strong. The work was recently projected onto the now boarded up Victoria hotel in Roebourne.

The word is that this is the most activated Roebourne has been for quite some time. The local community and the Aboriginal Corporation are looking to extend the project with this artist - a sure indication of the success of this remote intervention and collaboration.

CRAYVOX

The Island, a cemetery exhaled by the sea.

The tree of life, calcinated to a bleached white clinker raft.

Whilst all around, submerged beneath the endless sheet of water

Fronds branch and entwine, filament and fan, knoll and star

Electric pink jostles acid green, fading to sombre blue where the sharks sleep.

Nigel Helyer, 2011: [4]

On the tiny Abrohlos Islands archipelago off the coast of Geraldton (500kms north of Perth, Western Australia), Nigel Helyer spent two months with the crayfishermen and women for the Spaced biennial. Living and working on a number of these very remote islands which are made of calcified coral, he formed ties and recorded the tales of these very independent people.

Nigel Helyer is a sculptor and sound artist whose inter-disciplinary creative practice links art with scientific research and development. His research for the work will continue by linking in with the destination of the crayfish which are shipped directly to Taiwan. Helyer will spend time there with the import companies as well as restaurants and chefs who are the next main part of the chain of relationships in this project.

The resulting piece, *CrayVox* aims to present some of the issues of marine food security, environmental change, water security, and folklore, myths and oral histories. A small vessel will be equipped as a floating media and biology lab and will also serve as the artist's accommodation. The artist will operate the vessel's scientific and technological systems and engage in a creative manner with the fishing communities, their related service industries on-shore and the research section of the Department of Fisheries. The community has been selected to highlight a unique cultural, environmental and economic activity within the region. [5]

DARWIN COMMUNITY ARTS: *FRONTLINE*

Moving to the top end of Australia, to an outlying area of Darwin we come to Malak, where Darwin Community Arts is active in an outreach program with local Indigenous and recently arrived refugee teenagers.

Since 2009, Darwin Community Arts (DCA) has facilitated a locative media project in the Malak area of Darwin. *Frontline*, builds on previous work by DCA dealing with the relationship of Indigenous, African, and other communities in Malak and the northern suburbs of Darwin, enhancing its "community arts intervention" in Malak through locative media. [6]

Malak is considered a frontline suburb for confronting social, economic, and cultural issues facing Darwin today. It is also the frontline for exploring positive changes, including cultural changes, at a local level. This is why DCA is based in Malak; they seek to make a difference at the frontline.

Frontline builds on DCA's work in Malak since mid 2007, which has included running a Telecentro (community based Internet access facility), facilitating workshops on digital media, and hosting Darwin Fringe events.

The project engages with all communities in Malak, including but not limited to Indigenous and African youth, with whom DCA has worked since 2007. Special attention is given to engaging young people, particularly Indigenous and African young people who make up a significant proportion of the population, and who have featured prominently in tensions in the area.

The Malak Telecentro -- in Shop 10, Malak Shopping Centre -- offers broadband access to the Internet and digital office and production facilities free of charge to the community. It currently has a running network of twelve (12) personal computers with the Ubuntu GNU/Linux operating system, and one (1) Apple eMac; there are more computers that are in storage, slated for setting up later. WiFi connectivity is available for Telecentro volunteers.

The computers and other equipment were donated mainly by Charles Darwin University, and also by St John's College, Bunji Elchoate, Controlability, Taminmin High School, Bees Creek High School, and Mike Foley. The furniture is mainly from NT Government surplus stores. Other equipment was provided by Darwin Community Arts, which operates the Telecentro.

NT Freenet (http://www.the-mesh.org) provide technical advice and support for the Telecentro and related projects. The Telecentro is staffed mainly by volunteers from Darwin Community Arts, Melaleuca Refugee Centre, and NT Freenet. [7]

Participants have been experimenting with open-source laser tagging and LED Throwies during the Darwin Fringe, at Malak Shopping Centre and car park and more recently with tagtool at the Darwin Parliament House.

The methodology of DCA is to use media in a number of forms, with the intention that interest will be maintained with groups of, predominately, teenagers. Other media forms include:

- Amazing Malak: A version of the Amazing Race, which has proved popular with young people in Darwin, organised through vacation care programs. This game/race is held across Malak's parks and other places, with on- the-ground racers working with virtual, online participants in spaces such as Second Life.
- Computer Kiosks: Computers placed around Malak to accept video blogs and other contributions that annotate and trace people who come through these spaces.
- Interactive Spaces: Multimedia presentations are made about the spaces themselves (e.g. film or video clips) and triggered by movements of visitors to them.
- Online Social Mapping: Residents are encouraged and assisted to post information about places in Malak and surrounding areas on Google Earth/Maps.

Frontline is a great example of how collaborative artistic interventions can work by using the kinds of activities the young people are interested in. It aims to move them from breaking into the shops in the mall and acting out in the streets, to making art in one of the shops in the mall and taking that to the streets.

LARGE SCREENS AND THE TRANSNATIONAL PUBLIC SPHERE

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This is a highly collaborative arts-based project between nations and cultures where the role of the artist and the project teams are closely intertwined.

The first two works which blazed the trail related in a delicate way with each other, both articulating identity in some way, beginning what is becoming a poetic transnational creative dialogue.

'sms_origins' uses the large screen as a public sms graffiti board. Leon Cmielewski and Josephine Starrs conceived and designed the piece working closely with programmer Adam Hinshaw. A phone number is displayed on a large screen in a public space along with the instruction "sms the name of the country you come from." When participants sms their (and/or parents or grandparents) country of origin a curved vector is added to the map of the world displayed on the large screen, which updates in realtime as it receives messages.

The concept, design and programming by Seung Joon Choi in '<Value>' explored what is important to people. A word sent via sms responding to the question "what is valuable to you" generated a text and data flow. The wordcloud expands depending on how importantly people value each word. The words may be 'love'/'networking'/ 'home'/ 'joy'. <Value> expresses what any particular group, in that time and across space, wish to emphasize and suggests that we take a step back and lightheartedly explore whether it is possible to harmonise different values.

The current work-in-progress is the "HELLO" project. The idea, based on the practice of Australian choreographer, Becky Hilton, in collaboration with Korean choreographer, Soon-Ho Park, is that gestures are gathered from various groups, five gestures are subsequently selected to form a choreographed sequence. These are then exchanged one-on-one between participants to produce an unanticipated dance.

SANS-FRONTIERS

The scale and impact of the works I have described vary significantly in terms of the support systems and populations involved; however, the basic premises for successful artistic collaboration remain fairly

consistent. These include the need for great investment in time, communication techniques and expansive thinking beyond borders. We could also consider these remote interventions as effective artistes-sans-frontiers projects.

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INCOMPATIBLE ELEMENTS

Leon Cmielewski & Josephine Starrs

Incompatible Elements is an ongoing project that evolved during an artist residency at Performance Space, Carriageworks, Sydney. The media art installation explores ways of representing the relationship between nature and culture, embedding poetic texts into animated satellite images of global landscapes at particular risk from climate change.

AUTHOR(S)

The failure of nations to reach an agreement to curb carbon emissions has highlighted the huge gap between the scientific consensus and public perceptions of climate change and its effect on our planet. Responding to climate change in ways that are mythical, biblical and chemical, Josephine Starrs and Leon Cmielewski's media artworks question the urban perception that we exist apart from or outside of nature.

Commercial interests often co-opt nature, using images of animals, landscapes and seascapes to sell their products. Telecommunications companies consistently use wildlife, such as eagles, lions, and primates to promote their communications and IT products, but there is no acknowledgement made of the wildlife they are exploiting. In response to this trend, filmmaker and photographer Gregory Colbert attempted to create the Animal Copyright Foundation to enable advertisers to donate to conservation. He calls it "renegotiating our contract with nature." [1] More recently, Bolivia is about to pass the world's first laws granting nature equal rights to humans. [2] In the same way that advertisers exploit nature, the IT industries have also usurped words like 'web' and 'surf' from nature in which to dress their new products, the most recent being the word 'cloud', that ephemeral space where million of people now store their music and data. The cloud that Silicon Valley alludes to is in reality a network of massive data centres consuming enormous amounts of electricity, which in turn generates vast amounts of $CO2$, negatively affecting the real clouds and atmosphere.

In the visual media field, re-rendering the familiar in new ways is a strategy to encourage audiences to reconsider cultural assumptions. For example, an Australian's familiarity with the map of their country was challenged by Norman Tindale's 1940 Aboriginal Language Map of Australia. [3] Here was an astounding re-rendering of the familiar, with the display of so many indigenous language groups, far more than our limited education had lead us to imagine. It was enlightening to see one's country divided up in such an unfamiliar way, where those comforting but arbitrary boundary lines between Queensland, New South Wales, South Australia & Victoria had been erased by a very different set of boundaries, where people had a more profound difference than the brand of beer they drank: the difference of language.

In our previous artworks *Seeker* and *sms_origins*, visualisation and mapping are critical devices used to explore the impact of globalisation in relation to issues of diaspora, community and nationalism. Our current project *Incompatible Elements* is a media art installation that attempts to re-present the relationship between nature and culture, by embedding poetic texts into animated satellite images of landscapes suffering from the stresses of climate change. There is a long tradition of artists combining text and image to communicate ideas and concepts, and we source texts from local custodians or appropriate works of literature.

Only relatively recently have the general public had access to the god's eye view of satellites, which has been democratised by the flourishing of the likes of Google Earth & Google Maps. This previously specialised tool of government planners and the military allows us to visualise what the earth might say if it could speak back to us. The intention is to configure the land itself as active, not neutral; to imagine it being able to speak and make a comment about the impacts of climate change. This form of personalisation of the land has been further developed by working with indigenous people who generously provided their own perspectives about land as invested with cultural and spiritual attributes. For example working with Maori elders in New Zealand to incorporate Maori language into aerial photographs of Aotearoa.

Using a bird's eye view as a representation highlights the way the land often is embedded with a cultural imprint. This is evident in the NASA aerial imagery from Agricultural Patterns from Space [4] that show ways in which human inhabitation leaves particular traces and patterns on the landscape. For example, the circular forms of large scale irrigation farming compared to settlements in Peru where each farm plot is a radial slice of land focused on a small village. We can see that the land is shaped by human activity in a variety of ways depending on cultural attitude and technological intention. In Incompatible Elements, the words "days like these" (lyrics from John Lennon's song "Nobody Told Me") are embedded into an image of the Ganges Delta, where the land is being inundated due to sea level rise resulting from global warming. In an area in South Australia called the Coorong, a world heritage wetlands at the mouth of the Murray River, we have embedded and animated the text 'a living body'. This is a quote from Tom Trevorrow, a Ngarrindjeri elder who is a custodian of this land. He spoke these words on the steps of the South Australia Parliament house at a public rally protesting the destruction of the river. [5] The Ngarrindjeri people see no difference between land and sea, perceiving the river systems as a living body and are concerned about the degraded state of the Coorong.

In early 2011, we attended SCANZ (Solar Circuit Aotearoa New Zealand) spending three days in the local Marae at New Plymouth/ Taranaki, NZ, where we met Maori Elder Dr. Te Huirangi Waikerepuru. After showing him our previous work he granted permission to use Maori poetic texts to incorporate into aerial photographs of Aotearoa. We experimented with embedding the words WAI O TAPU (sacred water) in the area around the Tasman Glacier, which is melting and retreating due to climate change.

Through consultation with locals, we learnt of the erosion problems and landslides effecting Mt Taranaki, the majestic conical mountain that dominates the landscape in New Plymouth, New Zealand. Local people described hearing the sound of boulders and rocks crashing down the mountain at night. In a satellite image of Mt. Taranaki, we embedded the words PUWAI RANGI PAPA or 'waters of radiant sun and earth mother'.

…when permission is granted by an elder of the region for a story to be told and te reo (Maori language) to be used, the artists are provided with a place from which to transmit important messages across cultures. If settler cultures can shift from conceiving landscape or weatherscape as inert matter 'to-be-looked-at' to living bodies encompassed in Maori terms such as 'mauri' then we come closer to ecological reconciliation. Puwai Rangi-Papa could signal an important shift in articulating a reconfigured political ecology where Western environmentalism and indigenous cosmologies might join in restoration and care of the land. [6]

The videos in the installation are projected onto the floor to reinforce the god's eye view when looking at satellite images. The light boxes on the floor show close-up images of degraded riverbeds where mud

has turned to acid and has taken on a fluorescent red/rust appearance. Sydney artist Alex Davies created the surround soundscape alluding to sounds of water, dust, chemical reactions and satellite static.

As Performance Space curator Bec Dean wrote of Incompatible Elements, "Starrs & Cmielewski engage in a kind of digital geochemistry, terraforming new waterways and barren patches of sand that tell stories in winding, cursive script." [7]

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THROUGH THE WEB BLOCKS

Yiannis Colakides

"Through the Roadblocks" was conceived as a transdisciplinary project which examines ways with which information transverses geographical, political, social, economic, cultural and virtual borders is adopted through assimilation and transmutation, this short paper presents some existing roadblocks in our media landscape.

"We very soon got to six yards to the mile. Then we tried a hundred yards to the mile. And then came the grandest idea of all! We actually made a map of the country, on the scale of a mile to the mile!" (L. Carol, 1889, *Sylvie and Bruno Concluded: The Man in the Moon*)

As the information highway is getting faster it is also getting bigger currently consisting of over 250,000,000 domains but, more is not always better. Surfing within these domains we find sites with thousands of pages and others with millions, some of which inform and others misinform. Similar to the propaganda rhetoric of the cold war era, we again, can not distinguish real from fake information. The web's exponential growth iterates Lewis Carol's map where too much information becomes incomprehensible. Are we experiencing a new information driven renaissance or are we falling into the digital dark ages?

Although "Through the Roadblocks" was conceived as a transdisciplinary project which examines ways with which information transverses geographical, political, social, economic, cultural and virtual borders is adopted through assimilation and transmutation, this short paper presents some existing roadblocks in our media landscape.

A HIGHWAY OR A ROADBLOCK?

On June 16, 2009, Reuters news agency reported that the US Government contacted Twitter to "urge it to delay a planned upgrade that would have cut daytime service to Iranians who are disputing their election." [1] "*The revolution may not be televised in Iran, but it may well be tweeted*" 'ragnarokker' wrote two days later. This year Facebook and Twitter continued their adopted role as unconventional platforms where revolutions are incited and reported. But was this a logical development from blogging to citizen journalism to social networking, climaxing into social upheaval? These cloud based tools according to Richard Stallman are contaminated as "The U.S. government is encouraging people to go on the cloud because it can seize that data without the need for a search warrant." [2] In web 3, the trend points towards social engineering geared towards macro political goals reinforcing Gómez-Pefia's comment that in discussions of electronic media "twenty years of post-colonial theory simply disappear." [3] Smart Mobs [4] might not be as smart after all and cyberspace as a "technologically mediated space of cognition, communication, and cooperation" [5] might be becoming a thing of the past as the activists become more technologically aware. For now Rheingold's 2005 statement "the designs that dominate early in the growth of a technology can have disproportionate power over the way the technology will affect power structures and social lives" [6] has become eerily prophetic.

A ROADBLOCK ON THE HIGHWAY

One of the popular definitions of web 3 is 'a fast broadband to the internet always and everywhere'. This definition assumes an international infrastructure and access to the latest hardware and software. The current model both enables and constrains this aspiration as it relies on the financial capabilities of individual countries whilst the access to the information depends on economic class but also, in Pierre Bourdieu's terms, the cultural capital. The current volume of the net assumes that you read and write a European language (preferably English or Spanish) whereas if one wants to be involved in programming or scripting, English is the only available language which results in the exclusion of the non english speaking population or creating an unfair advantage at best. It might not just be the funding and infrastructure which makes the US a leader in software development but as software controls content, content can become prejudiced.

COLLATERAL DAMAGE

According to Zuckerman, people are "interested in seeing cute cats being adorable online. When the government blocks DailyMotion, it impacts a much wider swath [...] than those who are politically active. Cute cats are collateral damage when governments block sites." [7] The dominant western view criticizes China's firewall which blocks part of the internet within its borders but this very same view blindly accepts the access limits and censorship on cloud computing based software. Google has in the past two years developed algorithms which block any YouTube videos which they recognise as bridging their content guidelines. Facebook goes one step further. During the Egyptian uprising earlier this year, online activists created facebook groups where plans of action were discussed. One such group was the 'April 6 Strike group' which eventually reached 76,000 members. [8] The group was administered by two users, Rashid and Maher who were moderating the messages. Maher started sending messages to the group which eventually resulted in getting him banned from Facebook as the software recognised them as spam not because of message content but because of message frequency. The absence of human judgment in the administration of large sites presents us with yet another restriction to our freedom reinforcing Zuckerman's argument "the tools that have become most useful to activists have characteristics that un-recommend them for activist uses." [9]

THE CONNECTION HAS BEEN RESET

Every site's server we visit records our IP address as well as other computer specific information. Our internet footsteps are recorded, existing as latent documentation with a potential to be analysed by webmasters or official and/or unofficial agencies. Collecting IP addresses has been recently made illegal in Germany and browser cookie serving will be made illegal in EU without the surfer's prior consent. The German law prohibits the collection and processing of IP addresses whilst the UK law seems to be clear regarding website owners who "must not store information or gain access to information stored in the computer (or other web-enabled device) of a user unless the user 'is provided with clear and comprehensive information about the purposes of the storage of, or access to, that information' and 'has given his or her consent'." [10] *'Wir speichern nicht'* has become a motto amongst the Apache server users in Germany but the rest of Europe is slow to follow whilst in many other countries, the discussion has not even begun.

Unlike online social networking software, where identities are exaggerated or faked, IPs and MAC addresses can be pinpointed to a particular computer in a particular street address. Rashid's Facebook protest resulted in her arrest by the Egyptian security forces. Our telepresence is currently traced and our online privacy is mostly non existent.

THROUGH THE WEB BLOCKS

Cloud computing software might be appropriate for banal tasks like sharing pet photos or promoting a business but may be considered careless or naive for organising a protest against an oppressive regime. Nevertheless "There are times [...] when issues of autonomy, of voluntary cooperation, and the liberation of desire have greater practical currency." [11]

So, how does one transverse the roadblocks? In the physical world of geographical, political, economic, social and cultural borders, the model varies but its traces are evident. Fashion and cuisine are but two obvious disciplines whose inspiration crosses national boundaries. What interests me is the transitory stage which is temporary and possibly the most exciting. The stage when we are neither here nor there, when the fusion of ideas appears new and fresh and resistance in the form of revelations and actions from the unexpected, and in most cases, underestimated periphery dominate. In the virtual world of the internet where the body is absent, communication is mediated and the identities are constructed rather than experienced. The situation becomes more complex but models of activism, resistance and creative processes are present in both worlds.

... *"Now let me ask you another question. What is the smallest world you would care to inhabit?"* (L. Carol, 1889, *Sylvie and Bruno Concluded: The Man in the Moon*)

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PUBLIC DATA VISUALIZATION: DRAMATIZING ARCHITECTURE AND MAKING DATA VISIBLE

Dave Colangelo & Patricio Davila

In this paper, we explore emerging modes of digitally-mediated participation in urban space that engage bodily and architectural relationships with data rich environments. We contend that the combination of data visualization, public space, and digital display technologies represent an important aesthetic and technical challenge that engage new dimensions of presence in a social and material environment characterized by networks and data.

"Fig. 1. E-TOWER (tower view), Oct 2, 2010, Dave Colangelo and Patricio Davila, Installation.

Fig. 2. E-TOWER (participant view), Oct 2, 2010, Dave Colangelo and Patricio Davila, Installation

Fig. 3. Archives of Ontario: Dramatizing the Archive (projection area), Dave Colangelo and Patricio Davila, Installation.

Introduction

In this paper, we explore emerging modes of digitally-mediated participation in urban space that engage bodily and architectural relationships with data rich environments. While briefly outlining each component – data and information visualization and collective engagement in public space – we will reflect on some of our recent work that aims to combine these components in order to test and develop techniques and theories of public data visualization. In particular we will focus on *E-TOWER* (2010), a visualization of Toronto's "energy" on the city's tallest structure, the CN Tower. [1] We will also reflect on a forthcoming large-scale interactive projection at the Archives of Ontario in Toronto that will enable participants to navigate through a digital image archive projected on the side of this building via voice recognition. Some examples from artists that have employed similar techniques such as Alfredo Jaar and Krzysztof Wodiczko will also be discussed as they relate to public data visualization. We contend that the combination of data visualization, public space, and digital display technologies represent an important aesthetic and technical challenge that engage new dimensions of presence for people, places, and things in a social and material environment characterized by networks and data.

A Fluid, Hybrid Space

The rhythms of the contemporary built environment at times feel slow in comparison to the frenetic oscillations of social practices mediated by information and digital infrastructures. The immaterial architectures, crowds, pathways and rest-stops of Facebook, YouTube, Second Life, and Tumblr, to name but a few, are frenetically populated and dramatized. But, of course, these sites are not limited to an engagement through desktop computers. Smart phones, networked screens, large digital public displays, and the many surfaces susceptible to a data projector's beam allow for a link between concurrent and contingent on and offline spaces.

Large media facades, reactive and relational architecture, geo-tagging, and networked location-aware mobile devices present us with a potentially productive confluence; a fluid, digital layer [2] that permeates the city. This mix of technology and urban space creates an increasingly conflated real and virtual

space, a new hybrid space. [3] The confluence of the networked, fragmented publics of the Internet and the publics formed in the squares, roads, and shared spaces of our cities, now adorned by media facades, sensors, and mobile devices, presents us with an expanded presence for cultural engagement and self-reflection. As Scott McQuire points out:

… media-dense spaces, comprising a variety of platforms such as large screens, LED signage, wireless networks, and a growing range of interactive capabilities ... are the inheritors of the tradition of public space constituted by street life, city squares, cafes, and public cultural institutions. They have assumed the task of catering for those who are present at a moment when being present has assumed new dimensions. [4]

The hybrid layer constituted by the built form, data, and communications networks represents a productive assemblage upon which identity, knowledge, narrative, and experience can be explored and constructed.

E-TOWER

It is upon these theoretical foundations that we began, in early 2010, to design what was to become *E-TOWER*. Our goal with the project was to create an interface that would link the participants of Nuit Blanche 2010 with one another through the city's tallest structure, the CN Tower. We aimed to engage participants at this all-night art party in a cooperative, collaborative project that would allow them to visualize their cooperation – what we termed "energy" – via phone and data networks and reactive architecture. The CN Tower, already equipped with LEDs and a Light System Manager (LSM) – and not to mention 500m in height – was an ideal canvas. On the night of Nuit Blanche, from sunset to sunrise, over 5,000 participants across the city texted the word "energy" along with the additional text that was displayed on an *E-TOWER* Twitter feed. The lights on the tower were programmed to respond to the quantity and frequency of participation by changing from "cold" to "hot" colours, growing faster and brighter as "energy stages" were achieved, culminating in a pre-programmed light show at the end of each full colour cycle.

Information Visualization

Between data and its expression, between the text messages sent for *E-TOWER* and the lights on the CN Tower, lies the crucial function of data visualization.

Data visualization, or information visualization, is one response to the interpretive and representational challenges related to information excess. Recent advances in computation and increasingly ubiquitous networked data-gathering and storing processes and devices have produced an incredible surge of information available to users (both specialized researchers and general consumers). This phenomenon has the dual effect of producing a potential increase of control over the flow of information of users, objects, and environments as well as a potential decrease in real knowledge due to a glut of information.

By compressing vast amounts of data into shapes moving in time and space in order to extract meaningful information, visualization promises to give users greater access to phenomena that normally escape human detection due to invisibility, distance or scale. With *E-TOWER*, we attempted to measure, interpret and display something otherwise invisible – the "energy" of the city during its annual all-night art

party. Of course, where we decided to display it – the mapping function that occurs through a visualization operation – was of particular importance. Donna Cox suggests that visualizations are particularly powerful in how they recontextualize data. [5] For instance, when demographic data is placed on a visual representation of the city, source domain is mapped onto a target domain. Meaning is thus borrowed from one in order to create new meaning. Examples of this include thermographic imaging as part of energy efficiency analyses, heads-up displays (HUDs) that place navigational controls and contextual information on windshields (and by extension onto the environment in front of the vehicle) or on views of first-person-shooter (FPS) games. Visualizations, in this sense, bring together heterogeneous objects onto a common plane or field of view contextually relevant to the data.

Contextually relevant visualization was central to *E-TOWER*. The CN Tower is a symbol of the city of Toronto, a marker of civic pride, and thus the "energy" that we were looking for was both called forth and displayed by the tower, augmenting the significance and presence of the tower and the citizens of Toronto. *E-TOWER* mapped quantitative data onto architectural space, and by nature of its visibility, mapped this on to geographical space. Both the mapping of information onto geographically relevant space and the shared experience of interacting with a visualization in that space represent an important combination of participatory and meaning-making potentials that form the focus of our research into public data visualization. *E-TOWER* explored a way of experiencing the city that combined light, data, and architecture, and attempted to visualize the emotions, connections, and data that flow between users, objects and their hybrid environments.

Dramatizing Architecture / Making Data Visible

Alfredo Jaar's *Lights in the City* (1999), presented as part of Mois De La Photo in Montreal, was an early and quite successful attempt at mixing data, light, architecture, and public space. Red lights were installed in the Cupola of the Marché Bonsecours, a landmark in old Montreal. Homeless shelters located within 500 yards of the Cupola were equipped with information about the installations. In each shelter, electronic buttons connected wirelessly to the red lights in the Cupola were installed. Every time a homeless person entered any one of the shelters they could push a button to engage the lights. The lights sent a sign to the city about the unacceptable condition of the homeless. At the same time, as the Cupola had suffered from fires in the past, the red light also represented the new and potentially more damaging threat to the city, that of its inability to care for all of its members. The data collected at the shelters and its representation on the cupola allowed for the experience of a presence with a human flow of people that have been historically marginalized and kept invisible. In terms of data visualization, here we have source domain and target domain combined: a demographic of the city was collected and displayed to the city by a symbol of the city.

Krzysztof Wodiczko's works also conjure presence through the use of media and architecture. His tactics often respond explicitly to the architecture and involve mapping the human body onto a building. Wodiczko's projections create a surrealistic collision between the image of a building or monument and the projected image. In this relationship, the built environment has figured as a central element of the final work as it brings forth its own social histories. For instance, Wodiczko's *The St. Louis Projection*(2004) in which prisoners and victims of crime share their stories, was originally intended to be projected on a large-scale on the face of the St. Louis Historical Old Courthouse – the site of a landmark lawsuit against slavery in 1846. Due to last-minute controversy concerning the content of the project it was moved to a nearby library building in order to avoid embarrassment. This signals the potential for the social histories of buildings to be re-presenced along with contemporary issues through visualizations and projections.

These examples serve to illustrate how presence can be explored through interactive symbolic representations and narrative forms. While Jaar's installation visually abstracted the movement of people in the city, Wodiczko's work literally places the bodies of people onto buildings. Both artists highlight, in very public ways, the stories and traces of people in the city and connect them back to place and the viewers located there.

Just as Jaar and Wodiczko seek to tell us about hidden aspects of historical events and present circumstances in public, Bruno Latour argues for an active and creative engagement with the flows and networks of people and things that are often concealed within objects including buildings and other environments. The goal for Latour is to make things public, to make spaces for critical reflection and engagement. [6]

We see public data visualization working toward the inclusion and interpretation of many flows and actors on the surface of a pubic structure. Associations between objects and humans as ongoing processes are represented such that the building upon which the visualization is projected assumes a kind of liveliness and complexity that juxtaposes the stable and concrete image of the structure with shifting and ephemeral flows of digital traces.

Archives of Ontario: Dramatizing the Archive

Following from these examples and our experience with *E-TOWER*, our next project,*Archives of Ontario: Dramatizing the Archive,* aims to create an interface with the searchable image database of the Archives of Ontario by projecting these images directly on to the building and allowing participants to access them through voice recognition. Pedestrians just outside of the building will be able to interact with the archive by speaking their search terms as they face the building. The unbroken interface afforded by voice recognition, the direct line of sight between the participant and structure, aims to address the discontinuities we found in the split interface of *E-TOWER* that required participants to interact first with their phones and then with the tower. Search terms will be captured and processed by voice recognition software that will allow participants to interact by speaking directly to the building. The results will be animated and projected on the side of the building. Search terms will be conjured by voice and emerge, when spoken, from behind a curtain, evoking the early practice of veiling sensitive photographs. Archive images will be pulled through the curtain by white-gloved hands. This refers to the procedural care that the staff at the archive take with each artifact that comes to the building. We hope that *Archives of Ontario: Dramatizing the Archive* will bring together archive, architecture, space, and audience in an expanded narrative and dialogue while animating, dramatizing, and connecting each in the process.

Public Data Visualization

It is our contention that art and design practice must take on the challenges of relating data, people, and space when being present includes living amidst ever-expanding digital archives and real-time data capturing capabilities. Our goal in considering data visualization and public space in the projects we have just described is to relate and make accessible a mixture of physical and virtual space, to create richer hybrid spaces that relate data, people, and things to one another in order to provide an opportunity for self-definition and self-understanding. *E-TOWER* attempted to do this by soliciting, visualizing, and mapping real-time data about the city's collective energy on a symbol of its collective energy. *Archives of Ontario: Dramatizing the Archive* will attempt to do this by moving the existing query and organization capabilities of the digital image archive to the surface of the building and creating an interface that will link

people, place, and data, dramatizing and extending each in the process. It is important for us that the associations between these entities are animated and related such that the building upon which the visualization is projected assumes a kind of liveliness and complexity that juxtaposes the stable and concrete image of the building with the data flows that increasingly define our always changing sense of personal and collective identity and architectural and spatial solidity.

Conclusion

Engaging people and public space through light, architecture, and data – mixing material and immaterial spatial regimes in order to explore the expanded presence afforded by the current interconnected state of media, communication, and public space – lies at the heart of our work in public data visualization. Although, as Liliana Bounegru reminds us, "technological mediated interaction in artistic environments … may be seen as producing an aestheticization of human relations and thus mask and weaken the meaningfulness of their direct experience by their spectacular representation by overwhelming the senses," [7] it can also afford, "opportunities for amplified consciousness of the self in relation to other beings in an intense sensorial, engaging way which goes beyond community and allows a more primary, more deep sense of human communion, a collective genesis afforded through technological mediation." [8]

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VERSOR: PROPOSAL FOR A SYSTEM OF ORGANIC CONSTRUCTIVISM

Pablo Colapinto

An introduction to the characteristics of conformal geometric algebra [CGA] is used to argue for its potential use in morphogenetic research and experimentation by digital artists. Figures included were generated using *Versor*, interactive software for generating organic forms and environments.
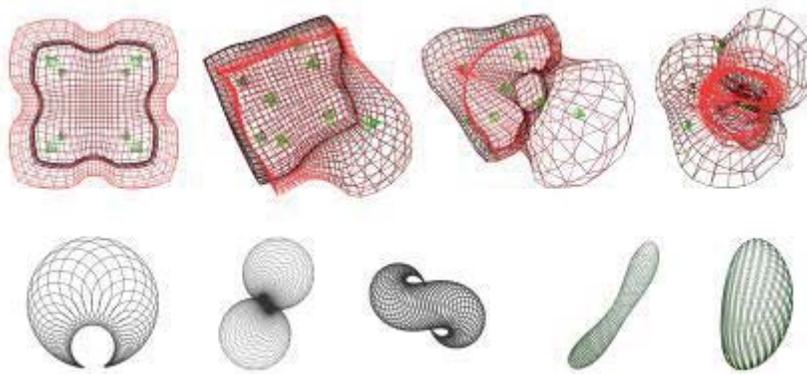
1. *Above: The effect of a warp field on a lattice of points. Below: Some loxodromic transformations of a circle.*
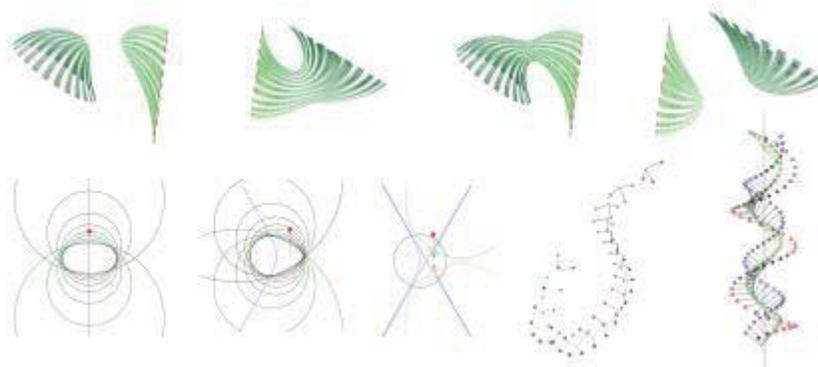
2. *Above: Soap-bubble effect. A model of spontaneous surface generation through linear combinations of circles. Below Left: Some conformal transformations of a circle. Below Right: Motor generating twists.*

3. Table of elements and operators in 5 dimensional conformal geometric algebra. Three-letter codes are used for shorthand and represent the origin, infinity, point, point pair, circle, sphere, line, dual line, plane, dual plane, flat point, vector, bivector, trivector, directions, tangents, rotors, translators, dilators, motors, and transversors.

In these pages, I introduce a little-known mathematical framework for spatial computing, and suggest its particular suitability for constructing developmental systems analogous to those studied in biological research. I do so here without the use of equations – for a more in depth look at the algebra the reader is referred to my master's thesis on the subject, [1] and the references found therein.

The accompanying images are selections of processes generated using computer software I develop called *Versor*. *Versor* is a free and open source C++ graphics-synthesis toolset for exploring new techniques in the manipulation and activation of virtual forms and dynamic environments. It implements conformal geometric algebra through an efficient and integrated multimedia platform, low-level enough for "serious" applications and high-level enough for "user friendly" functionality. Drawing from an excellent textbook by L. Dorst, D. Fontijne, and S. Mann, [2] *Versor* simplifies experimental exploration by putting some of the more exquisite features of CGA into the hands of digital practitioners, and can be used for both artistic and engineering-based design. Integrated with various dynamic solvers, a graphics user interface library (GLV) [3] and an audio synthesis library (Gamma), [4] *Versor,* can be compiled as a stand alone application or as an external library. It incorporates many compositional techniques for analysis and synthesis of dynamic forms and structures, some drawn from the CGA research landscape and some introduced for the first time, such as "Hyper Fluids".

Versor aims to provide a basis for research requiring the visualization of complex multidimensional fields such quantum electrodynamic phase spaces, gauge theories, lorentz fields, spacetime curvature tensors, and morphogenetics. Potential artistic and engineering uses include live performances, immersive environments, multimodal interfaces, molecular modeling and crystallography, morphological studies, hyperbolic geometry, and dynamic physics simulations. Its future development is suggested by the examination that follows – namely, the construction of an operational network for simulated ontogenetic processes.

Background

Geometric algebra [GA] is a mathematical system of combinatoric spatial logic based on William Clifford's hypercomplex algebras of the 19th century. With it, synthetic geometric concepts such as circles

and lines can become variables in an equation. The algebra allows one to use ratios of these geometric entities to construct analytical operations such as rotations or twists. More advanced concepts quickly emerge from this holistic and scalable combination of synthetic and analytic geometries.

A long-awaited fulfillment of "common sense" spatial relationships, GA integrates various methods for modeling and engineering dynamic systems. Applications exist in computer vision and graphics, neural nets, DSP, robotics, optics, particle and relativistic physics, and metamaterials research. The now classic work by the physicist David Hestenes, *New Foundations for Classical Mechanics* (1986) demonstrates the compactness of the math, [5] while the most recent text by cyberneticist Eduardo Bayro-Corrochano, *Geometric Computing: For Wavelet Transforms, Robot Vision, Learning, Control and Action* (2010), demonstrates the expressivity of its powers for geometric reasoning. [6] Many other authors make a similar case: geometric algebras encapsulate many other mathematical systems (through *isomorphisms*) and solutions worked out in smaller dimensions can often be extrapolated to higher dimensions (through *outermorphisms*). It is an expressive logic of spatial relationship, which allows intuitive mathematical experimentation across a widening range of disciplines.

Visible use of geometric algebra in spatial computing has grown with the introduction of a model for generalized homogenous coordinates. Based on Riemannian projection onto a hypersphere, physicists developed a conformal mapping of 3-dimensional Euclidean space onto a 5-dimensional Minkowskian sum. Introduced into the geometric algebra community by Hongbo Li, Alan Rockwood, and David Hestenes in 2001, [7] this conformal model enables algebraic manipulation of direct geometric entities – lines, planes, circles, spheres – as well as their dual representations and even more subtle concepts – surface tangents, tangent spaces, hyperplanes, and space-time boosts. It provides mechanisms for describing closed form (i.e. exact) solutions within Euclidean, spherical, and hyperbolic geometries, and unprecedented control over the synthesis of parametric forms. Still, the use of conformal geometric algebra for exploration in graphic modelling remains a relatively esoteric exercise in the larger scientific and artistic community. As a result, many of its formal characteristics and exotic morphological powers have yet to be fully explored.

Axiom and Organism

At the core of the mathematical system is the almost promethean enfranchisement of geometric primitives. Points, lines, planes, circles, and spheres can now operate on each other to create other entities. Three basic operators are defined – geometric product, wedge (outer product), and contraction (inner product) – as are three modifiers – reversion, involution, and conjugation. Elements can be modified to produce their inverse, thus providing a means for division. For instance, any element can be divided by the space it is in (referred to as the tangent space) to produce a dual representation of itself, which can be used in marvelous ways. For instance, a dual plane can be wedged together with a dual sphere to produce a dual circle – defining the meet between the plane and the sphere, or in other words, revealing the circle the plane cuts through the sphere.

All this is done algebraically, which means we can make computers do it. This is no small feat, for it endows computers with a rigorous toolset for deductive reasoning about space. And beyond introducing a cornucopia of different geometric elements representable as variables in an equation, this algebraic model of space simplifies and generalizes calculations of all general rigid body movements within Euclidean and non-Euclidean spaces. Conformal geometric algebra opens the door to a rich set of transforma-

tions previously unexplored visually and typically closed to artistic experimentation. These tranformational operators are called 'versors.' They allow for reflections, rotations, translations, dilations, motor twists, and transversion boosts around, along and across round and flat elements.

This powerful fusion of deductive reasoning with analytical techniques is an irresistible invitation to revisit the most confounding and particular shape-making and shape-changing processes known to date: the evolution (phylogeny) and growth (ontogeny) of living organisms. Indeed, beyond its logical formalism, conformal geometric algebra exhibits certain characteristics, which mark it as a peculiarly organic.

Combinatorics and Hypercomplexity

Geometric algebras rely upon a combinatoric system to generate a hypercomplex graded algebra of multivectors. These sparse matrices of mixed dimensionality are ultimately what represent our transformational operators and geometric primitives. Hypercomplexity here refers to the fact that there multiple imaginary numbers involved in the system. That is the concept of multidimensional hypercomplex numbers should not be confused with the concept of complex or nonlinear behaviors which exhibit emergent properties, except in so far as they can be more easily be used to generate such behaviors algorithmically. Here, I should note an intriguing set of articles written by C. Muses in the late 1970's which point to hypercomplex numbers as having a unique use in modeling biological systems. Published under the auspices of the mobile and mysterious "Research Centre for Mathematics and Morphology," Muses' articles – such as the 1979*Computing in the Bio-Sciences with Hypernumbers: A Survey* – are filled with parametric lobes and coils and argue for the specialized use of imaginary numbers in the study of biological form.

Point and Process

The mechanics of the conformal model begins with the definition of a null vector – a point in space which has has no magnitude. Using Hermann Grassman's algebra of extensions, it builds up larger dimensional objects such as point pairs, circles, and spheres. These round elements of the algebra serve as both operators and objects in a consistent and predictable way. One can construct a continuously differentiable perturbation operator from a pair of points that is itself perturbed by another operator. This greatly simplifies dynamic simulations by providing a linear approach to creating higher order phenomena. Since there is no real difference, in the computer's memory, between a point in space and a process in space, the representation of space itself gains a certain parameterizable agency. For instance, the construction of self-organizing tangent spaces is possible, creating a whirlwind of subspaces within it: a spatial configuration of configuration spaces.

Twist and Boost

The plethora of round elements created by combinatorics would by itself provide a rather glib organicity were it, not for the particular elegance of the operations allowed. Given a line in space, we can twist any multivector (geometric element) around it. Given a point in space, we can accelerate any multivector into it or away from it. These transformations describe rich movements in space that can be easily compounded. The versors form a closed *automorphic* group, such that multiplying them together will return another member of the group. This powerful structure allows for transformations to be concatenated

through multiplication as is done in matrix algebra. The complete set of Euclidean and conformal transformations are possible with the versor construction: inversions, translations, rotations, screw motions, dilations, and transversions. By constructing an operational network of transformational effects, bilbous and twisty forms are easily generated. Spaces can be cinched, pinched, blown out, twirled, twisted, or torn into and out of real and imaginary radii.

Morphisms and Hybridity

Tensor, vector, and matrix algebras are all embedded in geometric algebra through characteristics shared with group theory and lie algebras. A variety of mathematical species such as complex numbers, Plücker coordinates, Dirac and Pauli Matrices, and the symmetries of various particles as described by lie groups and their algebras have been shown to be isomophic to, and easily represented by, various metrics of geometric algebra. These isomorphisms are critical to cross-fertilization across different fields of science, bridging gaps between physicists and biologists, for instance. The algebra also has outermorphic properties: discoveries made with simpler elements in lower dimensions can often be generalized to higher dimensions. The logic is designed to be extrapolated meaningfully, and the outermorphic properties of the algebra allow for this. This helps in building intuition and experimenting with algorithms across dimensions.

Orientation and Polarity

A critical component of the algebra is its asymmetric anticommutivity, for this fuels its orientability. Circles are not just circles, but they have an inherent direction (clockwise or anticlockwise). Spheres likewise have an inherent spin, as do lines a direction. The orientability of the algebra is useful for describing chiralities or "handedness". This sensitivity to the polarity of forms is also found in the molecules of living organisms.

What these analogous characteristics point to is the suggestion that if any mathematical system is appropriate for modeling characteristics found in living organisms, it is some flavor of geometric algebra. What, then, is proposed here is the use of these grammar-of-forms in the design of an ontogenic processor: a simulated developmental system. Ontogeny is the trajectory of an individual organism's morphogenetic developments, from seed to maturation and death. Phylogeny is the evolution of ontogeny over generations. Embedding the GA grammar into a functional framework of emergent causal structures could be a first step towards a phylogenic-ontogenic computer.

What is currently missing is a sort of statistical memory. In a computer we are forced to use memory in ways that it is never used in biology, so it is important to set a few internal boundaries for this task. It is not the proposed goal to envision a geometry that can correctly model any particular specimen. This limitation is set to avoid answering the question of how real life forms grow, the mechanics of which are best described by biologists. Similarly, it is not the intention to reflect a model of life back onto actual life in a particular way – that is, to make a specific statement about living things that would be better phrased by philosophers.

Rather, the primary goals are artistic: an aesthetics of movement, a self-organizing differentiation of forms and tangent spaces, a furnishing of lifelike qualities into a geometric system, the further enfran-

chisement of uncertain spatial concepts, the development of new relations. Developmental analysis remains one of the most mysterious biological processes, and I doubt we will ever fully simulate the growth of a seed in computer memory. We might, however, be able to do justice to a dream of adaptation and growth: to generate a network of spatial relations complex enough to grow *something*. Then, precisely where and how the computer's analogies fail to illuminate actual biological processes could prove fruitful in both biological and philosophical trains of thought.

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DISSEMINATING KNOWLEDGE OF ELECTRONIC TEXTILES AT ART SCHOOLS AND UNIVERSITIES

MELISSA COLEMAN, MICHEL PEETERS, VALÉRIE LAMONTAGNE, LINDA WORBIN & MARINA TOETERS

This paper aims to give an impression of how knowledge of e-textiles is shared in art schools and universities. With this paper, we intend to create a context for future reflections on e-textiles education and knowledge dissemination for educators in this field. We hope to stimulate knowledge sharing on e-textiles between institutes and with the e-textiles community at large by identifying opportunities for open learning.

Students present their semester project. Copyright Wearable Senses, Industrial Design, Technical University of Eindhoven, The Netherlands

The context of e-textiles education

The field of electronic textiles is multi-disciplinary and operates at the intersections of textile and fashion design, industrial design, furniture design, computer science, interaction design, and media art. The students who are taught in this field are diverse and possess a skill set associated with their future work field. When students create electronic textiles in higher education, they are primarily judged by the quality standards of their specific field of study. Consequently there are many ways to teach this subject.

Although end-goal requirements of students differ, the skill set that is necessary to create an electronic textile is the same. Students need to have a basic understanding of the textile technique and electronics

they intend to work with and to know how to tackle integration issues. This common ground in e-textiles education indicates that there may be opportunities for dissemination of knowledge that transcend the boundaries of the disciplines. We believe that this kind of dissemination is possible through the sharing of educational artifacts, i.e. all media that are produced for and through educational contexts.

In the following sections we will give insight into e-textiles education at five art schools and universities. At the end of each chapter we will highlight the educational artifacts that are in use at the institute.

Wearable Senses at the faculty of Industrial Design (ID), Eindhoven University of Technology (TU/e)

Three years ago, the theme Wearable Senses (WS) was set up, applying the mission statement of the ID department, with a unique focus on those intelligent interactive products, systems, and services that are close, near, or on the body. In the course of time, the theme has been expanded with a textile electronics workshop and a material library with high-end innovative textile and electronic materials. Wearable Senses have a strong network of industry partners (regional, national, and international) and in this way receives support on different levels from both the textile and the electronics world. The main application areas of the theme are expressive clothing and accessories, sports garments, interior textiles and interesting deviations.

Within the theme, students work in close collaboration with the WS-staff and are considered as junior employees, actively contributing to the development of the theme's vision, identity, knowledge, methods, skills and tools. Each semester, bachelor and master students work alongside each other on various educational activities. One of these educational activities is the intelligent textiles module. This is a one-week course in the ID master in which multiple design crossovers are being made between textiles and electronics, using or in search of what we at Wearable Senses like to call 'boundary objects'. [1]

In the module around twenty students systematically explore the aesthetic quality and potential of textile electronics with a hands-on approach. The students design and create textile electronics interactions or effects. These designs take the form of interactive textile samples, which are sensitive to certain stimuli, smart or intelligent, and contain expression.

During the module, students work in groups of three to four people. On the first day, each group works on a different technique: 1) weaving, 2) knitting, 3) embroidery, 4) cut/overlock/sew/heat press, 5) laser cutting/3D printing. Day one ends with presenting samples to each other and explaining opportunities for design of each separate technique. After day one, there are five 'technique expert' groups, each containing four students. On the second day, students rotate and new 'hybrid technique' groups are formed. Day two, having the same assignment as day one, ends with presenting 'hybrid samples' to each other, and explaining opportunities for design by combining two techniques. On days three to five, the student groups are given the assignment of systematically exploring the combination of techniques, and successively creating a textile electronics interaction or effect. The module concludes with a demo of the final results.

Educational Artifacts: physical e-textile samples, previous student projects on display, presentation boards (A3 size with working textile mockups and annotations), digital documentation of circuits and textile techniques, tools and skills in video explaining design steps, construction, materials and electronics specs. At ID we call this specific video capturing environment, in which students document their work, the 'Library of Skills'. [2]

Electronic Textiles at the Royal Academy of Art, The Hague

Electronic Textiles are taught at the Royal Academy of Art in The Hague (KABK) as part of the Introductory Courses, which are classes designed to give students basic skills in technical subjects that are not covered in the regular course program. Students have often undergone at least one year of study as the courses are intended for specialization after acquiring basic knowledge in one's field.

The course Electronic Textiles introduces students to the field of e-textile design over the course of seven lessons of three hours each. The emphasis of this course is on the aesthetical design and integration of electronics in textiles. Students are taught both textile techniques and simple electronic circuits through the creation of e-textile samples. The course buildup comprises a series of short workshops to acquire skills and produce a volume of e-textile samples, an individual project, and lectures that place e-textile design in a social and cultural context.

Students are first introduced to a basic principle of textile design: building a material through the repetition of a pattern. They are shown an overview of textile techniques that can be repeated ad infinitum and are challenged to make modular textile electronics using a textile, a LED, conductive thread and a soft button. This is called an e-textile building block. Over the course of the first and second lessons the e-textile building block is used in a pattern where nine LEDs are connected in a parallel circuit. The third lesson introduces movement in textiles by using a small motor in a pattern, where a moving component breaks the repetition. The fourth lesson focuses on felting raw wool with electroluminescent wire, exemplifying the inclusion of electronics in a textile and creating a new material. The fifth lesson teaches students screen-printing with thermochromic ink and controlling color change through resistive heating. The last two lessons are reserved for an individual project: a high quality sample with sketches and a presentation explaining the intended use for the material. The learning goal of this assignment is for students to implement their newly acquired knowledge in a product that fits into the context of their field of study.

Educational Artifacts: physical e-textile samples, lecture slides and digital documentation of circuits and textile techniques, project documentation.

Department of Design & Computation Arts at Concordia University Montréal

The Department of Design & Computation Arts is part of the Faculty of Fine Arts at Concordia University in Montréal. Students in Computation Arts are taught a broad spectrum of media from motion graphics, 3D software, physical computing, sound design, video editing, graphic design and interactive arts through to performance media. In combination with the arts curriculum, students take programming classes, which are taught both within Computation Arts and in Computer Science. The undergraduate program is a 4-year course program. Students have core classes (design, networked culture, basic programming) and electives, which permit them to choose a direction (physical computing vs. 3D modeling vs. motion graphics). The Computation Arts program has the goal to form designer/artists who can work both commercially and independently. The focus is on creating meaningful, artistic products, which respond to today's cultural climate.

There is a strong emphasis on self-learning with a series of inspirational technical workshops, which are complemented by a number of physical resources available to students. The Computation Lab is a resource center where students can get help with various programming languages. The Sense Lab is a

physical computing lab, which is equipped with e-textiles equipment such as sewing machines, embroidery machines, and soldering and circuit-making tools. There are full time technicians in both labs to help students with their projects.

Students have access to one specific wearables class, Second Skin, usually taught by Joanna Berzowska from XS Labs. However, they are encouraged to explore body-interfaces in other classes (i.e. wearable controls and physical computing / installation projects utilizing e-textiles). Open design practices are encouraged via a number of online and in-situ didactic platforms. Class instructors and students make use of online forums to share information and techniques. Student projects are documented and posted online. Hands-on exchanges are encouraged in open lab contexts. Collaborative projects are also encouraged in order to foster better communication and project development. Computation Arts holds both end-of-the-year and open studio class events. Within the context of these events, students are encouraged to showcase gallery-ready projects, which are technically and aesthetically resolved and accessible to a wide-range public.

Educational Artifacts: a wide range of online resources and online project documentation.

The Smart Textile Design Lab at the Swedish School of Textiles at the University College of Borås

In 2008 the Smart Textile Design Lab (STDL) [3] was initiated as part of the research initiative Smart Textiles at The Swedish School of Textiles funded by Vinnova. [4] The lab focuses mainly on experimental design research. There are three overall themes in the STDL: textile sound design, textile interaction design and dynamic textile patterns. This is an important foundation for the integration of electronic textiles in our education.

The researchers, post-doc, doctoral candidates, and master students in textile design have a shared environment, with individual workspaces, but with a joint meeting and working areas. Other meeting places are the Material Library and the weekly Design Seminars, where both smart textiles/electronic textiles and more traditional approaches to the textile field are covered. The lab has research collaborations with the national textile industry, producing interior and technical textiles, and has collaborations with the transport industry and a furniture producer amongst others. Researchers and doctoral candidates supervise students in individual projects as well as in joint collaborations with and without industrial partners.

The lab has integrated its research topics with existing basic courses in the textile design education to widen the perspectives in the three main textile techniques that are taught: weaving, knitting, and printing. In the basic weaving course optical fibers will be introduced in the near future and the weaving class is being extended with workshops on light as a design material. The notion of dynamic textile patterns [5] has also been added by printing with thermochromic (TC) ink in the basic classes, which naturally brings in conductive materials as both a heat source and to exemplify a new design variable in textile design.

Master students attend basic textile courses where necessary; later they are given more individual hands-on supervision and support for their own design projects. Regarding electronics, workshops have been given in topics such as integrating LEDs in woven structures (including how to build a simple circuit

with a resistor, light, and energy source), stretch sensors and buttons, and how to connect a textile material to a computer program and control it. The Smart Textile Design Lab organizes its own workshops and invites external experts to teach.

In the STDL there is an ongoing project called Smart Textile Sample Collection where textiles are developed by the meter to be used in joint projects with industry (e.g. the Recurring Patterns [6] project) as well as during workshops. For example, one material was developed for a dynamic textile pattern workshop using thermochromic ink; this textile was plugged into a system where students and designers could control heat sections from a program and change the textile's color.

An important aim of the STDL is to teach students the basics of electronics and programming and provide them with a vocabulary that allows them to communicate with other professionals such as electrical engineers and programmers. A Digital Fika [7] (translation: digital coffee), an informal meeting/coffee break combining basic hands-on demos with discussions, starting with how to use a multimeter, reading textile sensory data and controlling inputs and outputs to create a textile expression, has been introduced in this regard.

Educational Artifacts: Smart Textile Sample Collection and Material Library.

Technology and Ecology at the fashion design department at Utrecht School of the Arts

Design education is 'based on social idealism.' [8] This certainly applies to the education of fashion students in Utrecht, who are taught to think from a social perspective. In designing they consider the consumer's point of view, how the consumer emotionally adapts to the world through positive aesthetics, and how to place design in a contemporary context. Historically the fashion industry has stretched people's minds by seducing them to stay ahead of the curve by consuming 'newness', thus achieving wide social acceptance for new concepts in clothing. Looking at consumers' attitudes toward innovation, it seems that they want clothing conceived by fashion designers and not by technicians. This implies that fashion designers and fashion design education must get involved in new technological developments.

To aid this development, the class Technology and Ecology is taught at the Utrecht School of Arts to second year fashion design students. The aim of this course is to inform students about what innovations are, or soon will be, available in the textile and fashion industry, to inspire them to explore and integrate innovations in their design process and to give students tools to easily communicate and collaborate with technicians. Technology and Ecology is an 8-week course of two hours per week. The main focus of these lessons is the interaction between fashion, technology and innovation and how this contributes to a more sustainable environment. The course poses questions like: Which functionalities can technology add to clothing and to what purpose? And how can fashion designers design for the future?

Five lectures introduce students to past, present and future innovations in fashion to help them develop their vision on design innovation. The lectures cover innovative design, adoption issues of technology, critical reflection on fashion and innovation, ecological issues and experimental tools. 1) Introduction to by-wire.net and 200 visuals of innovative projects 2) Innovations in the production process of textile and garment fabrication 3) Recycling & cradle to cradle [9] 4) Old vs. new textile 5) Wearable electronics.

During the first lecture students are exposed to innovations ranging from garments of Inuits, who made animal skins flexible so that their people could move to colder environments, to contemporary examples

of self-growing textiles, sensory active protectors and moving garments. Students then choose three examples to explore through literature and online documentation, resulting in a short report discussing the technology/ecology aspect of projects, the projects' participants, the users, and the added value for consumers. After these lectures, students choose one subject and start an individual artistic research on materials, technology, ecology, and function inspired by innovative projects from the by-wire.net library. [10] They conclude their research in a communicative and conceptual item of clothing. Students present their research and prototypes to their peers.

Educational Artifacts: the digital project documentation in the by-wire.net library, lecture slides and physical e-textile garments.

Discussion

In summary, knowledge dissemination of e-textiles in the five institutes presented here takes place mainly through the educational program by overlapping education and research, sharing student work in class, by presenting work of students in the institute, and by organizing events with specialists. Many of the educational artifacts we have discussed in this paper are unavailable outside the walls of the institute, even though they have the potential to extend further. Contributing to open learning, as a counterpart of open design, is currently not actively pursued, as it is not part of the core activities of educational institutes. This raises the question if institutional contribution to open learning benefits institutes.

If educators want to contribute to open learning, the most effective way would be to share educational artifacts online. Looking at the institutes discussed in this paper, there are many artifacts, such as lecture slides, lists of online lectures/articles/blogs, students' project reports, technical schemas for electronics and textiles and the Library of Skills, which are already of a digital nature and are therefore highly suitable for sharing. Other artifacts, such as materials, samples, and finished prototypes, are of a physical nature and would need to be digitized if they are to be shared online. Research is needed into the best methods for digitizing. Besides sharing artifacts, educators may also consider transforming their educational artifacts into textbooks (e.g. Open Softwear) [11] or online courses. In the future we hope to see more knowledge sharing on e-textiles by educational institutes. Through sharing educational artifacts we have the opportunity to teach and inspire the entire international e-textiles education community and beyond.

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LOCOMOTOART: INTERACTING WITHIN NATURAL SETTING THROUGH PERFORMANCE USING PICO PROJECTION

LAURA LEE COLES & PHILIPPE PASQUIER

LocoMotoArt is a creative field backpack that gives the user the capacity to explore and make digital art from, and in, the natural environment. Liquid Crystal on Silicon pico projection technology was studied during the production of two live technology-mediated experiments on the island of Hawai'i. We question whether different experiences of technology in nature can subvert preconceived notions of the human-nature-technology relationship.

Power
- OP-26 12V SLA battery pack 25Ahr 150Whr. with dual regulated inputs and triple outlet hub with meter
- Flexible roll up portable solar panel 55.4W 3600mA with 12V female CLA socket outlet
- 12V male cable, 12V DC 100W Mag Safe adapter for an Apple 15 inch Mac Book Pro laptop computer to power through the OP-26 battery
- 12V USB Port adaptor, for iPods, iPhones and other USB devices
- MH-C40-1FS-DC and AA AAA battery chargers

Capture
- H2 Zoom field sound recorder
- Canon Vixia HF R100 AVCHD mini camcorder Canon SLR digital camera

Production
- Apple 15" Mac Book Pro with Final Cut Pro, Adobe CS5, Adobe LightRoom 3, Aperture, Processing, Toast Titanium, DVD Studio Pro, iTunes, and Garage Band pre-installed

Playback & Display
- Three Aaxxa LCoS P1 Jr. pico projectors; 10 ANSI-lumens, <20dB 0.5w mono speaker, SD-HC card reader, mini USB, and composite A/V, 4:3 aspect ratio control, 10 ~ 50 inches projection image.
- Apple iPod, one Tunebug Portable SurfaceSound™ speaker where sound waves pass through the surface it rests on, and two Diamond Mini Rocker 4 Watt 4Ohm computer speakers with standard 3.5mm audio plug.

Figure 1. LocoMotoArt system components for backpack

Figure 2. (a) Kaumana Cave, (b) Coastal Forest Performance Site, (c) "Hand of Fate"; Cave Experiment. Photographs by Laura Lee Coles.

Introduction

The LocoMotoArt field system has four capacities: independent power, capture of sound and visual media, laptop for production and Liquid Crystal on Silicon (LCoS) pico projection technology for visual display in a natural setting. Various interactive components such as Wii controls and XBox Kinect compliment the system.

We define nature as the realm of the non-human made world. We refer to technology as this human made digital devices that comprise the LocoMotoArt system detailed herein. It is our position that much of the digital technology currently used by humans (mobile phones, GPS, electronic books, portable pads and pods, and computers) are more than appliances because "we experience them." Digital artifacts "are now part of our world as much as trees, animals, and other manifestations of nature". [1]

In his book "Spell of the Sensuous - Perception and Language in a More-Than-Human World," environmental philosopher David Abram postulated that Westerners are disconnected from the natural world, partially due to the intensiveness of interaction between humans and technology. According to Abram, humans still have the chance to re-connect to the magic and sensuous phenomena of the natural world within which "our technologies are rooted," because the implication of our symbiosis to technology does not make it necessary to "renounce our complex technologies." [2]

Through the use of LCoS pico projection in outdoor natural settings, our initial research seeks to provide insight in the area of mobile projection as a method to inquire our lost connection to nature that Abram posits. We question how the human experience of the non-mediated sensorial awareness of the natural world can be perceived and possibly changed through the experience of using digital mobile projection technology in outdoor settings. We further question whether values, behaviors or preconceived notions of nature and the use of technology can be changed through the user experience when placed in the context of a natural setting. What is the change, if any, and what caused it? To facilitate the study, two artists on the Big Island of Hawai'i were provided with LocoMotoArt for a period of ten-days.

Related Work

While some artists are using projection in nature, most of the research on mobile projection has been limited to indoor laboratory environments or urban settings. [3] They studied users in multiple environments such as a train station, bars, public transport, a museum, and shared public spaces during a three-day trip in Lancaster (UK). The scenarios tested included map interaction, media browsing, and projection onto alternative surfaces such as a wall, or the roof of a public bus. Vlahakis et al. [4] developed an augmented reality system users can wear to access visual and historical information regarding a specific ancient ruin while on site. We note that there is limited research on outdoor use of pico projection specifically in artistic practices in the natural landscape.

System Overview

LocoMotoArt is a creative field system that provides the capacity to the user to make digital art from and in the natural environment. All digital devices for LocoMotoArt are transported in a standard backpack. The system weighs 20 pounds without the portable battery pack and 40 pounds when users

choose to include the portable 12V SLA battery. The components for the backpack system are listed in Figure 1.

Despite the very low lumen capacity, the Aaxxa P1 Jr. pico projector was specifically chosen for this project because of the multiple features in relation to its affordability. The unit is quite small which is ideal for using as wearable projection. The LocoMotoArt user, therefore, may use the Aaxxa P1 Jr. for small scène graphic lighting design or exhibition of photography using the slide show feature. The Tunebug was chosen because it is compact and can turn any surface can become a playback source.

Detail of Study

The research during this small-scale pilot study employed interpretive ethnography, participation observation methods and incorporated field notes, photographic and video documentation. Norman K. Denzin, [5] citing Abram, defines his vision of interpretive ethnography as that which "…seeks to ground the self in a sense of the sacred, to dialogically connect the ethical, respectful self to nature and the worldly environment."

Background of Study Participants

Anne F. Bunker, choreographer and director of OTO Dance, a multi-media aerial dance company and partner, musician and multi-media designer, Gerald Chuck Koesters participated in the initial research study. The artists have expertise through their combined extensive professional background in lighting, performance and sound.

The spectators studied consisted of two nineteen year old males. Unexpectedly, one spectator indicated that he was purposefully educated at a private school that emphasized a non-digital school environment, in which the use of computers, cell phones, Internet and e-mailing was absent. His current use of digital devices is extremely limited. He indicated that he uses an electric typewriter instead of a computer and a cell phone ten minutes per day. Unlike the non-digital user, the second male's digital technology use had been closely monitored by his parents. He is currently a user of digital technology. He stated he uses the computer, e-mail, Internet, cell phone, and social networking on a daily basis.

Pre Interviews and Biases

When asked if they thought that humans could use digital technology to experience a connective sense to nature, the participants from both groups voiced skepticism. No one believed that they would be able to recognize a personal connection between their use of digital technology and the sensorial realm of nature because nature is so "unique" and "special" while technology is separate and apart from nature. One artist and the non-digital user spectator indicated that digital tools were "annoyances" and "disruptive" of the human condition.

Unexpectedly, the non-digital user spectator stated that digital technology made him feel "angry" because "people use them over human contact". However, the other artist and other spectator stated that they used digital technology on a regular basis and considered digital technology a positive influence on human factors, but emphasized that the digital artifacts should be used with restraint rather than "take over" a person's life.

All of the participants claimed not to have addictive tendencies towards digital technology. All participants indicated they have existing personal attunements to natural settings, through hiking, camping, and trekking.

Field Work

The artists used LocoMotoArt in a lava field, near the ocean, inside a lava tube cave, a grove of trees near a swimming area, and a forest on the Big Island Hawai'i.

The artists chose to stage a live technology mediated performance in a forested area at the end of a road near the coastline of South Hilo, commonly used by local fishermen. The performance took place at nightfall so the projections would not be washed out by light. Koesters used photographs taken during previous field excursions. Koesters manipulated the images using High Dynamic Range techniques for image processing. Additionally, natural ambient sounds such as the pulse of ocean waves crashing upon the lava rocks and the Coqui frogs' robust chorus of chirp song were incorporated into the soundscape.

An additional soundtrack from Koesters' footage of Kilauea volcano eruptions played on the mono speaker of the LCoS projector as a hissing crackling sound. During the performance, a light misty rain fell.

The second site, Kaumana Cave, is situated in the foothills above Hilo, Hawaii. The cave is a lava tube that was created when the volcano Mauna Loa erupted in 1880. This site was chosen for a brief exploration of sound and video using pico projectors because it is a dense and dark environment. It had no echo, and there was water dripping from above.

Results Coastal Forest Performance

Live dulcimer and recorded original music compositions were played using a Tunebug Portable Surface-Sound™ Speaker and an iPod. Koesters also introduced a Roland COSM battery operated amplified speaker into the LocoMotoArt system.
Bunker and Koesters handheld or fixed the projectors onto their wrists. Bunker moved the images along the tree trunks and canopy of trees, onto rocks, and the ground. Bunker used two projectors and layered projected images simultaneously in a collage effect. Koesters was lying on the ground, hidden in the darkness, projecting video footage of Kilauea's volcanic lava flow onto Bunker's moving white clad figure as if she was a human projection screen. She would occasionally shut off the projectors, retreat under a large black cloth, move unnoticed to another location of the forest, drop the cloth and start the projectors again. This imagery gave an impression of a ghost or spirit moving about the forest. This uncertainty of when or where the entity would appear again portrayed a body without identity.

Limitations in the brightness of the projectors and sound playback were overcome because the spectators shared an intimate proximity to the artists, which became an immersed stage setting.

Results Kaumana Cave Experiments

Bunker positioned one of the projectors overhead at an arms-length and pointed it at an angle. She projected images and video footage onto her hand. The scene was observed as a hand or entity suspended

in space, moving, existing otherworldly and spectral. The projected visual content got combined with the material textures of the natural environment when Bunker moved the projectors along the wall, floor, and ceiling of the cave. Content became form. Like the camera, the relationship of LCoS pico projector to the body operated as a prosthetic extension and provided the user with an enhanced extension of self. In this embodied experience, Bunker transformed self as theatrical apparatus.

Overview of Post Interviews

Artist-bias prevailed early in the use of LocoMotoArt. However, through their use of mobile projectors during the performance, the artists became more engaged as they discovered that the technology offered new ways of seeing and understanding their art practice, both temporally and corporeally.

The artists also indicated that they were amazed by a new sensorial awareness to "place, time, and body movement". Both artists remarked that pico projectors worked like "mini-gobo stage lighting" effects and would be fun to use in costuming. The artists also indicated they felt a closer connection to nature when they used technology in a natural setting. Koesters: "I had doubts at the start of this project and was surprised how well it worked to tell the truth. As a performer, there were moments I felt completely connected to the environment, Anne [Bunker] and the technology. All those things came together in a surprising way." Bunker: "Space was altered when shining the projectors up and down the trunks of the trees and into the canopy, it flattened out the canopy, became two dimensional, a very different kind of surface. I was able to carve space with the projections and move space around in the darkness which was interesting."

Spectator Experience Forest Performance

The spectators both conveyed marked changed notions from their pre-interview positions, specifically the non-digital user. When asked to comment on the event and the spectator experience, the responses were as follows: Spectator non-digital user commented, "Peaceful, nice." Spectator digital user: "I don't know, I saw a stage, really that is what it was." When asked whether the technology detracted from their sense of nature. Spectator non-digital user: "No made you notice it more, I don't think I would have sat there in the trees in the dark without that going on. Not really sure, kind of why it appealed to me, not exactly sure what I got from it physically." Spectator digital user: "When I saw it, I didn't think digital technology. It did not separate itself from the environment, which was nice. It was a very symbiotic relationship."

Conclusion and Future Research

Despite the initial biases and skepticism of the artists and the spectators, both study groups indicated a new appreciation of digital technology as a means in sensing interconnectivity to raw nature and natural settings. Because of the change in attitudinal perspective, these initial results indicate that the hypothesis that digital technology may serve as unexpected sensorial pathway to interact with nature warrants further research. Although small in scale, our study gives insight that may be of importance in the study of locative mobile projection because it assists in understanding the human relationship to digital technology which consequently informs their design.

Future research includes the study of the LocoMotoArt enhanced field power system, which operates higher powered electronic equipment. This portion of our study includes both artists of soundscape composition and video arts practice displaying their work in natural settings. The purpose of this study seeks to understand the values of reorienting environmental arts practice by placing New Media works directly in the natural landscape. We are reminded of Arnold Berleant's idea of the "aesthetic field," and the importance of how his concept of the "aesthetic engagement of nature" may bare upon the future of electronic environmental art praxis. Situated at the intersection of human societal concerns for the environment and interests in the human-machine relationship, our research responds to both, and to the particular demands of the dialog between them.

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THE VALUE OF SOCIAL RELATIONS

Elanor Colleoni

This paper outlines how social and affective relations shared via online social media sites are integrated into the process of value creation and transformed into tangible monetary value in the financial circuit in Informational Capitalism.

The development of an information economy, and in particular its more recent "social economy" phase, has seen the "pluralisation" of conceptions of value (Stark, 2009). The rise of brands, the growing importance of reputation, both for individuals and for companies, the need to attract affective investments and in general to establish a positive large-scale recognition for companies are all manifestation of this. While companies have clearly identified the strategic importance of these intangible assets, an adequate and broadly accepted interpretation of how such immaterial wealth is transformed into tangible monetary value still lack.

The process of value creation in Informational Capitalism

Traditionally, the process of value creation was conceived as a firm-centric issue. Particularly, Marxist labour theory of value identifies two essential processes in value creation: production and circulation. The production process takes place within the firm and is hierarchically organized by the employer who owns the means of production. The value is created by the "living labour" - i.e. the workers – and the specific value of a good is determined by the amount of labour time needed for its production (Marx, 1976). The labour force is exploited mainly because the price they have sold themselves in the labour market is less than the value gained from selling the goods produced and this difference represents the surplus value appropriated by the employers. The value extracted from the workers is "realized" in the circulation process: when commodities are effectively sold in the market place.

The advent of an informational economy has changed both the production and the circulation processes. The end of mass production capitalism and the transformation of productive systems that this has entailed have made measurable forms of labor time less essential as a source of value while the relevance of innovation, flexibility, brand and other intangible resources has risen in proportion.

The important thing about such intangible resources is that their production often occurs outside the control of single organizations, and sometimes, as in the case of brands, it builds on input from non-salaried actors including consumers and the public at large (Arvidsson, 2006). The creation of intangible value in the form of either a corporate culture conducive to innovation and teamwork, or an attractive brand, involves the appropriation of common knowledge, symbols, relations and competences, or General Intellect (Virno, 2004).

In its broader sense, General Intellect represents an emerging property of complex and heavily socialized forms of productive cooperation. As a consequence the value is based increasingly on the general productive power of the "social". The achievement of cooperation and engagement, i.e. the mobilization of such networks, relies on the abilityto establish affective recognition, such as reputation and goodwill, as well as to mobilize these affective bonds, like the ties that bind consumers into a community of interest or "tribe". The ability to "activate" affective investments is considered a signal of

company wealth in financial markets, which increasingly represent the arena where the realization of value takes place in the circulation process (Marazzi, 2008).

However, the "intangible" nature of such affective bonds and consequently the complexity of their measurement represented a problematic issue until the diffusion of social media platforms.

Indeed, with the advent of Internet, and in particular the diffusion of social media platforms, such as Twitter and Facebook for customer co-production, or "prosumption" (Toffler,1980; Tapscott,1995), the influence of these new socialized networks and their productive power have become more visible and "tangible". These platforms represent a materialization of what Gerlitz & Helmond (2010) call a "like economy". In the like economy the main determination of value is direct forms of user engagement which has been objictified through the proliferation of "social buttons", like Facebook's like button, twitter's re-tweet button, or bookmarking buttons on Digg or Reddit. Such social buttons "allow for transforming intensive social and affective dynamics into comparable metrics and thus add a social and personal qualification to the hit economy" (Gerlitz & Hemond, 2010: pp.3). In other words, the introduction of social buttons allow for an objectification and valorization of the users´ ability to create webs of affective attachments around informational objects, such as a corporate or a brand.

As a consequence, in the last few years a new set of data mining techniques, such as opinion mining and sentiment analysis has been developed in order to analyze massive data produced in social media sites and blogs and to quantitatively measure affective ties and opinions.

Particularly, sentiment analysis is part of the affective computing paradigm and refers to the process of categorization of unstructured human-authored documents "based on their affective orientation, meaning the emotional attitude of the person expressing the opinion" (Mølgaard & Szewczyk, 2010: p.1). Among other things, what sentiment analysis and opinion mining produce is an objective and "tangible form" of the affective investments around an object resulting as an emerging property of grassroots collective wisdom. In other words, they are transforming "intangible values" into a tangible form.

Social media and General Sentiment

These new data mining algorithms have created a recognized measure of social affective investments around a brand or a company which now can serves as a base to establish a new "general equivalent" - i.e. general sentiment – (Arvidsson, forthcoming). In Marx' analysis of value, the labour time represents the general equivalent in the production process: It does not matter if you produce textile or concrete in your company, with different means of production or under different legislations. Labour time is an abstract unit of measure aimed at creating a common space for market exchanges. In the same way, general sentiment functions as a general equivalent in the ethical economy (Arvidsson, 2006). Individual expressions of affective attachment are converted into signal of wealth and trust as objectified flows of 'potential' value which is then realized into the financial markets.

According to this analysis, the role of social media and of web data mining is far beyond of being conceived as a new tool for targeted advertising. Indeed, social media platforms play an important role in defining the parameters of the distribution of such financial value by enabling the affect of the

multitude to be objectified into a brand, or conventions that can justify financial valuations. Consequently, online social media sites represent a unique place where the affective flows deriving from attention and "prosumer" inputs on the part of the multitude are organized and controlled.

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FROM HUT TO MONITOR: THE ELECTRIFICATION OF CHOKWE WALL MURALS IN ANGOLA, 1953-2006

Delinda Collier

My concern in this paper is with the continuous reinscription of protocols of access to ghosts and ancestors of a mythic past. The digitization of "African" culture presently thematized by many African artists negotiates communalism in terms of "free" information technology and visibility/access, a postcolonial return to ancestors that overcomes colonial appropriations of "African" creativity.

Fig. 1. Page from José Redinha, Paredes Pintadas da Lunda. Lisboa: Companhia de Diamantes de Angola, 1953, n.p.

Fig. 2. Page from Gerhard Kubik, Tusona—Luchazi Ideographs: A graphic tradition practiced by a people of West-Central Africa. Wien: Föhrenau, 1987, 49.
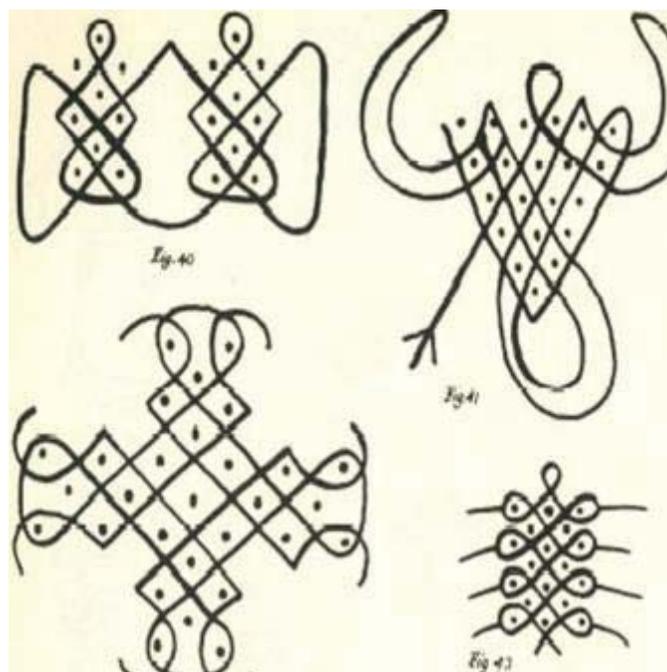
Fig. 3. Page from José Redinha, Paredes Pintadas da Lunda (Lisboa: Companhia de Diamantes de Angola, 1953), n.p.

In 1957, the Companhia de Diamantes de Angola [Diamang] completed a hydroelectric dam on the Luachimo River in northeastern Angola, in the Lunda North province. The dam was emblematic of Diamang's monumental presence and technical capacity that it meticulously developed throughout the twentieth century. Diamang was a mammoth diamond extraction company in Angola during the zenith of Portuguese colonial rule. By the 1950s, Diamang provided a large portion of funding to the colonial state seated in the capital of Luanda. It returned large profits to its Portuguese, Brazilian, American, and Russian investors. It was a "state within a state" with its own police force, radio station, museum, health services, and agriculture. Eighty percent of Diamang's workforce in the Lunda region was made up of the ethnic Chokwe group, a once powerful state that was defeated as the Portuguese made their final push into the interior of its massive colony. In this paper, the Luachimo Dam should come to symbolize the activity of mining an area for material and non-material resources, the transforming of matter into information and energy, and as being the catalyst of a disruption and enlargement of a feedback loop. It should represent the dual nature of the media used to inscribe and transmit Chokwe art: electrification and rationalism.

In 1953, Portuguese anthropologist José Redinha published a book on the topic of Chokwe wall murals, *Paredes Pintadas da Lunda* (Painted Walls of Lunda). Redinha was director of the Dundo Museum on Diamang's company compound and had for some time been interested in the murals; he was an artist and was fascinated by the murals' popular execution. He traveled around the immediate region and copied what he saw on the hut walls exactly, choosing paint in order to preserve the colors and even using the same pigments and binders as the Chokwe artists. Bertrand Brothers publishing house in Lisbon then printed the book using offset print and color plates. Since the company had no legal rights to sell the book, it was sent to academic libraries and museum collections worldwide.

In 2006, two online heritage projects were launched, both of which presented material digitized from Paredes. The Trienal de Luanda's website scanned the book's image plates as part of the online component of the first major contemporary art exhibition in Angola after the end of a devastating thirty year civil war. ITM Mining Ltd., a diamond company operating in Lunda North, launched www. culturalunda-tchokwe.com, which used both the scanned images from Paredes and transcribed its text. Angolan artist and Trienal de Luanda director Fernando Alvim authored both projects. Each was presented as a type of heritage project dedicated to disseminating the indigenous cultural production of Angola to a wider public. The Trienal emphasized the artistic merit of the images as such, photoshopping out the characteristic signature that Redinha placed on all of his images, in order to return them to Chokwe authorship. No context was provided for the images other than the project's conceptual essay that proposed to correct the wrongs of Redinha's appropriation of Chokwe art, as he did not include the names of individual artists. ITM presented the anthropological content of Paredes. As the company operates in the Lundas, they declare on their website, "Tradition as we respect cultural values." ITM is of the progeny of Diamang that resulted from Angola's nationalization of the diamond industry following its independence in 1974. Both the Trienal de Luanda and ITM's website had an ethos of participation. The Trienal encouraged public interpretation of Chokwe aesthetics through its gallery, internet, and billboard exhibitions, while ITM's message board and online forum solicited feedback and exchange.

In 1987, Friedrich Kittler wrote his influential essay "Gramophone, Film, Typewriter" on the eve of the internet revolution. Among other things, Kittler describes erasure of distinctions between media types with the transition to fiberoptic cable transmission and the gradual electrification of media. On the issue of how meaning is generated within this relatively new standard of information, he writes, "quotidian data flow must be arrested before it can become an image or sign. What is called style in art is only the switchboard of these scannings and selections." [1] He then describes a type of information hierarchy as a natural outcome of re-mediation, where one medium ghosts another through its obsolescence and related changes to our senses. Kittler's analysis dissects a process that is often regarded as a natural progression: the alphabetic monopoly of print media to the eventual triumph of electricity-based digital information.

I want to bring in a different aspect to Kittler's theory of media, one that accounts for both the historical contingencies of mediation and also to the blind spots in descriptions of its infiltration. In colonial situations, the abstraction of information that develops with mediation is inextricably bound up with extraction of materials such as diamonds, achieved as it was most often through coerced labor and societal violence. Consider, for instance, that one Diamang official could call the project to record folk songs "Song Service" in order to match it with the labels Mines Service, Construction Service, and Health Service. [2] Each of these was a piece of a total project of control over bodies and life in the Lundas. It would be inaccurate, therefore, to claim that the implementation of media conditions were universally experienced or, for that matter, inevitable.

The Dundo Museum was part of Diamang's project termed "Scientific Colonialism". The museum compound was a laboratory of Life found in the Lundas and must be seen as synonymous with Diamang's labor practices. The effort that materialized the diamonds, the book, the museum, the folk music records, and indeed the hydroelectric dam, all capitalized what Diamang extracted from Lunda North. Here, not only were the Chokwe, in the crassest of interpretations, considered matter, or the "real," but the idea of the real was itself developed within the logic of the media they used. The conditions that Diamang established were coterminous with the electrification of production and the ephemeralization of information.

In the case of colonialism in Africa, the ghosting of indigenous media practices was not an unfortunate consequence of colonial rule, as most scholars of the time understood it, but rather an intentional divestment of indigenous populations of power by participation. The now common knowledge that Europe created the notion of Africa as practicing unchanging traditions amounted to the limited definition of medium in Africa to that of objects and performances as emblems of superstitious practices. Under that logic, they had to remain static. One must look no further than the statement by Julio de Vilhena, who claimed that the Chokwe had a tendency to adopt music "other than the traditional, and withhold from the traditional the value and importance attributed to it by his ancestors." [3] He goes on to argue that Diamang must "[show] him the value of his folklore, by inducing him to cultivate it regularly" by providing them with positive encouragement. [4] Vilhena even suggests that the whites clap for the natives after performances, a type of feedback that indicates paternalism, where Chokwe art and performance is not an open system, but rather artifactual data in a control system. There were, then, implications of the process of etching voice into "fragile stock[s] of virgin discs…in the tropics" beyond just ghosting certain sense perceptions through transformations in media. [5]

One such mnemonic and oral practice based on participation and permutation with the Chokwe is called "sona," a type of drawing that appeared in the murals that Redinha copied. Authors variously define lusona (plural of sona) as mnemonic devices, symbols, pictograms, ideograms, and mathematical formulae. Chokwe terminology for the practice has not allowed for an open interpretation for outside scholars, either as a matter of fact or because of purposeful concealment of specialized knowledge. That is, sona is a code. In its formalized practice, only the male elders had the specialized knowledge of the algorithms and knew their relationship to the various tales, figures, and behavioral instruction. Therefore, within Chokwe society, lusona represent the hierarchal structure of access to knowledge, resources, and contact with the ancestors.

The word sona can indicate the name of the practice or the finished visual symbol. The process by which lusona are drawn in the sand is formulaic, as is the format of the resulting images, though they can be embellished. The akwa kuta sona, the elder maker of the drawing who is usually in his fifties or sixties, finds a patch of ground and smoothes it to make a clear drawing surface. He begins the drawing by impressing dots with the tips of his fingers. These dots form a grid structure in which the dots are carefully plotted equidistant from one another, measured by the distance between the fingers. (see fig. 1)

After the akwa kuta sona has plotted the grid specific to the sona, he begins to draw an unbroken line around the dots. He circumnavigates each of the dots quickly and precisely, creating an even and symmetrical lattice pattern. [6] They can be enlarged or diminished according to the operating algorithm. Given their performative nature, there is great pressure on the akwa kuta sonas to execute the drawings perfectly. Mistakes are often marked by laughter or a quiet sarcasm. [7] For that reason, sona is a popular pastime for Chokwe and a favorite activity as men pass through each other's villages. It is a social event, a conventional way to disseminate information and to reinforce the social code. Crucial for the current discussion, however, is that sona allows for innovation based on new iterations of standard algorithms.

Increasingly, scholars of lusona have explicated the range of algorithmic operations involved, concluding that it is at once a specialized mental activity, a body of shared knowledge, and a recursive operation. They are not only, as Redinha constructs them in his book, a repository of forms. The morphing of resulting figures and images is facilitated by the simplicity of sona's building blocks, the line and dot. The drawing's value lies in the mastery of an operation that lays bare a clear binary code by which the resulting image, whether representational or not, is an outcome of an operation and is not *a priori* visual.

Thus, sona involves both mnemonics for the memorization of form and also the development of operational logic. Because of this, sona performs a social function in excluding certain members of the community from restricted physical and intellectual spaces, while it can also be a purely ludic activity. It was this ludic aspect of the images that Redinha was interested in, as he was driven to discover the "soul" of the Chokwe people.

Redinha's *Paredes Pintadas da Lunda* compiled the finished visual figures of sona that were painted by non-practitioners on the huts. (fig. 2) Redinha found vernacular interpretations of lusona, the optical "interface" of lusona. Because of his interest in non-professional art and his preconceived social biases, he ignored the operational aspects of sona drawing. Redinha's book, its format and its logic, re-semanticized the symbols to act as identifiable cultural characteristics. The Social Darwinist model through which Redinha reads sona drawing, from rock art to ethno-cultural symbol, speaks to the ultimate irrelevance of Chokwe logic within Portuguese colonial occupation.

Sona is also the Chokwe word for writing and likewise a code that enacts a bi-directional mediation with the real, of which the ancestors are a part. Sona mediates access to their power, the acknowledgement of their continued presence in the world, and the methods to influence their decisions. Sona incorporates feedback into its political and cultural message, but also refers to itself as a system. Additionally, sona is a medium with its own history of imperializing previous media. Representational and mediatic colonization, in fact, was integral to the Chokwe 19th century expansion.

Diamang's by then anachronistic project of Scientific Colonialism not only codified life itself in Chokwe territory, but its policies also forced a separation between their intellectual and physical labor. As water passed through the Luachimo Dam, the Chokwe body passed through Diamang's health services, educational reform, sports, and displays of culture. Both the dam and book conceptualize Africa as a resource holding energy that can be used, circulated, and stored, much like the raw diamond is transformed into a financial commodity. The electrification of lusona rerouted their feedback loop across oceans and into global finance, discourses of Africa, primitivism, anthropology, and art history.

Kittler writes of the societal correlations of media logic: "Mouths and graphisms dropped into prehistory. Otherwise, events and their stories could not have been connected. The commands and judgments, the announcements and prescriptions that gave rise to mountains of corpses–military and juridical, religious and medical–all went through the same channel that held the monopoly on the descriptions of those mountains of corpses." [8] Kittler's "channel" emphasizes the specificity of the mode of transmission and the type of information suited to the communication circuit. Algorithms animated by the dam and the division of labor in Diamang's production line were of the same order that Redinha's book was published under: typeset, offset printing, serial pages, etc.

The Luachimo hydroelectric dam in the 1950s in many ways already prefigured the death of mechanization and of Redinha's book. As an effect of electricity, hardware, and code, Chokwe art is information within the Trienal de Luanda Lunda Tchokwe and ITM Cultura Tchokwe re-mediation projects. The death of Redinha's book performed by the websites is analogous to the transition from archive to database. Chokwe art so configured is morphological and, accordingly, can be directed to very different ends. One site thematizes a correction of the wrongs of Angola's colonial past through aesthetic participation. The other declares a diamond company's dedication to its neighbors and workers, which only thinly veils the continued violence of the industry. Given my previous argument that colonialism is embedded in the very DNA of media, what are the protocols of power and access to the ancestors (read history) today?

Both sites share the same author, code, basic format, and mode of transmission. Both depend on a functional electric grid, hardware, and access to Redinha's book and the web, all of which are tenuous in Angola. The images and text on both sites are syntactically propelled forward as they were in *Paredes*. The hypertextual progression through the images and information has no direct indexical relationship to the sand or hut, and serves to veil the relationship to its infrastructure. The images and information on both websites are purely optical manifestations of labyrinthine protocological operations. As Redinha's book displayed the optical effects of sona, effectively veiling the protocols of sona production, so does the monitor embody ludic capitalism, spectrifying the bodies and matter on the other side of the electrified interface.

References and Notes:

1. *Friedrich Kittler, "Gramophone, Film, Typewriter," October (Summer 1987): 104.*
2. *Julio de Vilhena, "A Note on the Dundo Museum of the Companhia de Diamantes de Angola," Journal of the International Folk Music Council (1955): 42.*
3. *Ibid., 41.*
4. *Ibid., 41.*
5. *Ibid., 43. In a topic for further discussion, it should be pointed out that Africa has continued to feel the effects of the globalization of information and media in the extraction and disposal of raw materials for hardware. Among other examples, see the impact of coltan mining in the Congo and computer waste disposal in Nigeria.*
6. *The type and existence of symmetry in lusona can vary according to the type of drawing. See Paulus Gerdes, Sona Geometry: Reflections on the Tradition of Sand Drawings in Africa South of the Equator (Maputo, Moçambique: Instituto Superior Pedagógico Moçambique, 1994).*
7. *Paulus Gerdes, Sona Geometry: Reflections on the Tradition of Sand Drawings in Africa South of the Equator (Maputo: Instituto Superior Pedagógico Moçambique, 1994): 14.*
8. *Friedrich Kittler (1987), 105.*

HERE AND THERE

Susan Collins

Susan Collins places network cameras in remote locations constructing landscape and seascape images continuously, pixel by pixel over time. The work provides an in-depth study of place, introducing a representation of time showing simultaneously day and night views of the same scene studied and recorded over the course of the year. This presentation explores the introduction of new devices and language to the tradition of representation.

Glenlandia, 19 August 2005 09:53am, 2005, Susan Collins, Digital Still from Archive (detail), Copyright Susan Collins.

INTRODUCTION

I am a fine artist who works across a range of media including sound, internet, video and installation. Most of my work has been made in response to different sites and situations with my recent works mainly employing transmission, networking and time as primary materials, often exploring the role of illusion or belief in their construction and interpretation. It is a series of works exploring what it might mean to record a digital image and transmit it across space and time that I am going to present and discuss today, work which relies on transmission and the network for its fabrication.

I have been working for a number of years on recording landscapes using pictures transmitted live from remote network cameras. These images are made pixel by pixel, from top to bottom and left to right in horizontal bands continuously so that a whole image is made up of individual pixels collected over a period of time. When the image is completed, it starts again at the top left of the image and writes over itself. The images are low resolution – 320 x 240 – so that at the rate of a pixel a second, a whole image is made up of individual pixels collected over 76,800 seconds or 21.33 hours, just under a day.

FENLANDIA/GLENLANDIA

I have placed cameras in a number of locations resulting in works including *Fenlandia* – developed with Film and Video Umbrella – where a network camera was placed on the roof of a 17th c. coaching inn in

rural Cambridgeshire for a year; and *Glenlandia*, developed with Horsecross in Perth, where a camera was installed in a fisheries research laboratory looking out over Loch Faskally, Perthshire, Scotland for two years. Both these works deliberately trade on the convention – or rather the perceived convention – of how a landscape image might historically have been composed and constructed, however, while both compositions appeared to be of natural landscapes, technology was in fact embedded seamlessly into both images. With *Fenlandia* the camera was looking out over a technological marvel of an earlier age, the fens of Cambridgeshire – a reclaimed land of sluices, ditches and drains; whilst the subject of*Glenlandia*, Loch Faskally, is in fact, a manmade loch which services a hydro-electric dam in Pitlochry, providing power to the surrounding glens.

When archived and lined up together in series the images present a heightened sense of time, revealing all sorts of shifts and changes – from the thinning and widening band of black (nighttime) showing the lengthening and shortening days throughout the year – to the full moon that *Glenlandia* occasionally captured and which appears as if a white comet streaking through the night sky but is in fact, the moon slipping through the image over time.

I view this work as a kind of 'open system'. One inhabited and activated by light, day, night, weather, movement of the sun, the moon, the seasons and all these analogue variables that conspire to produce an infinite variety of unique images.

SEASCAPE

I became interested in developing further the potential for abstraction in the work, and I began looking at the seascape as a potential subject while artist in residence at Monash University in Melbourne in 2006; experimenting by constructing images from Australian 'surfcams' – the webcams set up on surfer beaches to let the surfers know when the surfing is good.

The *Seascape* project emerged from this when I was invited to develop the work further with Film and Video Umbrella and the De La Warr Pavilion, Bexhill-on-Sea, a modernist icon on the south east coast of England housing a gallery whose long wall of picture windows look directly out to sea. Between March and October 2008, networked cameras were installed at five different vantage points along the south coast of England: at Margate, Folkestone, Bexhill-on-Sea, Pagham (near Bognor Regis) and Stokes Bay (near Gosport). The intention was to create a panoramic work that would directly reference the Bexhill seascape view while extending it to encompass and appropriate other vantage points across the south coast. Each camera transmitted an image to its own server in London, which then constructed and archived the images. For Seascape, I changed the timing of the construction of the images so that a whole image was made from individual pixels collected over just under seven hours, which is approximately the time it takes for the tide to come in or go out.

At the De La Warr Pavilion, five live projections showing the seascapes being constructed in real time were projected into the windows, against the backdrop of the actual, live coast itself. I set the view for each camera to frame the sea and sky with a common horizon line so that each image might be seen to form a fragment of the continuous panorama that is the South East coast.
In some images, you can see the picture evolve from night-time through dawn with the sun appearing on the water later in the day. Sea and sky often became interchangeable, creating false horizons through the horizontal construction of the image combined with fast changing light and weather conditions.

I also selected a series of stills from the archive to show as prints, regarding each of these as a complete work in itself that might be seen as a form of timelapse caught within a single frame – positioned somewhere between the still and the moving image, the lens and the pixel.

CONCLUSION

Whilst this process reveals some things such as the movement of the moon through the sky in *Glenlandia*, it misses others. For instance, in Seascape, the most violent lightning storm might appear as just a few stray pixels giving little or no sense of a turbulent sea. A re-presentation of a familiar subject, it is reality but not as one normally witnesses it. Six or seven hours compresses into a single frame, time shifts, and while the source for the image may have come from a landscape or seascape, the image has the potential to become autonomous, something else, with the accrual of the image over time bringing its own set of artefacts and abstractions.

INDEXICAL IMMATERIALITY: PHOTOGRAPHY AND FILM INSIDE THE MACHINE

Rosemary Comella

At stake in my research in interface design is the indexicality of the photographic, not just its function in fixing moments of historical time but also the ambiguity of its meaning and the ability to navigate between its material and immaterial aspects. In contrast to the idea that the digital is eroding the power of the photographic, the digital extends its role as a conceptual art and is a rich area for exploration in interface design.
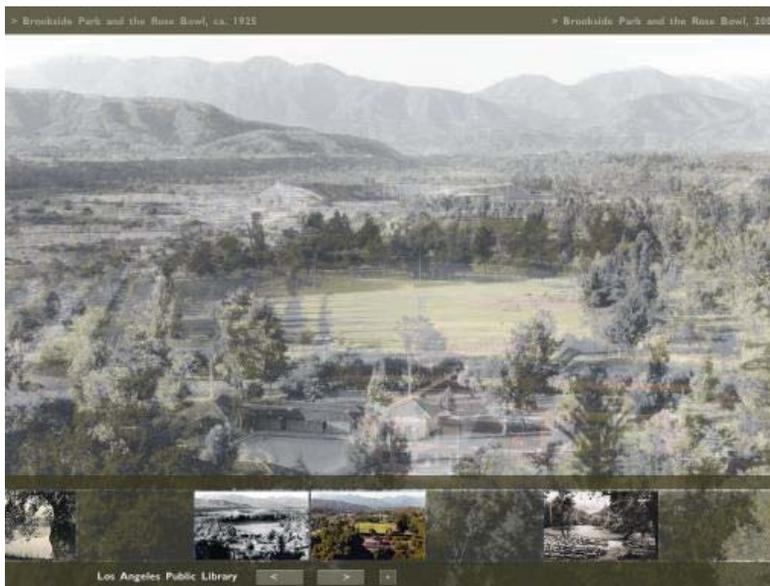
Fig 1. Cultivating Pasadena: From Roses to Redevelopment, 2005 © The Labyrinth Project, USC

Fig 2. Tracing the Decay of Fiction: Encounter with a Film by Pat O'Neill, 2002 © The Labyrinth Project, USC

Certainly, within film theory, confronted with the threat and/or promise of the digital, indexicality as a category has attained a new centrality....

—*Mary Ann Doane* "The Indexical and the Concept of Medium Specificity"(2006)

In the work that I do I am drawn to the indexicality of the photographic, that is its trace of the real, and wonder how this may function differently within a computerized environment than in a cinematic one. How does the photographic, whether still or moving, affects one's sense of space and time once sub-sumed within a computer interface. If, in cinema, movement, and sequence represent time, then does a still photograph represent space? How does the indexicality of the photographic function within a com-puter interface? How is it different than within cinema, or is cinema just another type of interface that doesn't significantly affect this? If we look at cinema for an answer, then, what can we conclude about Chris Marker's film *La jeteé* (1962), a series of stills about a man who time-travels? Or Michael Snow's 45-minute film, *Wavelength* (1967), a single shot as the camera's lens slowly zooms across the space of a New York loft, to a still photograph on the wall opposite. Or the embodied time rendered in Michelan-gelo Antonioni's films where viewers feel the sheer duration of the on-screen events? Even within one medium there exist a wide variety of techniques that can affect one's sense of space and time quite dif-ferently.

It is in this vein that I examine *Tracing the Decay of Fiction: Encounters with a Film by Pat O'Neill* (2002) and *Cultivating Pasadena: From Roses to Redevelopment* (2005), two interfaces that I was key in devel-oping while working at USC's The Labyrinth Project. Both these works present full-screen photographic imagery within a robust computer interface, yet they move physically and emotionally in different ways. One privileges archival and contemporary still photography, and explores a city's history through this imagery, while the other privileges the cinematic by converting contemporary 35mm film footage of a dilapidated hotel into an interface that combines history and fiction. The content and style of both of these works has no doubt benefited greatly from the influence of certain modernist cinematic inclina-tions, like those already mentioned, as well as in films by Alain Resnais with their emphasis on the past haunting the present, and the mix of fiction and history, or by Federico Fellini's tangents and digres-sions. Furthermore, the 35mm film we worked with is by renowned experimental filmmaker, Pat O'Neill, who has created various strategies and techniques—around issues of movement, time and space—that, in their inventiveness and execution, inspired the design of a unique interface.

Before I began working in new media, I was experimenting in photography as conceptual art and did not necessarily see it functioning as a pure medium, but as something that could easily encompass hybrid artistic forms and technologies. This eventually led me into new media as an art form and makes sense now, for these times, described by art theorist Rosalind Krauss as our "post-medium condition." Krauss suggests that art's adoption of photography—as not so much a specific medium but as a "theoretical object"—was a precursor to this condition. In 1980, Barthes published *Camera Lucida* in which he also considers the photograph as a theoretical object. Barthes writes about how he considered the photo-graph not only to be unique in its representation of reality as an actual "trace of the real" but also to be something akin to "the child pointing his finger at something and saying: that, there it is, lo! but nothing else." It is interesting to consider the use of technology as a way of pointing at things. In this sense, a mouse, cursor and camera have something in common. In 1978, I had made my first encounter with a computer as a worker producing letters on a word processor with no images and no mouse. Now, I find it interesting to consider how my livelihood as an administrator and my avocation as an artist working in photography merged so quickly. I went from developing and printing film in the darkroom and experi-

menting with biochemical processes to scanning in analog photographs for manipulation on the computer, to directly hooking up a digital camera to the computer, voilà, no film. One could be expected to wonder: in this evolution of photography onto the computer what exactly is happening?

Now that these areas have joined forces, each has been transformed. Indeed, in the infinite possibilities of its manipulation by the machine, now re-constructed via bits and pixels, and removed from its biochemical process, the photographic has further lost its credibility as a representation of some kind of truth. Also, the computer has progressed from its first tasks of evaluating polynomials to word processing, telecommunication and so forth, to now being also a machine for the creation and manipulation of image and sound as well as their viewing in a conflation of a cinema-computer (Manovich, 2001). We still trust the computer's ability to do invisible computational tasks, and similarly the photograph has not completely lost its credibility to visualize the real. What Susan Sontag wrote in *On Photography* in 1973, still has resonance: "The picture may distort; but there is always a presumption that something exists, or did exist, which is like what's in the picture." The photochemical image as trace and thereby as index of the real does not preclude the digital photograph from bearing this trace as well. There is still the pointing finger.

What I am curious about is how photography or cinematography exists, or functions, within an environment that tends to spatialize data. How can existing techniques for exploring space and time as found in experimental film, video and photography be employed within a computer interface? Can these techniques and the computer's inexhaustible ability to spatialize, manipulate and present data be combined in ways not yet explored? The interactive nature of the computer makes viewing content a different experience from that of cinema or television. Yet, a clip viewed on the computer is not so different from viewing it on television. That is, until it is made programmable. I find myself, so-to-speak, drawn to this place—where all media, once digitized, is created equal (Manovich, 2001). It is at this point where interface design takes place and artists, interface designers and programmers can really explore giving users a different kind of experience.

For my purposes, it is interesting to consider visual effects found in cinema— such as animations, dissolves, abstractions, montage, framing and composite images. They are both material and symbolic. A dissolve is just an image atomizing into very fine particles, but metaphorically it can represent a transition, or relay an emotional state. The experiments of avant-garde filmmakers and photographers have already made their way into the popular imagination as ways of representing mental processes. How can this materiality be transformed within the programmable computer and made to serve the agency of the viewer in a way that will be different than if it was viewed in a film or video? It is here that I would situate the crux of the work that I have done and that I would like to expand upon for future projects.

Both the projects addressed in this essay are concerned with giving the user a full-screen, photographic or, cinematic experience, but one with the pleasure of agency—not only a space or place to embody but a unique way to navigate it too. Giving a sense of embodied space within a new media environment demands that an interface designer create suggestive "real world" models or metaphors of navigation that reverberate cognitively and emotionally for the user. The following considers the two above-mentioned projects in this register.

The goal of *Cultivating Pasadena* is to allow the user to visually explore the development of Pasadena and its surrounds from the end of the 19th Century to the present in a unique and enjoyable way. The project's main appeal is the archival and contemporary camera shots of the exact same place taken decades or even more than a century apart. Users can perform cross-dissolves between archival black-

and-white photographs and contemporary color photographs of precisely the same city scene—often taken many decades apart—and easily and precisely control the speed and repeatability of the cross-dissolve between the two images—pausing, reversing, as well as comparing smaller versions of the images side by side. It is the simple action of moving the cursor from the left to the right of the viewing screen to see the photograph change from "then" to "now". If the user stops or slows down somewhere in the middle, she can examine at leisure how the images intermingle and overlap, noting the ghostly impressions one photograph leaves behind as it is totally replaced by the other. (The archival photograph is black-and-white and the contemporary photograph is in color so it is easier to distinguish what superimpositions belong to what photograph.) It is both a material occurrence and psychological activity, suggesting among other things, time-travel and recoverable memory. In a much more prosaic way than *La jetée*, it also has the effect, like the film's narrator says, of drawing attention to "the paradoxes of time" and perhaps, reminding one that, "there is no way out of time."

For me, the cross-dissolves in *Cultivating* provide the "punctum" that Barthes discusses in *Camera Lucida*, but in a slightly different way—a kind of double punctum. In describing this concept Barthes implies that it is something the viewer adds to the image. The experience is something analogous to Barthes description of Lacan's concept of the *Tuché*, the chance encounter with trauma. In Lacanian terms the *Tuché* or touch is the disruption of the compulsory self-regulation of the symbolic order—the moment when something happens to break its normal operations and reveal the Real—which 'pierces the viewer'. In *Cultivating*, the work itself adds a kind of punctum in revealing the contemporary image and, perhaps, a radical transformation, but the viewer must herself add something in the gap or absence of time between the images. In a sense, *Cultivating* is a work that tries to straddle the symbolic and the Real. Symbolically it is a space in which to explore change, transformation and preservation on topics ranging from architecture, cityscapes and geography to culture, race and community. Also, the photographs, labeled and described, are objects of discussion for historians and aficionados of Pasadena, thereby entering into the realm of language and the symbolic. The Real in *Cultivating* is the demonstration of the passage of time and the transitory nature of life.

In transitioning from a discussion of *Cultivating*—which though it contains some video and sound, is essentially grounded in still photography—to a work that is based on a 35mm film, one may consider what Barthes says about film. He asks: "Do I add to the images in movies? I don't think so; I don't have time: in front of the screen, I am not free to shut my eyes; otherwise, opening them again, I would not discover the same image; I am constrained to a continuous voracity; a host of other qualities, but not pensiveness…. " It is essentially film's ability to capture time and movement that separates it from photography, which freezes the moment. It is these two features that are played with in the interface to the interactive film described below.

Like Pasadena, the Hotel Ambassador in Los Angeles—the place O'Neill filmed—has a culturally important history, yet due to the cinematic 'noir look' of his footage one could be forgiven for entering into its space, perhaps expecting a story. However, *Tracing the Decay of Fiction* frustrates the viewer in terms of a traditional narrative story and has more in common with a film like *L'année dernière à Marienbad* in its enigmatic narrative structure. It is also quite different than the somewhat straightforward cultural history presented in *Cultivating* in that history and fiction blur. The similarities between the two works are that they both are an indexical record of an actual space over time and both provide the user with a way of navigating that recorded space. *Cultivating* privileges the still image and it is through these still images that one navigates which is quite the opposite in *Tracing* where the film is the ground on which one 'exists' rather than a changing set of different photographs by different photographers over many

decades. *Tracing* is more stylistically and spatially cohesive. It was filmed in one location, by one film-maker and in a relatively short period of time. The space was filmed empty and with an eye for its nostalgic affect on visitors. O'Neill employed certain techniques such as time-lapse photography on a computer-controlled dolly system to accentuate this feeling of time passing. One could identify with this particular omnipotent stylistic camerawork as if it were one's own eyes—delighted by the play of light within in the hotel and on its grounds—that had captured it. In other words, there is something already intrinsically subjective about witnessing this camera vision, without then being given some direct control over it by an intuitive and nearly invisible interface. Within a computer interface, the ability of the user to control the vision of the camera can itself be the subject. In *Tracing*, the combination of time-lapse photography captured by a camera smoothly and steadily moving through a hotel, uncovering it in turns, with rapidly changing light and shadow became the reason for the interface. Watching this footage, one feels transported into an uncanny world where space and time are somehow different. The key to designing the interface was mainly to not impair this aesthetic experience.

Ordinarily, a space one can navigate on the computer is 3-D modeled, or virtual, like those found in a computer game or an architectural fly-through. Like the camera itself, a new media object can replicate human vision and agency. In the words of Lev Manovich: "As computer culture gradually spatializes all representations and experiences, they [users] are subject to the camera's particular grammar of data access. Zoom, tilt, pan, and track—we now use these operations to interact with data spaces, models, objects, and bodies." What is different about this work, however, is that you are navigating actual recorded two-dimensional space enhanced by time-lapse photography and a computer-controlled camera and tracking dolly system. The experience of navigating through this richly descriptive footage, this aestheticized trace of the real, and the fact that one must actually activate the movement or stand still, combines to feel like an uncanny experience of time and space. What would Barthes make of this? In *Camera Lucida* he writes: "Like the real world, the filmic world is sustained by the presumption that, as Husserl says, 'the experience will constantly continue to flow by in the same constitutive style'; but the Photograph breaks the 'constitutive style' (this is its astonishment); it is without future (this is its pathos, its melancholy)." Might he consider this work both photographic, in the melancholic way that he describes, and cinematic, simultaneously?

Mary Ann Doane writes: "Hence—and I think Krauss would agree—it is ultimately impossible either to reduce the concept of medium to materiality or to disengage it from that notion. In its very resistance, matter generates the forms and modes of aesthetic apprehension. Yet, technologies of mechanical and electronic reproduction, from photography through digital media, appear to move asymptotically toward immateriality...." For me, this raises the question that within the digital what is the difference between the material and immaterial? Doesn't the digital helps to extend the role of photography as a form of conceptual art and be a rich area for exploration in interface design?

References and Notes:

The Labyrinth Project is a research project on interactive narrative under the direction of Marsha Kinder with collaborators Rosemary Comella, Kristy H.A. Kang, Andreas Kratky and Scott Mahoy. The goal of this theory and practice research, in Kinder's words, "is to generate a productive dialogue between the language of cinema and the interactive potential of new media."

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ART OF DECISION: AN INTERDISCIPLINARY APPROACH TO RAISING AWARENESS OF ACTIVE CITIZENSHIP

Fionnuala Conway & Linda Doyle

Art of Decision explores the possibilities that creative applications of multimedia and technology, in combination with an artistic approach, offer for the development of innovative ways to raise awareness of Active Citizenship. The exhibition consists of 9 interactive multimedia rooms that present opinions from research participants in an engaging way alongside statistical information, using sound, film, and interactive installations.

Since the 1990s, there has been a renewed interest in the concept of citizenship as an important idea that has relevance to today's social and political problems. [1] In the Irish context, citizenship has become more relevant in the context of recent social, economic and demographic changes in Irish society. Ireland continues to experience significant levels of voter apathy, increasing immigration and increasing diversity around moral, religious and ethical perspectives. [2] These developments in Irish society have made it clear that the health and stability of Irish democracy depends not only on its basic structures (political structure, representation and accountability) but, on the qualities and attitudes of its citizens; for example, how citizens respond to these social, economic and demographic changes; how they participate in government in order to represent the public good and hold politicians accountable. [3] Since the early 1990s, there has been a growing concern, at both the international and Irish level, for a definition of citizenship that focuses on "the identity and conduct of individual citizens, including their responsibilities, loyalties and roles." (ibid) A review of the health of Irish democracy based on standard indicators such as voter participation and representation does not give it a 'clean bill of health'. These inequalities in representation stem from inequalities in political participation and are a cause of great concern for the health of Irish democracy. The matter is of such concern that the Democracy Commission was established in 2003 to address the issue of poor participation, unequal representation of groups and general civic and political disengagement in the country. [4]

2 The individual at the heart of Active Citizenship

Following on from the Democracy Commission report, increasing attention has been given to addressing citizen engagement. The importance of the community and voluntary sector has been seen as playing a considerable part in establishing a strong civic culture and society. In April 2006, the Prime Minister, Bertie Ahern established a Taskforce on Active Citizenship "to recommend measures which could be taken as part of public policy to facilitate a greater degree of engagement by citizens in all aspects of life and the growth and development of voluntary organisations as part of a strong civic culture." [5] The Taskforce on Active Citizenship conducted a *Survey of Civic Engagement* in order to begin to measure social capital and found that overall the levels were very healthy, with no apparent decline in recent years in levels of volunteering, active membership of community and voluntary organisations. [6] The Taskforce have also looked to the civic republican tradition as a means to actively encourage citizens to participate. The distinguishing feature of civic republicans, that separates them from other participations is the exhibition, therefore, explore "emphasis on the intrinsic value of political participation for

the participants themselves." [3] The Taskforce definition of 'active citizenship' has now established a definition of the 'active citizen' as one who plays a role in the family, their neighbourhood, their community, voluntary organizations, the workplace, as well as in political structures.

In their final report to government, the Taskforce presented a set of recommendations to enhance the work already being done to develop a strong, independent, and inclusive civil society. [5] Among others, the recommendations relate to institutional and procedural mechanisms as well as citizen engagement measures aimed at increasing participation in the democratic process. [5] Of specific interest to this research is the Taskforce recommendation that innovative projects to raise awareness of Active Citizenship should be supported. The Taskforce suggests that projects in which community development and Active Citizenship are presented as something "attractive, real and personal could spark public debate and interest." [5]

In this spirit of pursuing innovation, the remainder of this paper presents an overview of the *Art of Decision* mixed-method approach and interactive multimedia exhibition that explores new ways to raise awareness of Active Citizenship, in a manner that makes it attractive, personal, and engaging. [7] Multimedia and new artistic modes of information presentation, in combination with qualitative social research methods are used to provide a platform for the presentation of information on Active Citizenship and content drawn from personal views, insights and opinions of people and their communities. The*Art of Decision* research and resulting exhibition therefore explore the possibilities that creative applications of multimedia and technology, in combination with an artistic approach and aesthetic sensibilities, offer for the development of new innovative approaches and responses to the Taskforce recommendation.

3 Art of Decision: an interdisciplinary approach to design

In the last decade of the twentieth century, computer technologies have played a dynamic and increasingly important role in altering how we make art in all disciplines. [8] The characteristics of multimedia as defined by Packer and Jordan present defining emergent characteristics of the diverse array of multimedia presentations that set them apart from other media presentations including the integration of all art forms; interactivity that offers the user new ways to manipulate media and communicate with others; the use of hypertext and hypermedia; immersion in different experiences through entry into the simulation or suggestion of a 3D environment; alternative narrative structures. [9] Artist-researchers continue to address the use of computers to advance the presentation and organisation of large volumes of complex information and are looking at new ways to visualise and allow interaction with information by creating visualisation methods that incorporate experimental two-dimensional, three-dimensional, time-based, meaningful and metaphoric visualisation, and interactive environments. This way of doing things is significant in that it not only exploits new technologies to facilitate the expression of artistic ideas but has also brought about new stylistic and aesthetic modes of thinking arising out of the conceptual implications of the use of technology in an art context. These characteristics and approaches define a way of doing things, both artistically and technologically, and an approach to artistic creation that was adopted for the research and design of the Art of Decision exhibition.

At the heart of this research is the use of art to raise awareness of an issue of social concern and the creation of artwork that can be used for that purpose. The application-oriented approach requires that the artist considers the context for the work, the variety of artistic and technological methods available to realize the work, and importantly that the artist has a concern for the human dimension in addressing

the creation of such a work. There is a need for multiple disciplines, methods and perspectives to illuminate the human context [10] and input is needed from a variety of disciplines relevant to the study, in this case including art, technology, design, politics, and social science. Social research offers useful methods for an enquiry into what people think about issues, which can give the artist a unique perspective and offer opportunities for reflexivity. Interview and media-elicitation methods are a particular part of this approach to enquiry and the generation of participant-authored content that is presented in this research. Social research also offers methods to organise and present the resulting data. In particular, content analysis and thematic networks analysis offer ways for the artist to structure and present the information in themes that can be presented using multimedia and technology in an artistic manner. *Art of Decision* draws from these methods but is primarily situated in the art and technology field.

It is worth mentioning here that this research and the resulting art exhibition are not an examination of how the artwork can bring about social change. This type of evaluation presents other challenges and perhaps is best examined from another research area. The work presented here is about the exploration of artistic practice, informed by political theory and social research methods, with the aim of creating art that raises awareness of social issues, with a particular focus on Active Citizenship. The next section will provide a brief overview of the *Art of Decision* exhibits.

4 *Art of Decision*: themes and exhibits

The *Art of Decision* exhibition is a series of 9 interactive multimedia exhibits that present opinions and ideas about power and decision-making from a variety of research participants in an engaging, theatrical way. Contributors' ideas are presented alongside statistical information in a meaningful and innovative fashion using sound, film, and interactive installations. The technology also facilitates visitors to contribute their ideas to the exhibition as it evolves in the space and in future research. For the purposes of this paper, these exhibits will be presented briefly under the three broad themes:
a) information presentation: *DATAmap*
b) insights and opinions on Active Citizenship: *Decisions³, Finding Your Voice*: *Siobhán's story* and *Mamo's story*, *VIP room, Images of Power/Powerhouse*
c) react, take part and debate: *Art of Decision Daily Post, Rantroom* and *Rite of Passage*

THEME 1: INFORMATION PRESENTATION

Art and technology offer new and alternative possibilities for presentation and audience engagement. The artist working with multimedia and technology can exploit these possibilities to present a complex view of many layers of information in an accessible and meaningful way. While this approach permeates throughout the entire exhibition, and all the rooms in the exhibition present information of some form or another, *DATAmap* is solely dedicated to enriching the presentation of factual information, specifically the levels of representation in Irish State bodies, with a focus on gender balance.

DATAmap is a large-scale interactive map of Ireland (housed in a room that is 48ft long, 24ft wide and 12ft high) designed to present statistical information on the gender makeup of Irish decision-making bodies in a novel way, presented on 6 surrounding projector screens. As visitors enter the installation, they are presented with lights illuminating sensors that correspond with information points. As they walk across the map, visitors trigger animations that present data on the gender balance on Irish State bodies in over 70 locations around the country.

THEME 2: INSIGHTS AND OPINIONS ON ACTIVE CITIZENSHIP

Media research methods, and the generation of text, audio, video and image authored by participants or created through interview, are appealing to the artist as they can be used in multimedia presentation. The exploration of content can be facilitated with the aid of social research techniques such as content analysis and thematic networks analysis that allow the researcher to sift through data and organise it. The artist is interested in using the themes that emerge from the enquiry as a way of presenting Active Citizenship and is particularly interested in participant-authored content as it can be used to present Active Citizenship in a more personal and meaningful way. The analytical process is very much an exploration to find out the general themes that describe what people think on the topic. Media research methods were used extensively in the research and design phase of *Art of Decision* and resulted in five of the nine exhibits presenting participant-authored and participant-generated media.

Decisions³ is a short documentary video where 9 contributors present their perspectives on decision-making. The filmed interviews were an attempt to get people to reflect on the similarities and disparities between their own decision-making and political decision-making such as happens at national government level. The documentary video is presented in a darkened room and is projected on a screen that is split into three panels so that three people speak simultaneously. Each division of the screen (panel) has a dedicated speaker that allows for sound to be directed to a particular spot in the screening room.

The ***Finding Your Voice – Mamo's Story And Siobhán's Story*** exhibits encourage visitors to find their political voice through the experience of listening to the personal stories of 2 women, Mamo and Siobhán. The two stories presented here are drawn from recorded interviews made by Melissa Thompson, an American documentary filmmaker, and are special and illuminating because they tell of external forces and circumstances that affected these women and how, as a result, they turned their lives around. Both women tell personal stories of their life experience, overcoming the odds and being drawn into political action. The concept relies on the motivating power of the interviews and their impact as role models. Both stories are recordings of the women's own voices, presented in two small, intimate spaces as audio installations with lighting that changes and responds to the stories as they unfold.

The ***VIP room*** exhibit presents 8 contributors' perspectives on the different types of players in the Irish political power game, the nature and direction of their influence and maps the interrelationships between them. Visitors navigate through this power map using a control that allows manipulation of a 3D model of the VIPs on screen. The *VIP room* sets out to make visible the political power game, its players and the way they interact. The project was administered as an interview wherein 8 participants from a wide demographic were asked to identify, in their opinion, the sites of political power in Ireland and plot and draw a map of these sites of power, their interrelationships and the degree of influence exerted by each site. As visitors enter the room, they are presented with an interface that shows a participant's hand-drawn map on a small screen and control dials for manipulating a 3D model representation of the map, which is presented on a large projection screen.

The content-generation phase, ***Images of Power/Powerhouse***, uses a photo-novella technique (uses photographs to encourage participants to talk about their day-to-day lives to generate participant-authored content giving perspectives on power. In the project, 72 participants from around Ireland were sent disposable cameras by post and asked to take photographs to describe what power meant to them. As the project was seen as a story-telling opportunity for participants, it was important that the image

and comments created what could be considered a 'picture story'. Using content analysis, the large volume of 'picture-stories' were organised into themes that provide an interesting and insightful view of how people perceive sites of power as dealing with the individual's power, the power of the family, the power of connections between people and how they influence each other. It deals quite prominently with these sites of power as being very positive as they provide support and comfort to the individual within the family, home, and the larger community. The presentation phase of this work is two-fold: a) on the website *imagesofpower.net* and b) as *Powerhouse* an immersive interactive multimedia exhibit that presents a physical space where visitors can experience the complex collection of 'picture stories'. Powerhouse presents a mixed-reality environment comprising of the website, a presentation of the card-mounted 'picture stories', a video presentation of the 'picture stories' and an audio recording of a selection of quotes from the reflections data. The exhibit is a custom-built large room that suggests the feel and familiarity of a home interior and outside space (garden, street).

THEME 3: REACT, TAKE PART AND DEBATE

In a world where it is becoming increasingly difficult to engage people politically, communication systems such as the Internet and mobile phone communication can offer novel and exciting possibilities for interaction and communication. The three exhibits presented under this theme offer visitors different ways to communicate their thoughts and leave their mark on the exhibition.

Art of Decision Daily Post immerses visitors in a giant newspaper where they can comment on the current affairs headline of the day. The 'front page' projection screen of the newspaper is updated daily and can also be seen on the dedicated website, www.artofdecisiondailypost.net, during the exhibition. People outside the exhibition can gain access to the exhibit by sending an email to post@artofdecisiondailypost.net or using Internet-based comment board at www.artofdecisiondailypost.net. A camera is positioned to film the *Art of Decision Daily Post* projection screen. All of these modes of interaction allow a larger audience of those inside and outside the room to participate in debating the news topic of the day.

Rantroom is the last exhibit in the *Art of Decision* journey and is intended as a resting space. It encourages visitors to reaction and leave comments on any aspect of the exhibition. Visitors are encouraged here to contribute their ideas and comments on specific issues raised throughout the exhibition, such as power and decision-making. Visitors can contribute to the *Rantroom* projection screen via mobile phone text messaging, email and an Internet-based comments board on the dedicated website, www.rantroom.net.

Rite of Passage gathers images of contributors' faces and superimposes them on members of the Irish government. In doing this, it challenges visitors to think of themselves in positions of power while also gathering contributions in a creative and alternative way and offers visitors an opportunity to 'play' with their contributions to the space and the idea of themselves in positions of power. The exhibit consists of 2 spaces: a corridor-like space that masks off and leads into a larger viewing room. Positioned at the end of the corridor is an opening in the wall that contains a cartoon of the faces of members of the government. As visitors place their head inside the opening 'for a closer look', a sensor triggers a camera hidden in the box to take a photograph of their face. Visitors are unaware that a photograph of their face has been captured. These images are transferred into the large viewing room and superimposed on the heads of members of the government. As visitors continue into the larger viewing area, they see a large projection of the members of the government.

5 Conclusions

If citizens are to become more engaged, they are required to take part in an active exploration and study of citizenship at all levels – personal, local, national and global. The mixed-method approach presented here is a rich palette of tools from which to draw on, tools that offer new ways to create content for presentation and the design of engaging multimedia presentations that are brought into the community. This research has presented a fresh approach to engaging the citizen and a new tool that can be added to the repertoire of ways to understand and examine how people view their role as individuals in society, within the family and community structures. The exploration offers new ways for multimedia artists to look at the process of creation and presentation and create engaging and unique perspectives on a topic. Social research methods offer many interesting ways for the creative work of the artist to be informed and made unique and the combination of methods, and changing role of the artist in the project, is a novel approach that informs the design of exhibits to address and engage a public audience.

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DATAMAP: EXPLORING GENDER BALANCE IN IRELAND THROUGH INTERACTIVE MULTIMEDIA INSTALLATION

FIONNUALA CONWAY & LINDA DOYLE

Traditional presentations of information, such as statistics, can often be inaccessible to the public or presented in a manner that is unengaging. Art and technology offers new and alternative possibilities for presentation and audience engagement. *DATAmap* is an immersive interactive multimedia installation that presents factual information on the levels of representation in Irish State bodies, with a focus on gender balance.

Fig. 1: Representation of Dun Laoghaire/Rathdown County Council statistics (Copyright Fionnuala Conway & Mark Linnane).

Fig. 2: DATAmap - visitors interacting with information (Copyright Fionnuala Conway & Mark Linnane)

Fig. 3: a close-up of a visitor stepping on a light sensor (Copyright Fionnuala Conway & Mark Linnane)

1 Introduction

The declining health of Irish democracy has been of increasing concern in recent times with low levels of participation, poor representation of groups and in general, a disillusioned population. [1] [2] In 2006, in response to this concern, the Irish Prime Minister established the Taskforce on Active Citizenship to look at ways to encourage a more engaged and active citizenry. [3] The Taskforce have made various recommendations on ways to encourage the development of an active citizenry, including the provision of information as a way to raise awareness of vital issues of concern for citizens. Digital media and technology, used in an artistic way, offer new ways to present information that can make it more attractive, accessible and engaging. The *Art of Decision* research project and exhibition is a creative application of art and technology to raise awareness of Active Citizenship and a novel response to the Taskforce recommendation. [4] The exhibition presents a series of nine interactive multimedia rooms that invite visitors to think about Active Citizenship and their involvement in society and politics. *DATAmap* is the largest room in the exhibition and presents a large volume of factual information on the levels of representation in Irish State bodies, with a focus on gender balance. This paper will first present the focus and motivation for the design. It will then go on to detail the design and creation of the *DATAmap* and will be followed by a discussion of the work.

2 Focus on representation of gender balance

In Ireland, as in many other countries, there is a concern about the inequality and under-representation of certain groups (young people, women and those in disadvantaged areas) in political decision-making. While it is clear that structural changes have to be made to address the barriers to participation from these groups, information and knowledge on these issues can be used to raise awareness of these issues and engage the citizen. The presentation of age, socio-economic and gender-differentiated data is important in understanding the position of these groups in society and decision-making. In attempting to engage the citizen with information, the challenge is to make it appealing, impactful and memorable by making it personally relevant and meaningful so that the citizen feels engaged in a way that forms the basis for action.

The traditional presentation style, for example, of presenting data, such as inequalities, as numbers and statistics is often inadequate in its ability to shock, anger, outrage and, therefore, engage the citizen. Traditional media has a role to play in the presentation of this type of information but often the presentation is a compact summary of a situation at a national level situation. The citizen's experience of information presented as a summary of the regional and national level statistics can be quite removed from their personal experience in their locale and community.

In an attempt to raise awareness of the gender balance in decision-making bodies throughout Ireland, the National Women's Council of Ireland (NWCI) and Department of Justice, Equality and Law Reform initiative involved the development of a life-size photographic exhibition, 'Put More Women in the Picture' depicting the gender composition of statutory bodies at national and regional levels. [5] By representing the numbers of men and women in these institutions as photographs of the actual people, the information is made more meaningful and engaging to the viewer. The exhibition has been displayed in a wide range of settings from locally based community centres to libraries and county buildings and, in situ, displays the information pertaining to the local area alongside national figures. While this presentation goes a considerable way to enriching the presentation of information such as this, art and technology offer new and alternative possibilities for presentation and audience engagement. The artist working with multimedia and technology can exploit these possibilities to present a complex view of many layers of information in an accessible and meaningful way. DATAmap is the novel result of an exploration by the artist into how the interactive installation could be a physical platform for the presentation of the complex set of local, regional and national data on the gender composition of State bodies around Ireland.

3 DATAmap design

The design of *DATAmap* had two purposes: a) to use multimedia to visualise and represent data on the gender composition of State bodies around Ireland and b) to design a physical interface that allows visitors to interact with information through a custom-designed physical space that facilitates a group experience.

INFORMATION VISUALISATION AND REPRESENTATION

In order to point out the breadth of institutions that are making decisions affecting citizens and society, a list of key statutory bodies was made that consisted of a wide range of decision-making bodies including, but not restricted to, those of local and national government. Along with national government bodies such as the Government and Senate, city, county and urban district councils, vocational education committees (VECs), city and county development boards were included as well as boards such as the Arts Council, the Gas board and Fisheries Boards, and others that may not be so immediately obvious to the public. A detailed database of the addresses and activities of each board was then compiled as this would also be used to influence the design. Data on the gender makeup of each of the boards was then gathered by consulting various sources and by telephoning the body and was collated as the absolute numbers and percentages of men and women on each board.

At the information visualisation design stage, it was important to find some way to differentiate the information from each organisation. The activities of each board served to inform the information visualisation as it allowed the artist to visualise and realise an animated scenario in which the numbers of men and women could be depicted, and served to give each board its own identity and personality. Photography of locations where organisations are based was also used in a considerable number of the animations.

Fig. 1

The numbers of men and women on each board are depicted as pairs or couples of symbols related to the activity of the board while also suggesting a gender for each object, and are presented in an animation of a scenario or location that suggests the activity of the board. For example, the scenario presented for each city council is an animation of men as mops and women as buckets arriving to clean a city street, as seen in Figure 1. This is a light-hearted depiction of the idea of inanimate objects having a gender as the 'gendered' objects appear in humorous cartoons that are intended to play with gender perceptions. Alongside the animation, the information is also presented as numbers and percentages of gender composition.

DESIGN OF THE *DATAMAP* SPACE

DATAmap is an immersive installation consisting of a room, built around a large-scale, interactive, colourful floor map of Ireland, designed to allow large groups of people interact with information. The room was designed as a large space, 48 foot long by 24 foot wide and with 12 foot high walls, which immerses visitors in an experience of the information and is surrounded by 6 projection screens that display the animations.

Upon entering *DATAmap*, visitors walk onto a large-scale, colourful map of Ireland covered with sensors marked by small lights, representing the 140 points of information that can be accessed in *DATAmap*. The overall interior design of the *DATAmap* was intended to create a playful space where use of colour, light and materials was important. The map of Ireland is divided into areas according to colours and the area around the map, depicting the Irish sea, is covered in a blue plastic grass-like material. The animations and floor lights are the only sources of light in the room. Figure 2 depicts the space.

Fig. 2

Providing visitors with an intuitive way to understand how to access the information were a core concern in the design of the *DATAmap*. It was important at the data collation stage to record the addresses of the boardsas this information was used to allow the placement of sensors at the geographical location of the organisations. Standing on the sensors triggers the related animation to play on a nearby screen (see Figure 3). However when a visitor steps on a light, only one animation is displayed at a time.

This means that people are 'forced' to watch the current cartoon and wait their turn for the information point they had triggered.
Fig. 3

DATAmap presents a rich experience of complex information in the form of an interactive immersive environment. It is designed to maximize the impact of the information to be displayed and to encourage engagement with the data. DATAmap provides an alternative, innovative and spectacular presentation of information thereby creating an experience for the visitor that is unusual, fun, thought-provoking and memorable.

INFORMATION VISUALISATION AND REPRESENTATION

DATAmap draws attention to a broad definition of the decision-making structure by presenting information on the number of men and women in a wide variety of bodies that may not typically be associated with political decision-making. For example, presenting information on government institutions is to be expected, but presenting information on bodies such as the Gas Board and Arts Council, bodies that also make decisions that affect the citizen draws attention to the wider decision-making sphere.

The use of animation facilitates the presentation of complex information as it allows three layers of information be presented in one, presenting data in the form of numbers, percentages and the creation of a unique scenario that gives the visitor some information on the activities of each organisation. The use of familiar locations in the design of the animations draws the visitor's attention to the significance of the information in their locality or community. The use of humour and familiar locations brings the data to life, makes it more appealing and personal to the visitor, therefore, has a stronger representation in the person's mind. The arbitrary assignment of gender generated much discussion, and this also served to encourage people to explore the room as they were curious to see how the other decision-making bodies are depicted.

INTERACTION WITH INFORMATION – THE MAP OF IRELAND AS AN INTERFACE TO INFORMATION

The map of Ireland, as a metaphor to engage with information from around the country, serves as an accessible framework that conceptually and geographically situates visitors in a landscape that is familiar to them, It is a strong visual and spatial cue to the visitor that they are being presented with information of local, regional and national relevance and helps visitors relate to their own area while also keeping an eye on the general national situation. The interaction with the space and information proved easy to learn as people could orient themselves in a space they already understood. Visitors to the space engaged quickly with the landscape and often would move immediately to a location that was familiar to them (where they lived or were born).

Providing visitors with an intuitive way to understand how to access the information was another concern in the design of *DATAmap*. In designing an interactive work with a physical interface other than the conventional mouse and keyboard, there is typically a concern that visitors may not understand the in-

terface. As the light sensors are mounted at the same location as the information point, visitors understood how to access information. The large amount of light sensors embedded in the map draws attention to the points of information and people naturally uncovered the interactive element simply by walking across the map.

The playfulness of the presentation encouraged visitors of all ages to physically engage with the information by moving and exploring the rich terrain of information. As they discovered information on a location, they became curious to discover the information in other locations to compare and contrast the information. Overall this interface provides an intuitive and familiar metaphor for visitors to understand what the space is presenting and how to interact with the information.

FACILITATING A GROUP EXPERIENCE OF INFORMATION

The scale of the room is intended to facilitate groups of up to forty people. The non-linear presentation and interaction with information through the use of sensors meant that visitors were free to move around the space and not be attached to a computer presentation. To encourage conversation and collaboration, the animations present one point of information at a time. As people waited for their turn to interact with the system, they would begin to talk to one another and this encouraged people to collaborate with each other in discovering the information. Groups of people, often strangers to each other, would begin talking to each other and discussing the animations and numbers. People would begin explaining the artwork to visitors who were trying to understand the piece. It was also observed that people would work together to compare data from different locations around the room. This collaboration seemed to reinforce the experience of the information.

A SPACE FOR REFLECTION

A crucial consideration in the design of the room was to create a large comfortable space where people feel encouraged to congregate, spend time and reflect on the information presented and interact with others visitors. The design of the space meant that the visitor was immersed in a rich visual experience. The only light in the room came from the projected animations and the light sensors. This drew attention to the visual spectacle of the animations and illuminated floor and created a strong feeling of immersion.

5 Conclusions

The role of the artist as an author of information is apparent in *DATAmap*. The artist exploits the possibilities of multimedia and new technologies to create a space for experiencing information and encouraging a playful discovery of that information. The artist exploits the possibilities afforded by multimedia and technology to maximize the impact of this information and thereby creates a new way for citizens to engage with information. There is also a conscious effort on the part of the artist to bring the artwork to the community. In doing so, the space not only represents a place for experiencing information but it also becomes a platform for congregation, reflection and discussion on issues pertaining to the community. The artwork becomes a locus for interaction and discussion and allows people to have a rich experience of issues around Active Citizenship.

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PROPAGATING TRANSDISCIPLINARY THEORY

Wendy Coones

The propagation and cultivation of an international field requires diverse and concerted efforts. Between formal education curricula, digital and print dissemination points, common research tools, national / international collaborations, and continually developing interaction structures; a poly-cultural space can evolve.

Library Plan, detail 4th Floor: Action – Orientation. 2011, The Warburg Institute, University of London, School of Advanced Study.

Propagating Transdisciplinary Theory

Transdisciplinarity for Theory

The theory and actuality of Transdisciplinarity are currently being written, with examples like large research institution's staffing, [1] international scientists / theorists [2], curricular practice [3], and national academies [4]. This emerging understanding of intellectual practice is, "ranging from a diffuse

conceptual term located above individual disciplines" [5] to proposals for Transdisciplinary Universities. The panel for which this paper is presented at the ISEA, Istanbul 2011 includes Transdisciplinary Research and Transdisciplinary Practice, with a larger view to inform the Leonardo Education and Art Forum (LEAF). So, how can the education of theory, the humanities, also benefit from a transdisciplinary approach and become a Transdisciplinary Theory? What we are looking for is an undefined direction in a not yet existing world. Of the various disciplines related to the Visual Arts, Science & Technology, those who may contribute to a transdisciplinary discourse are defined or discovered by the question needing to be answered. As the needs for theory to lend its hand towards tackling a real-world problem arise, the necessary participants are determined. These participants may be separate people coming from separate fields, like in a classic interdisciplinary or cross-disciplinary cooperation, but it is the fact of focusing around a common question lying in an unknown space which transforms the interaction into transdisciplinarity. It is a co-evolution, co-creation, co-existence, co-operation all impressed today by the digital revolution.

Although transdisciplinarity is a relatively new term, there are elements of its practice that seem quite familiar. Transdisciplinarity questions focus around real-world problems that cannot be sufficiently answered by one discipline. The combination of skills and knowledge sets necessary to take on a particular question is determined by the stakeholders and the potential uses for the answer. This resembles in many ways the learning theories of Constructivism and Applied Academics. The Santa Fe Institute was created 25 years ago when a lunch group of Senior Scientists from Los Alamos had the idea of starting an institution where scientists could pursue problem-driven science (versus the usual imperatives of paradigm- or funding-driven science) directed at 'hard' problems. [6] The 'hard problems' being set forth in complex systems research needing physicists versed in chaos theory, mathematicians, climatologists, computer animators, and more. Any use of a transdisciplinary approach put towards a question of the humanities, a question of theory, would also find the necessary "disciplines" already imbedded within the nature of the question, its stakeholders, and the use of its outcome.

CONCEPTUAL MODELS

Two conceptualizations for what this space of inquiry might look like, this 'trans' in transdisciplinary seem fruitful to bring into the discussion. One is Basarab Nicolescu's concept of the 'Hidden Third.' [7] That between the object and the subject of a problem lies a Hidden Third element that must be discovered anew each time. For the purpose of education, this means that an assignment from one year to the next, with generally the same objects and subjects, might have a completely different set of questions that arise from year to year. This Hidden Third is difficult to write into a curriculum plan, and ever more difficult to describe in a research proposal.

The second conceptualization is the historical poly-cultural planting practice of many Native American tribes who planted the 'Three Sisters;' corn, beans and squash. All three were planted on a mound together, the corn grew first, creating a stalk for the beans, the beans provided nitrogen for the soil, the squash covered the ground, inhibiting weeds and insects and acting as soil shade and waste recycling. Some even planted a fourth sister 'bee weed,' that encouraged pollination and was used for food, medicine and dye. It is possible to plant all these crops separately, requiring increased resources, but the poly-cultural system is more efficient and works even in the most difficult environments. The needs of one plant (vine needing pole,) leaves off where the characteristics of another begin; a kind of good

neighbor system. A truly transdisciplinary approach to theory would find the combination of these Sister Plants best suited for growing in the space of Nicolescu's Hidden Third.

CURRENT EXAMPLES – MEDIAARTHISTORIES AND IMAGE SCIENCE

Between formal education curricula, digital and print dissemination points, common research tools, national / international collaborations and continually developing interaction structures, a poly-cultural space for transdisciplinary theory can evolve. Two examples to be brought into the discussion are the endeavors and activities of the Department for Image Science at the Danube University during the past 5 years, and the international platform www.MediaArtHistory.org and its international conference series.

The first Media Art History conference in the series took place at the Banff New Media Institute in 2005. In the fall of 2004, a broad call for papers was announced, encouraging submissions from the following fields: *art history, anthropology, architecture, computer science, collecting, cd-rom & dvd creation, cultural studies, curating, cyberfeminism, documentation, ethnography, film studies, history of science, history of technology, image science, interaction, interculturalism, media archaeology, media art, media studies, museum direction, museum exhibit creation, nano arts, performance, photography, pop culture, presence research, preservation, psychology, robotics, scenography, science writing, semiotics, sociology, sound studies, supercomputing, teaching, theatre, videography, and visual culture.* Over 300 scholars responded and colleagues from 19 different fields presented papers at Refresh! The First International Conference for the Histories of Media Art, Science and Technology. Currently the 5th conference in the series is being planned for 2013, with no end for this transdisciplinary international conference series in sight. Focused around questions of common interest, answering the call for papers with themes bridging the spans between disciplines, the outcomes of this conference series are strong and continue to evolve. The MediaArtHistoriesArchive is the digital text repository of this new field, perhaps it is one of the newest transdisciplinary fields in the humanities created during the current digital revolution.

The Department of Image Science at the Danube University in Krems, Austria is currently the only higher learning institute of its kind conducting research and offering post-graduate studies in the field Image Science. The field of Image Science is translated in German as Bildwissenschaften, which means the study or science of the image, with "image," including everything from moving, still, historical or conceptual images. It draws from the academic pursuits in: *Art History, Archeology, Philosophy, Psychology, Ethnology, Media Studies, Communication Studies, Film Studies, Semiotics, Political Science, History of Science*, with relations also to: *Computer Science, Computer Visualization, Cognition Studies, Biology, Physics, and Medicine*. These are disciplines and theories that cluster around the image and their connections, images that cross normal academic boundaries. One of the fathers of Image Science, Aby Warburg organized his library on the "Law of the Good Neighbor" (Gesetzt der guten Nachbarschaft) and gives a primary example how Image Science is a historically transdisciplinary field. As Leland de la Durantaye explains, "the various sections and the books within them were arranged as a function of their ability to engage with the books on either side of them…. Visitors to Warburg's Library are thus confronted by an enigma – so intensely that upon first entering it Ernst Cassirer declared that one needed either 'to flee from it' or 'to remain there a prisoner for years.'" [8] The complexity and ingenuity of the Warburg Library connections can be seen in Fig. 1. Resembling the poly-cultural Three Sisters, the curricula and research strategies of the Department for Image Science bring together a variety of mutually beneficial theories and disciplines based on the problem to be addressed, with a curriculum constantly evolving to

fit the needs of the field and the larger questions related to the image. The breadth of theoretical questions requiring a transdisciplinary approach demand an open, fluid and poly-cultural oriented Image Science.

DIRECTIONS NOT CONCLUSIONS

Between the Media Art History Conference Series with its archives and the research and teaching at the Department for Image Science, a path in a larger transdisciplinary direction is being developed. Both are in pursuit of an unknown future (a Hidden Third), which constantly changes course and evolves. Just as Transdisciplinarity Research and Transdisciplinary Practice can be conducive to approaching over-arching questions, so can larger theoretical questions requiring a complex system of inquiry bring together mutually beneficial theories in a transdisciplinary way.

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FROM WEIGHTLESS WORLDS TO HYBRID HOMES: RETHINKING THE EXTRA-TERRESTRIAL

LEONIE COOPER

The space station and the virtual world are worlds, both real and imagined. Questioning established ways of imagining the extra/terrestrials, this paper provides a snapshot of a poetics of thought that can situate these seemingly disparate realms in productive relation to each other in order to address the ambivalence that is activated when they are inhabited through media technologies.

Introduction: Connecting Events

In a post by General Motors on my Facebook feed on March 19, 2011, a video recording of two astronauts unpacking the crate that contained the first robot to inhabit the ISS, Robonaut 2, appeared. In itself, the posting of this video was no surprise as NASA continues to extend the theatrics of space that it first choreographed during the Space Race in the 1960s with the use of television into the realm of social media. In a manner not so dissimilar to the collective audience constituted for the Moon Landing and other subsequent events, I was asked to bear witness to another milestone in space exploration and research. Yet watching this event I was reminded of another that also occurred 'on' my computer screen only two days earlier on March 17, during which a different form of astronaut struggled into existence. After I had manoeuvred my avatar to take a seat to watch a presentation by another avatar, Archivist Llewellyn, at the *Virtual Worlds Best Practice in Education* conference in *Second Life*, I waited with the audience while the speaker attempted to 'rez', without success, in the form of an astronaut.

Speaking of these micro-events in parallel points to a larger project I have undertaken into investigating the relations between space travel and screen media including film, theme park attractions and virtual worlds. Space travel has much to offer as a hermeneutic pathway into the figuration of the film screen as a space to be navigated, but my concern here is with media habitats, and with how both the space station and the virtual world operate as such. To make this argument, however, a central problem must be faced: how to conceive of these habitats as being in a relation of mutual constitution without resorting to a form of analogous thinking that has served to insulate these worlds-that-are-weightless from the tensions that are activated when they are imagined as, often paradoxically, capable of inhabitation.

Testing out the extra/terrestrial

Within the microgravity conditions of the space station, the astronaut floats. In the video of Robonaut's unpacking, their almost slow-motion gestures as they remove the foam padding surrounding 'him' signifying that their world is inherently different from that which their audience occupies. Weightlessness: it is the essential problem meant to be resolved by the psychologists, designers, behavioural scientists, anthropologists and others in the service of research into extended human spaceflight. It is also the symbolic condition that has constituted this extra-terrestrial habitat as ontologically different and enabled artists to explore what Eduardo Kac calls "antigravitropism", the capacity to create forms not constrained by gravity. [1] Even with persistent exposure to live 'feeds' from the space station, this phenomenon still fascinates as exemplified by the amount of attention that was paid to the unruly nature of

mission specialist Sandra Magnus's hair during a video call from President Obama on July 21, 2011 (designed to assure the crew that this last mission of the shuttle *Atlantis*, and the end of the American shuttle program, would not affect humankind's onward journey to the stars).

Yet, the marking out of the ontological conditions that appear to separate this world from the terrestrial has not stopped it from being imagined in terms analogous to other habitats. In studies on the effects of life in orbit on human inhabitants, research often occurs within 'space-like' environments on Earth where the terrain mirrors the harsh conditions in space and the habitats mimic the psychological and social conditions aboard the space station – the most current (webcasting 'live' of course) being at the Black Point Lava Flow in northern Arizona is NASA's 14th Desert Research and Technology Studies (RATS) mission. *The Deep Space Habitat* in the Arizona desert works in parallel to its off-world counterpart: both operating as diagnostic environments not so different to the training situations in the simulator that characterised the early days of American space travel and figured the astronaut, as Tom Wolfe ironically put it in his book *The Right Stuff*, as "a lab rabbit curled up motionless in a capsule with his little heart pitter-patting and a wire up the kazoo." [2]

Constructing such analogous relations might be necessary for research into the embodied effects of extended spaceflight but it is an epistemological process not without bias. In his study of space law, M.J. Peterson has argued that a form of analogical reasoning was key to Russia and the United States forming (at least preliminary) agreement on how terrestrial laws should apply to extra-terrestrial contexts. Whereas Russia likened outer space to the near-earth environment of aerospace, the United States advocated for an analogy with the high seas, an argument not surprising given the frontier imaginary that has fuelled the American political landscape and its discourse on space exploration. A process of "mutual persuasion" occurred, Peterson has argued, by isolating potentially useful analogies, mapping features from the source domain to the target domain (which is outer space in this case) and then transferring inferences about the existence of other features to create a model that was seen to best fit the situation. [3] To make reasonable inferences about one domain based on its likeness to another might be a process of cognitive reasoning, as Peterson argues, but the selection of the features that were inferred from the high seas to outer space depended as much on their phenomenological pull as their epistemological weight.

In other words, while analogous relations between the extra/terrestrial have been historically generated from a purportedly rational process of observation, their force depended primarily on a form of "thinking in images", a process that Michel Le Doueff argues has fundamentally informed Western scientific and philosophical thought. [4] The work of this imaginary has enabled authors such as Arthur C. Clarke to poetically figure the space station as an island floating in the sky in order to then articulate the knowledge-making processes, the 'science', that he puts to work upon it. [5] Much like Kant's island to which Le Doueff turns her attention and the phenomenological resemblances that allowed outer space to be considered similar to the 'high seas', imagining the space station as a floating island maintains the ontological difference of this weightless domain without undermining the symbolic gravity of the scientific enterprises that occur upon it.

Extending upon Le Doueff's argument, this poetics of thought enables the marking of ontological borders and yet its figurative work must be disguised. The operations of this imaginary (operating where, Le Doueff argues, it is not "meant to belong") can be traced in the video of Robonaut 2's assembly. [6] The box that contains Robonaut 2 is a microcosm of the space station itself. Unopened, it promises an array of components, neatly packaged, wrapped in plastic and Styrofoam. This chamber with its secrets

speaks of a closed hermetic world, set apart from the terrestrial in its clinical modularity. With the astronaut's hair floating like a halo as she lifts the lid of the box with seemingly little effort, its opening only testifies to the ongoing allure of this weightless world. Even when the lid is lifted to reveal that this crate is empty and no assembly is actually required, this emptiness only figures the space station as equally empty, as placeless place floating within a void.

Yet, and at the same time, this exercise is figured in terms analogous to the terrestrial. Assembling a robot might be a matter for scientists and engineers, but unpacking it is familiar territory to those who occupy the space station and who must also figuratively operate as interior decorator and housekeeper. Whether it is the familiar routine of unwrapping presents around the hearth or installing another component within the Deep Space Habitat in Arizona, the delivery of this newest addition to the ISS renders the symbolic operations that occur within this domain as essentially similar to its analogical situations.

The inherent problem with this imagining of the space station as habitat is that it perpetuates the ontological split that has informed much thought on space travel. Those who have spoken of the desire to 'go into space' must negotiate a conundrum: space is either figured as an 'imaginary' realm that enables those who are bound to the terrestrial to make sense of the symbolic and material effects of science and technology or one that tempts the so-called Earthbound into flights of figurative fancy that deny the ethical weight of lived terrestrial conditions. Thus, Constance Penley can argue in her study of NASA/TREK, a "hybrid" cultural terrain where the actuality of space travel intersects with its imaginary conditions as enacted in the television series Star Trek, that "going into space" is a primary mechanism for making sense of science and technology. [7] However, for others to go into space, or even to imagine so, is to fall "prey to 'ascensionism'… a general psychic orientation towards brightness, levitation, flying, climbing, upward pointing and moving." [8] Even Penley cannot avoid this trap as she begins her book recalling childhood trips to Kennedy Space Centre to watch rocket launches – a journey where what was real and what was only a dream were meant to blur. Such utopian imaginings can easily be conjured to serve the opposing argument: David Lavery, for example, recalling a dream in his critique of the desire to escape Earthbound conditions, but in his case one that was a nightmarish "nothing"… "blank, dark and abysmal: no light shone on it from any source." [9]

Beyond the extra/terrestrial: of real-and-imagined worlds

Can the space station and the labour of those who struggle to inhabit this weightless world be imagined without reconstituting this dilemma, where the 'Spacebound' and the 'Earthbound' are inevitably split? Moreover, can a world where avatars appear be considered in the same light as one in which robots are assembled, where the first is an environment generated from software and the second capable of being physically inhabited (albeit only at the risk of physiological harm due to radiation, calcium loss, muscle atrophy and the psychological effects of isolation and cramped conditions amongst a multitude of complex factors)? It might be possible, if a cue is taken from Edward Soja's thinking on "real and imagined worlds." [10] Soja uses this term to acknowledge the materiality of physical space(s) but to also understand how such space(s) are conceived, imagined and represented. In his terms, the space station is a world both real-and-imagined. Without denying its material differences as a physical environment, life aboard the space station has always been as much a matter of Imagineering, to use the term employed by the designers of the Disney theme parks, as engineering. The 'space' of the station is the contemporary equivalent to the mise-en-scene choreographed by NASA for its astronauts and it is designed so that its temporary inhabitants are as much viewers as figures for viewing: apertures act as windows through which astronauts have viewed (and photographed) the Earth and as doors that enable them to

perform the necessary social rituals of greeting each other as they move between modules performing their daily tasks, or saying farewell as they depart back to Earth – with all such scenarios perennially on view, courtesy of NASA TV.

Moreover, the station now operates as much as a world articulated upon the computer screen as a satellite circling the Earth. This physical infrastructure compiled from trusses and girders, nuts and bolts is no longer just symbolically tethered to the Earth by the transmission and reception of data packets. In service to the techno-scientific imaginary of Western thought as a sign that the parallel trajectories of cyberspace and outer space that have been tracked from the launch of the first satellite *Sputnik 1* have finally converged, it is bound to dissolve into the kind of super interplanetary datasphere ideally envisaged by journalists when they witnessed the Jet Propulsion Laboratory choreograph the *Pathfinder* mission in 1997 as a short-term, high-visibility media event required the development of a web portal and the ability to replicate, store and transmit Martian images and information across a commercial infrastructure of 1,300 reflector sites worldwide. Moving far beyond the communications network of weblogs, LAN networks and email envisaged as necessary to keep astronauts "in touch" with the "Earthbound" and to form a "viable" community of their own by researchers in media and communications, [11] the space station is now a fundamental component for the operations of NASA's desktop universe; perpetually online, feeding information, images, video and animations 'live' to our social networks. The unpacking of Robonaut 2 – indeed, the 'transmission' of the video that is archived on NASA's video gallery – is significant then for not only what it captures but its perennial availability, able to be accessed and 'regenerated' at each click of the play button.

If the space station is now key to NASA's cosmos on the computer, as much online as it is in space, life in space has also become a common means of poetically rendering online, multi-user worlds such as *Second Life*. Archivist Llewellyn's choice of an astronaut as their in-world representative is both indicative of their work as an archivist for *NASA CoLab* – an island within Second Life where a visitor can discover all the accoutrements of space travel ranging from rockets to lunar rovers – and the fact that the topography of space travel is now integrally embedded within the computational terrain of this virtual world. Parallels between the space station and the virtual world extend beyond the use of space-age iconography. The imaginary that has enabled the space station to operate in terms analogous to other habitats and act as a floating island set apart from terrestrial conditions also infiltrated early thought on virtual worlds. Self-proclaimed 'pioneers' of such worlds, during their 'adopter' period in the 1990s imagined them as islands floating within the oceanic vastness of the Net. With its emphasis on building, Second Life appears to have become the most fertile ground to establish relations with life aboard the weightless world of the ISS. Whereas the cybernaut and the astronaut might have once been rendered kin as they navigated their respective spatial realms of cyberspace and outerspace, now the astronaut and/as avatar is the configuration that enables the assembly of these worlds for inhabitation, particularly if the activities of a group of Second Life residents, currently numbering sixty-four, who advertise their services as "space riggers" on NASA CoLab are taken into account.

Soja's term, real-and-imagined, has been invoked in regard to virtual worlds, and Second Life in particular, to foreground the complex spatialities emerging between online and offline environments in distinction to viewing what is built in-world, in this case artwork, as analogous to its offline counterpart in the gallery. [12] His conjoining of the real and the imagined also offers a means of recognising that the virtual world and the space station might both operate as real-and-imagined worlds without denying their unique material conditions. However, his adoption of a form of both/and… also thinking is equally important and particularly significant if the complex and contradictory processes that have constituted both these real-and-imaging worlds are to be recognised.

Conclusion: The strangeness somewhere in-between…

The task of unwrapping Robonaut was another opportunity for the astronauts aboard the ISS to perform for those 'back home' at Mission Control as they pretended to all those watching that the crate containing the robot was empty, their labour a means of making the techno-scientific matters of robot assembly familiar and fun. Consider Robonaut 2's assembly as another figurative articulation of the space station as a real-and-imagined world and the imaginary processes that have constituted it as such begin to become apparent. Yet, the epistemological work of this imaginary remains unaffected. The astronauts labour only to draw attention to that which is empty and, in turn, to a weightless realm that awaits the symbolic gravity of an analogous domain.

View Robonaut 2's and Archivist Llewellyn's acts of dis/appearance as emerging from the interstices between both real-and-imagined worlds and the poetic rendering of these worlds as weightless domains that can only be inhabited by those who are 'Spacebound' or 'Netbound' is not such an easy endeavour. In her work on "thinking in images", Le Doueff has suggested that, rather than disguising the work of the imaginary, philosophical thought should recognise the "quality of strangeness" that is necessarily activated when image-making is put into the service of science. [13] Extend such an argument to the realm of techno-science and space travel, and instances of this epistemological tension are evident. Sending men and women to the stars has always been a troubling matter: those returning from the Moon looked more like aliens than pilots; the starlight that penetrated the retinas of those bodies transported within capsules from the Earth more often rendered as displays of potential ruination than illumination whilst the figures transmitted back to Earth appeared more to be ghosts than star-voyagers. [14] This ambivalence towards the confusion of ontological and epistemological borders persists as NASA continues to design the cosmos as a kind of desktop universe. Soja's thinking is useful in that it not only foregrounds the space station and the virtual world as both real-and-imagined worlds but enables them to be situated in a productive set of relations. Such a both/and poetics of thought is important as it also points beyond established thinking on the relations between the extra/terrestrial towards the ambivalence that is activated when these strangely compelling realms are both imagined as worlds for inhabitation.

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AVOL - TOWARDS AN INTEGRATED AUDIOVISUAL EXPRESSION

Nuno N. Correia

AVOL is an interactive audiovisual project for the Web by Video Jack (Nuno N. Correia and André Carrilho). Its main objective is to allow for an integrated musical and visual expression, in a way that is playful to use and engaging to experience. In this paper, the project is presented and contextualized with related works. Its design is then discussed. Finally, results of the project's evaluation are outlined, allowing for conclusions to be reached.
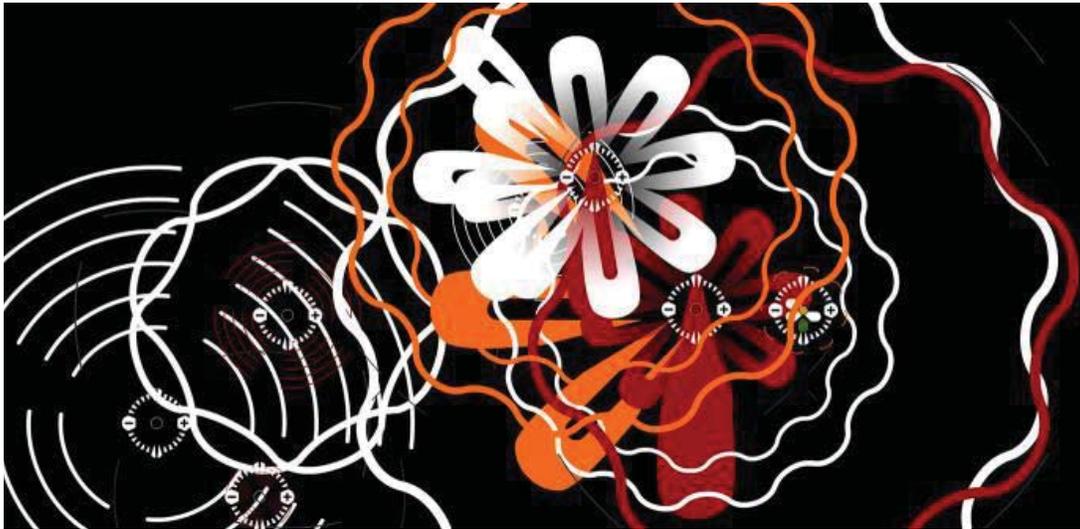
Fig. 1. Screenshot from AVOL, showcasing the second set of visuals. @ 2007/2011 Nuno N. Correia & André Carrilho.
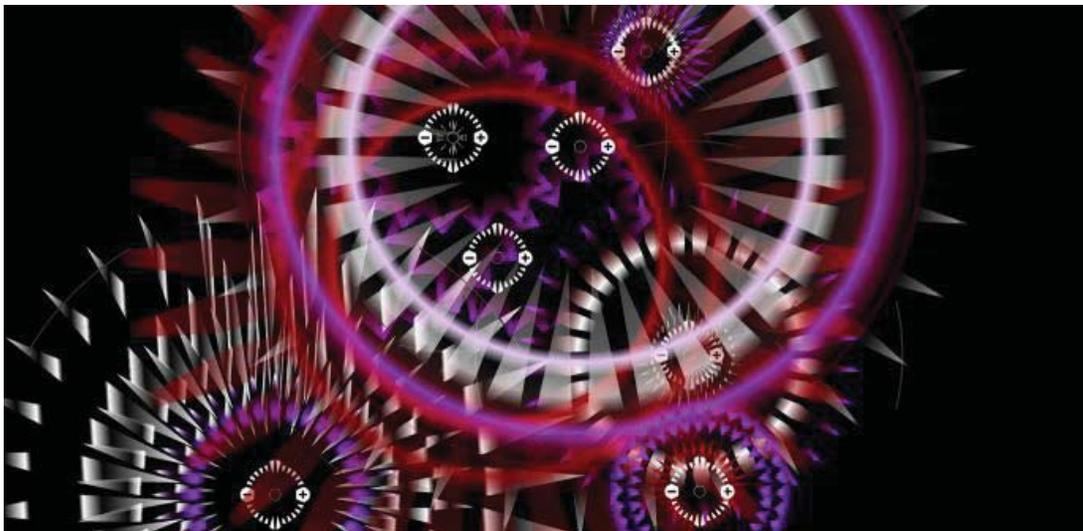
Figure 2. Screenshot from AVOL, showcasing the third set of visuals. @ 2007/2011 Nuno N. Correia & André Carrilho.
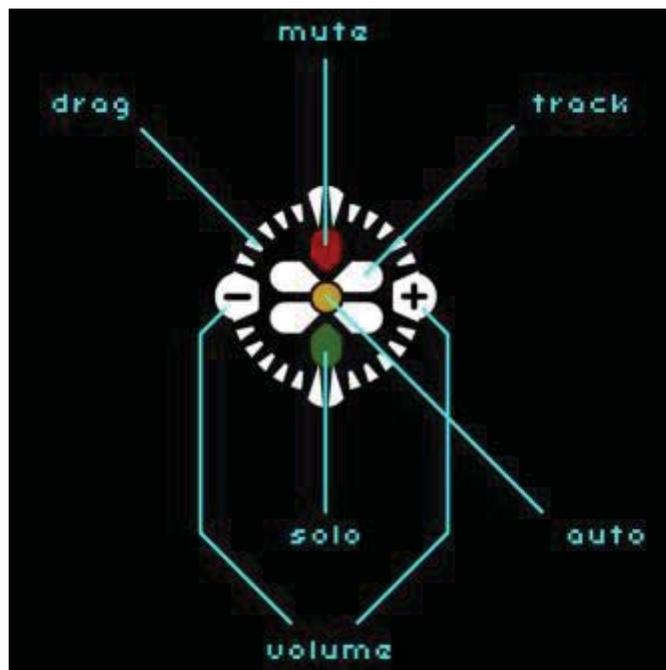
Figure 3. Diagram of an IAVO in AVOL. @ 2007/2011 Nuno N. Correia & André Carrilho.

1. Introduction

AVOL (AudioVisual OnLine) is an interactive audiovisual project for the Web (http://www. videojackstudios.com/avol) by the author and André Carrilho, under the name Video Jack. The program-ming and music were developed by the author, while André Carrilho was responsible for the graphic de-sign and animation. *AVOL* was released in December 2007, and further developed until 2010. It was one of the four winners of a call for projects by the Arts Department (DGA) of the Portuguese Ministry of Culture for their newly created net art portal. It follows up on previous audiovisual work by Video Jack such as *Heat Seeker* and *Idiot Prince* (both 2006). The project aims to allow for an integrated musical and visual expression in a way that is playful to use and engaging to experience.

AVOL was presented as an installation at several new media festivals in 2008: Cartes Flux (Espoo), Re-New (Copenhagen), Create (London) and Live Herring (Jyväskylä). In the same year, it was also pre-sented as performance at Abertura Festival (Lisbon) and at Electro-Mechanica (St. Petersburg). In 2010, due to the redesign of Video Jack's website (http://www.videojackstudios.com), and in order to better showcase the possibilities of *AVOL*, new videos and music tracks based on the project were released on-line. At that time, three of the music loops in the project were updated.

AVOL can be contextualized with a wide range of works that have attempted to create integrated audio-visual experiences. The pursuit of correlations between music and visuals has a long history, from An-cient Greek philosophers such as Aristotle and Plato to renaissance artists, notably Arcimboldo. [1] The development of cinema allowed for further approaches in this field. Innovators such as Walther

Ruttmann and Oskar Fischinger explored combinations of music with abstract animation. [2] A new generation of artists, notably John Whitney, pioneered the use of computers to create visual music films. More recently, artists such as Golan Levin and Toshio Iwai have taken advantage of developments in computer technology and human-computer interaction (HCI) to create playful interactive audiovisual experiences. Both Levin's *Audiovisual Environment Suite* (*AVES*), "an interactive software that allows for the creation and manipulation of simultaneous visuals and sound in real time"; [3] and Iwai's *Electroplankton*, a musical 'toy' for Nintendo DS consisting of an aquatic universe "filled with different species of plankton that can produce sound and light when you interact with them," [4] were important influences for *AVOL*.

2. Project Design

In *AVOL*, the visuals and music, together with the graphical user interface (GUI) that controls them, are grouped in seven 'objects' entitled IAVOs (Interactive AudioVisual Objects). The visuals consist of abstract concentric vector animations that are audio-reactive. The reactivity to each sound is based on the scaling of the respective animation proportionally to the sound amplitude.

IAVOs contain four audiovisual options – four pairings of sound loops and animations. Therefore, there are a total of 28 interchangeable sound loops and animations in the project, allowing for numerous combinations. Each of the four content options has a differentiated character (in terms of color, shape, animation, and sound palette). In addition to buttons for triggering the four content options, each IAVO contains in its GUI buttons for: stop; solo; automatic motion; sound volume (which also affects the scale of the animation); and a draggable area.

Each IAVO has its own sonic nature (for example, 'bass drum' or 'guitar'). All sound loops have equal duration and tempo (16 seconds and 120 beats per minute respectively) and are synchronized. They were composed with the purpose of being coherent and harmonious independently of the active combination of sounds. The collision of two IAVOs triggers a custom sound.

2.1 ANIMATION AND VISUAL DESIGN

André Carrilho tried to differentiate the four content options of each IAVO with different types of shapes, using modular compositions based on one or two simple elements. After finding the basic graphic elements, he would animate them with the movement suggested to him by their shapes. The shapes also inspired the choice of color. For example, the color palette of the second animation set (triggered by the second button in each IAVO) is white, red and orange, while the one in the third animation set is blue, blue-grey and white. There was an interpretative differentiation between animations according to the nature of the corresponding sound, mainly between rhythmical sounds (the first four, counting from the left) and melodic ones (the last three). For example, in the second animation set, the four 'rhythmical' animations are based on simple circles, while the three 'melodic' ones are based on a circular wave pattern. Despite these nuances, the animations were designed to be harmoniously interchangeable. Each animation contains two elements, an audio-reactive component and a non-reactive one, in order to convey current volume level and ensure that the animation is visible even when the sound amplitude is low.

The use of vector graphics is an important element in *AVOL*. It ensures that the animations are scalable and react fluidly to sound. It also guarantees a faster loading time of the website. The animations had to be as 'light' as possible, and not too complex in terms of shape or motion, due to computer performance restraints. But Video Jack believe that technical constraints may help to focus the creative process and lead to a coherent whole.

The animations, although abstract, suggest natural shapes of different scales with a concentric nature, such as atomic, cellular, floral or planetary imagery. The visuals in*AVOL* resemble John Whitney's concentric animations. Quoting Gene Youngblood's description of one of his animations (which could apply to *AVOL*): "all colors move into the ring simultaneously from all sides, forming circles within circles all scintillating smoothly in a floral configuration." [5] There are also similarities between the 'objects' in *AVOL* and the organisms in *Electroplankton*, even more apparent when collisions occur.

2.2 INTERACTION DESIGN

The interaction design of *AVOL* aims to achieve an intuitive experience and to foster exploration by its users. As an example, the 'stop', 'auto' and 'solo' buttons within the IAVOs follow a traffic light metaphor. As Jakob Nielsen states, metaphors "can facilitate learning by allowing users to draw upon knowledge they already have about the reference system." [6] The visual design of the ring, with its rough edges, is meant to convey a 'click-and-drag' affordance. According to Donald Norman, affordances refer to "the perceived and actual properties of the thing", in particular those "that determine just how the thing could possibly be used." [7]

An important element of *AVOL* is the aesthetic integration of the GUI with the animations. The design of the GUI with its petal aesthetics reinforces the floral visual undertone.

3. Evaluation

As designer and user of *AVOL*, the author considers that the project achieved its objectives in terms of playfulness and engagement, due both to the IAVO approach of integrating audio-reactive animations with the respective GUI elements, and to the harmony, coherence and mutual agreement of the audio-visual content. However, the author detected several shortcomings in *AVOL* that constrain its potential for creativity and expression. After the release of *AVOL*, Video Jack started designing a new project that would address these issues. In 2010 the new project, entitled *AV Clash* (http://www.avclash.com) was released. Following this release, the author planned a questionnaire to users of Video Jack projects, including a section comparing *AV Clash* and *AVOL*. This section would allow him to evaluate if his initial conclusions regarding *AVOL* would be confirmed by users.

3.1 *AV CLASH* – FOLLOW-UP PROJECT AND BENCHMARK

AV Clash intends to solve some of the insufficiencies detected by the author in *AVOL*, mainly its scarce audio manipulation options and its limited amount of sounds and visuals. In order to access a larger amount of sounds than *AVOL*, *AV Clash* connects to*Freesound.org*, an online sound database. Approximately 240 sounds from *Freesound.org* are used in *AV Clash*. The project also contains a larger number of animations (96) than *AVOL*. Audio manipulation capabilities include audio effects ('echo' and 'filter') and sound trimming. [8]

The sound character of *AV Clash* is substantially different than *AVOL*: the sounds are not synchronized; they have different durations; and they have a much more diverse nature, ranging from field recordings of nature and voice recordings to synthesizer sounds. Some usability improvements where introduced, such as color-coding of IAVOs and usage of 'info tips'. Nevertheless, there are several common elements between *AV Clash* and *AVOL*: a similar visual style (abstract concentric vector animations); a similar IAVO approach of integrating sound visualization with GUI (although the number of IAVOs was reduced to four due to performance issues); and the same audio reactivity behavior, based on animation scaling.

3.2 QUESTIONNAIRE AND RESULTS

In the first half of 2011, an online questionnaire was setup to evaluate *AV Clash*. The questionnaire contained closed and open-ended questions, and was answered by 22 anonymous respondents. It included questions comparing *AV Clash* with *AVOL*. From the answers to these questions, important insights can be reached regarding *AVOL*.

AV Clash seems to have been more successful than *AVOL* in terms of engagement. Approximately three quarters of the test users (16) have spent more time interacting with*AV Clash* than with *AVOL*. Half of the users (11) attributed this to the additional manipulation options. Approximately two thirds (68%) of the respondents consider the possibility of accessing a larger amount of content in *AV Clash* to be appealing, against 27% who do not. One of the users is indifferent. Half of the test users consider the additional audio manipulation options in *AV Clash* to be interesting, against 18% who do not. Nearly one quarter of the respondents are indifferent. These results show that users value the additional content and functionalities of *AV Clash*.

When asked which project had a more enjoyable sonic and musical approach, 41% of the test users chose *AV Clash*, against 32% who prefer *AVOL*, with 27% enjoying equally both. The test users who preferred the sounds in *AVOL* mentioned the synchronization of the loops, the curation of sounds, and the inclusion of percussive elements as factors for their choice. Regarding ease of use, 36% of respondents consider *AV Clash* to be more intuitive, whereas an equal percentage of users reply that *AVOL* is easier to use. 27% consider that they are on the same level regarding intuitiveness. When asked the reasons behind their choices, six out of the eight users who considered *AVOL* more intuitive mention the simpler interface and fewer options as the reasons for their choice.

The majority (59%) of the respondents considered that *AV Clash* gives a higher feeling of creativity than *AVOL*, whereas only two users chose the latter. Nearly one quarter of the test users answer that both projects are on the same level regarding this issue, and two users do not get a feeling of creativity from either. From the 13 respondents who consider that *AV Clash* gives a greater feeling of creativity, seven mention more manipulation options, and another one more variety in sound, as reasons for their preference. One of the test users who consider *AVOL* to offer a more creative experience mentions that the sounds "fit together nicely", adding that switching between them created interesting results. From the respondents who were indifferent to or dissatisfied with the level of creativity allowed by these projects, one user considers that both projects shape the sound and visuals too much to allow for his/her own creativity, and another mentions that the projects are "too structured".

4. Conclusions

Despite the low number of respondents to the questionnaire (22), some useful insights can be reached regarding *AVOL* and interactive audiovisual projects in general. The results from the sections of the questionnaire comparing *AVOL* and *AV Clash* confirm the insufficiencies detected by the author in the former: the limited content and the few manipulation functionalities result in less creative options and a more restricted expressiveness. The majority of users consider that *AV Clash* gives a higher feeling of creativity. It was successful in achieving a greater engagement than its predecessor because of its additional content and media manipulation capabilities.

However, extra manipulation options and added content come at a cost in terms of usability: *AVOL* achieves similar results to *AV Clash* in terms of ease of use, despite the attempted improvements in interaction design. Moreover, *AVOL* comes close to *AV Clash* in terms of sonic enjoyment. Although more users (41%) manifest preference for the audio in *AV Clash*, a significant amount of users (32%) consider the synchronicity, coherence and harmony of sounds in *AVOL* to be more pleasant. Therefore, even though the majority of respondents favor *AV Clash*, there seems to be a significant number of users who prefer a simpler project such as *AVOL*, with fewer options and content, but with curated and more harmonious sounds.

Some of the users are dissatisfied with the creative and expressive potential of both projects, considering that they are "too structured" and shape the end result too much. Further developments in this line of projects could address these limitations, expanding the manipulation options, content, and customization possibilities. This path would concentrate on expanding the creative potential of interactive audiovisual projects as tools. Another possible path for *AVOL* would be to concentrate more on playfulness and intuitiveness, targeting users who prefer a simpler and more curated approach.

In future developments, the author considers that emphasis should be given to recording and sharing capabilities. Net art audiovisual projects such as *AVOL* should take advantage of their online presence to facilitate the recording and distribution of user-generated content, namely by leveraging social media. The author also believes that multi-touch mobile devices are attractive for future interactive audiovisual projects, since they allow for a more direct and flexible manipulation of visuals than a pointing device interface.

In the author's opinion, there is a large potential for creativity and engagement in*AVOL*'s path towards an integrated audiovisual expression, where "composer, performer and audience converge in the playing subject." [9] The results achieved so far show that this path might develop into separate branches, exploring different balances between expressiveness and playfulness.

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'FORSCHERTRIEB,' THE INSTINCT FOR RESEARCH: TOWARD A QUEER PSYCHOANALYSIS AND A PSYCHOANALYTICAL QUEER THEORY

Diego Costa

Linking the curiosity of the theorist to their sexuality, the paper argues for a Queer Theory (re-)turn to psychoanalysis, and its tradition of theory-based practice and practice-based theory, a move which must place the unconscious (of the object of study, of the researcher and the research) at the forefront of the research process.

The analyst's job is to facilitate the analysand's freedom to choose what he would like to do with his desire[1]. Whether that desire is 'good' or 'bad,' that doesn't concern the analyst. This analytical imperative entails the same critical opposition to the reductions of the self to namable identifications, conditioned by all sorts of moral-socio-political enterprises, that is supposed to '*drive*' queer theory. Although it is a popular caricature to mistake psychoanalysis' ability to recognize certain systems of ideality for its condoning them, similar queer critiques against compulsory reproduction (of babies and workers, or baby-cum-workers), the irreplaceability of the couple, the ills of consumerism and even the evils of the "university-government-clergy-nobility" can be found in the vast, multi-faceted and dynamic psychoanalytic literature.[i]

An engagement with psychoanalysis is a political engagement in line with, to the surprise of some, Foucault's utopian politics of bodies and pleasures. It is easy, for the psychoanalytically uninitiated, to take Foucault's figures of 19th Century power-knowledge – "the hysterical woman, the masturbating child, the Malthusian couple and the perverse adult" – as jabs at a psychoanalytical project, which, at least partially created these figures. However, that would be to confound psychiatry, psychology and psychoanalysis into one big monster, and mostly, to ignore psychoanalysis' "progress" throughout the 20th Century and to mistake its recognitions for prescriptions.[ii]

Foucault's envisioning of that potentiality of desire(s) somehow unbound by a pre-made tautological relationship to objects, free to roam around like *flanêurs*, against what he called the "deployment of sexuality," is perhaps the unseen link that can suture both queer and psychoanalytic projects[2]. To insist on not seeing that conduit line may mean to keep on tripping over it, and allowing it to knot up and around the researcher's own desire for truth of her object of study. For, as we know, any analytical project that demands its truth without accepting its risks is one fated to be a victim of its own perversions. The desire of the theorist, or the "instinct for research" (*Forschertrieb*) or knowledge (*Wisstrieb*), whose first signs are known to coincide with the sexual life of children's "first peak," is too often missing from queer work's considerations, although it is never absent. And we would do well in recognizing the desire of the (queer) theorist, always already a (sexual) sublimation vying for some kind of mastery, precisely when it takes the shape of such symbolic reluctance: where is, for instance, the theorist's dealings with her own "counter-transferences"?[iii]

This is not to say that queer theorists haven't included their own selves, consciously and not, whilst producing their work. I am suggesting, however, that we would benefit from a more calculated, and strategic, awareness of self-implication in conducting research that is akin to the extensive work that psychoanalysis has created concerning the analyst herself as a desiring subject. The branches of Queer Theory that resist a psychoanalytical approach often reveal a blinding U.S.-centrism in their claims of

Austria-centrism against psychoanalysis itself, along with the history of a certain sublimation that comes with "I," including strategies to control the personal risk inherent to the research, keeping it from contaminating the researcher herself, or exposing an always already contaminated researcher.[iv]

We know that all research activity begins at the moment it is aroused by sexual activity. And that the act of seeing, or finding out, is an extension of the act of touching They are linked to the Freudian theory of perception, which views it (the faculty of perceiving) "as consisting of a sending out of feelers, of sensitive tentacles, at rhythmic intervals."[v]The researcher's research may function, then, as a kind of "propping," much in the same way Freud describes Leonardo da Vinci's drawings as "props" for his anatomical investigations, an alibi-practice that enables other kinds of practices, investigations and discoveries.[vi] Jean Laplanche describes sublimation, which appears as a doing "something else" with sexual energy (sometimes in opposition, sometimes working together with sexuality), as an instinct of "excessive strength [that] triggers the earliest childhood sexual theories," the first of which revolves around: "Where do babies come from?"[vii]

 Laplanche gives the example the mother's pregnancy of another child as igniting that puzzling question. It provokes an investigation linked to a fantasy of construction faced with the parents' refusal to come up with an adequate answer, establishing a connection between sublimation in the form of having-to-know and "turning back,"[viii] or what Heather Love may call "feeling backward." This problematic question, emblematic of the drive to research, sets forth a traumatic relationship between the infant's intellectual inability to discover the answer and the level of the problem being confronted. It also discloses the way the '*will'* to know '*now'* harks back to the '*need'* to know '*then*.'

It is interesting to note that here the child's being confronted with a "other," the soon-to-be sibling in the womb, throws her in a queer position that drives Laplanche to liken children to Martians. Except that for a Martian, the most puzzling question, when parachuted on Earth would be, as far as Freud is concerned, the difference between the sexes (garb, behavior, social functionings). For the child gender difference is a natural "given from the beginning" ('*von Anfang an'*). But what if the gender question is not a natural given for a child who may, also '*from the beginning*,' occupy a place of queerness that exceeds the "normal" queerness of every child? If we follow Laplanche and Freud's scheme of investigation-and-research as sublimation (sometimes a compulsion, '*Zwang*,' sometimes a substitution for the sex act, '*Ersatz'*) triggered by a puzzling question borne out of a sexual curiosity, how does a previous unsettling of the gender difference "natural given" complicate the order and properties of things? If "the source of the itch" for a queer child, or a proto-queer researcher (beyond the "normal" queerness of every researcher), either precedes the one in the unmarked child or is there at all, what role does that play in the way certain researchers cathect their object of research?[ix]

I mention Laplanche's points here not to suggest that queer theorists, or Martians, might be more invested in knowing (whether it be where babies come from or where'*they'* do), but to illustrate how in "falling backward" during research one, inevitably, realizes how much is at stake for oneself as a researcher, which reveals a layer that is part and parcel of the research itself – perhaps its crux.

 I am proposing a queer theory turn to psychoanalysis, and vice versa, because theoretical work that doesn't place the unconscious at the forefront of its approach is one destined to the crevices of its own narcissism -- the narcissist subject, of course, being one who cannot accept her own susceptibility of loss nor the absolute alterity of the other as other, all intolerable things for a Queer project.

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PHOTOGRAPHY'S FALSE PROMISE

DAVID COTTERRELL

David Cotterrell discusses the abstraction of distance and the dislocation of ideas. From the comfort of knowing in London to the disconnection of the frontline in Afghanistan and back again for an image-frenzied art public in Britain, he offers a personal perspective on the image, the lens and the implicit lie of the narrative structure.

Fig.1. Sightlines, 2009, David Cotterrell, C-Type Print. © 2009 David Cotterrell.

Fig.2. Green Room, 2009, David Cotterrell, HD Video, 22mins. © 2009 David Cotterrell.

Fig.3. Supernumerary, 2009, David Cotterrell, C-Type Print. © 2009 David Cotterrell.

As I traveled from Brize Norton in rural Oxfordshire to the Commando base at Sangin in Helmand Province, my view shifted from a media-informed assumption of global understanding to a diminishing, narrowing perspective. I had printed internet-sourced maps of Helmand, bought a 'Lonely Planet' guide to Afghanistan and attended military briefings in Yorkshire. The morning of my departure I read a copy of The Guardian, loaded my camera gear into an army-surplus Bergen and entered the military environment via a C-17 Globemaster.

Arriving in Kandahar 24 hours later, I was taken to Regional Command South, where I was guided through maps of the war as defined by British engagement. Kabul did not appear on these charts. I progressed to Camp Bastion (this time by the smaller Hercules transport plane) and my new home, 201 Field Hospital. At 'Prayers', the morning intelligence briefing, an annotated chart covered the table. As well as the familiar battlefields of Kajaki and Sangin, it had the names of places I hadn't seen on any of my printed maps: 'Bryce', 'Delhi', 'Dwyer' and 'Inkerman'. The map was centred on our current location, with concentric circles emanating from the hospital. No miles were marked – distances were now measured in Chinook flight-times.

I was amazed by the detail of briefings: suicide bombers tailing convoys were described, the locations and probability of attacks over the coming 12 hours were declared, but the world beyond a forty-minute flight was no longer referenced. The last news I had seen included reports of the potential for martial law being declared in Pakistan. We heard rumours of problems in the country as our breakfast milk supply had dried up – the result of Taliban ambushes on supply convoys crossing the border.

I decided to try to find a newspaper. Post did come to Bastion, but had to compete for space with ammunition, medical supplies, reinforcements and military equipment, so the papers I found all preceded my arrival.

Two weeks later, I had been unsettled by the claustrophobia of Bastion and the death and injury I witnessed. I begged passage on a Chinook, first to Lash-Kagar, then onwards to Sangin. While Lash-Kagar offered the welcome opportunity to discuss the abstraction of political challenges to governance and progression with Foreign and Commonwealth Office officials, Sangin was a forward base occupying contested territory in the poppy-growing region, populated by 40Commando's 'Bravo' Company and a mortar team from the Coldstream Guards.

My ambiguous status (I had been awarded the title of 'Major' in order to travel with the Army, but was an odd addition to the military with my ponytail) enabled my attendance at intelligence briefings. These still lasted an hour, but the scope was further reduced: the horizon now was not flight-times but the range of foot-patrols. We knew the names of the Taliban commanders who were camped on the hills around us and were even aware of rumours of rivalries and intrigue amongst them. Within a couple of kilometers we had a vivid detailed mental picture. The rest of the world, Kabul and even Kandahar, was now abstracted beyond comprehension.

I remained in Sangin until the end of November, stranded as helicopters were diverted to support the attack on Musa-Kala. I had to wait until my return to the UK to read news more current than the date of my departure a month earlier. I discovered that Pakistan hadn't yet descended into chaos after all and only one of the soldiers that I had witnessed being injured had made it into the press-released history of the conflict.

I had an interesting challenge on returning from Afghanistan. I had travelled as a 'War Artist' in an attempt to investigate the apparent ethical contradictions between Medicine and War. I now had a thousand images of conflict and its bloody aftermath and was invited to present work in a public exhibition concerning the subject. Outwardly, this might appear to be a simple problem of editing and selection. Inwardly, I was struggling with what I had experienced, as well as witnessed.

I was asked to offer an independent observer's view of the trauma of front-line field hospitals, the ecological impact of conflict, the role of NGOs in construction and masterplanning within transitional environments (amongst other subjects that I am under-qualified to offer expert analyses upon). After the novelty of my experiences had been exposed, documented and discussed, I was asked to explain how a tangential and aberrant experience such as that offered to 'War Artists' can be reconciled with a longer-term practice as an artist.

With no great confidence, but with some intuitive feeling, I said that I had recognised a few parallels.

I had realised, as I tried to recount my journey in a chronological narrative, prompted by my projected photographs and the memory of my scribbled diary, that one of the most profound experiences of advancing forward through the military supply-lines was of a gradual disengagement with any perceivable macro-picture of context.

When required to contribute to the canon of mediated knowledge and demonstrate my understanding of truth to a wider audience, I chose to speak from the vocabulary of received secondary experience. Perhaps a focus on the dramatic and catastrophic impact of violence on the human body would have been appropriate. This aspect of war was vividly documented within the record of my time in the Afghan operating theatres. But this imagery, which I recognised as representative in my research in the UK, was not congruent with my memories of Afghanistan. The images I held in my memory were of gore and despair, but the traumatic nature of my recollections was not rooted in the inherent shock of the visual. The distance I was feeling from my colleagues, friends and family on my return to England was due to a memory of the calm, silent and slow experience of isolation, disorientation and uncertainty, which I had perceived to pervade the open-ended narratives that begin at the moment of injury. Media images of guns being fired, protest placards of bloody injuries and the smug ironies of contemporary art statements, focusing on digestible, if unpalatable, ideas that could offer mass gratification, failed to offer a fellowship with my private demons.

I chose to make work that deliberately denied the salacious appetite for drama. The work was to focus on the mundane, abstracted and ambiguous experiences that remain un-newsworthy: the interminable, night-time evacuation flights, the uncertain waiting for casualties, the abstraction of trauma through codified military terminology and the administrative burden of death and injury. When previewed, my responses naturally bemused some cultural commentators. While war correspondents, serving soldiers, recent casualties, veteran doctors and nurses seemed to empathise with the material I had introduced to the public domain, there was a palpable sense of disappointment from the art journalists who had visited the work seeking a satisfying and definitive response.

Writing in *Art Monthly*, one journalist appeared to lament the restraint with which the artwork addressed (or denied) the emotive potential of the traumatic first-hand experience. Having read my diary extracts reprinted in The Guardian, he was aware of the material potentially available for synthesis into statements for art-world consumption. Yet, the work presented offered nothing but a bleak and

uneventful representation of the period before and after the politically sensitive and personally devastating experience of military injury.

The parallels with my existing practice, identified while cathartically recounting my journey through the casualty chain of Afghanistan in front of a London audience, were not derived from the extremity of experience, a political critique or of a relationship to process. Rather, the congruity that I felt with my longer-term artistic practice was with a realisation of the consistency of fragmentation between personal and collective narratives. The illusion of linear history has been well-explored through the writings of Christopher Hill and other left-wing historians, who acknowledged that a national history could only ever be an illusory approximation superimposed across disparate local experiences.

I found in Afghanistan that immersing myself in the reality of an experience previously perceived from a mediated distance naturally led to the collapse of the authority of the summary analysis. The reduction of contextual peripheral vision appeared directly proportional to the increasingly vivid primary experience of conflict. The dramas and rationales for policies, campaigns and battles fragmented to become visible only as contradictory, arbitrary violent incidents. As empathy was gained with individuals, faith in the ability of history or politics to transmit the rationale for, or the reality of, suffering appeared to dissolve.

The contradiction between the macro and first-person view, which I had previously assumed to pervade all experience of politics, urbanization and domestic life, had been the subject of my practice on a regular basis: I had developed work to address the abstraction of planning and urban analyses. While recognising that slogans and statistical data were unlikely to represent my personal experience of love, life or bereavement, I had still naively consumed the comforting, iconic summaries offered by the media; had unconsciously accepted a seductive documentary response to aspects of life that I had previously challenged.

The cinematic documentary view, or Kino-Eye, has an internal logic, but like the rules of perspective within two-dimensional drawing, does not provide a record of reality as much as an alternate construct. The lens offers a virtual world devoid of experience. It shows us too much – flattening perception and reducing the impact of all information to a common level. We survey rather than engage. Photographic composition offers a perceived hierarchy of characters and events. We are guided to the dominant narratives through the editing of footage and denied the more mundane sub-plots hidden beyond the camera's depth of field.

The fixed frame of content within the rectangle of the screen is reminiscent of the aesthetics of memory, but it doesn't replicate corresponding subjective emotional states. While photographs illustrate a visual record of the world, the sustained roving of gaze, focus and the dominance of analysis, they do not automatically transmit a state of terror, melancholia, or sublime, which may have been tagged in our memory with reference to an original image.

Instead of abandoning the fallacy of the format, we are encouraged through the dominance of media delivery mechanisms to work within the frame, to allow visual material to dominate sensual understanding and to seek to deliver content which references and perhaps challenges the precedents and conventions of the medium, rather than challenging the validity of the format itself.

I felt that to actually focus on the reality of a moment, a level of manipulation, intervention and perhaps even fiction, might be required. *Green Room* is a small video question – one of a series generated in response to the problematic experience of being a witness in Afghanistan.

The film recorded preparations for the arrival of multiple casualties during a major incident, but it is not pure documentary. I had set the camera up on a tripod within the recovery ward, unsure whether I would be able to cope with the events that were about to transpire. It offered a substitute witness that could offer an objective position from which to review the narrative at a later date.

In fact, I had managed to be present for the treatment of wounded and had travelled with them to operating theatres and through the initial stages of their onward evacuation. The camera's silent role appeared to have been unnecessary. It wasn't until much later, when I returned to England, that I looked at the tape.

The narrative is clear. Nothing appears to happen until the sound of helicopters beyond the tented hospital is heard and British and Afghan soldiers and civilians, strapped to gurneys, begin to arrive. The clinical environment is overwhelmed by the dust of the desert, the armoured medical escorts and the steady, urgent response of the surgical teams to the challenges confronting them. Had I been behind the camera, I would have determined the lens's focus.

The camera had been set to record with the maximum depth of field and neutrally surveyed the interior. The apparently unimportant activity in the background was also rendered visible: the anxiety of observers as they waited to be instrumentalised; the attempts at levity to distract from the bleak anticipation; the shift of focus as they viewed the enormity of their imminent task. I chose to direct attention by reinstating a limited depth of field on what I believed were equally important but naturally overlooked aspects of the traumatic experience.

The manipulation of view takes place after the fact: a simple post-production device is used to selectively deny focus. The loss of definition thwarts our natural desire to understand the dominant narrative. We are left with sharp images of the mundane, the redundant and the waiting. I had interfered with the documentary record and manipulated the footage.

For me, this had been one of the most profound realisations of my time in Afghanistan: despite recognising the aesthetics and contextual references through media familiarity, I had failed to remind myself that the gradual assumption of knowledge gained from exposure to synthesised reality rarely prepares the viewer for the inevitable contradiction between mediated and primary participation. I was reminded of conversations with my grandfather, who often told me that war was mainly boredom, punctuated by brief periods of fear. However, I had not understood that the undocumented intervals between dramatic events were also dominant and emotionally charged experiences.

Rather than remain satisfied with a synthetic alternative, artists need to challenge our media to regain the initial experience. By accepting the impossibility of providing an objective macro-view and by considering the limitations of the documentary witness, perhaps we can compensate for the inherent error of the Kino Eye, its false narratives and its great illusion of truth.

PUBLICNESS, PERVASIVE TECHNOLOGIES AND A HISTORY OF SHIT

GEOFF COX

If modern power is founded on conditions of the management of human waste (as Laporte argues in *History of Shit*), can we say the same of software? This issue is crucial for a fuller understanding of political expression in the public realm and the ways in which sociality is ever more privatised through the use of pervasive technologies.

If language is beautiful, it must be because a master bathes it - a master who cleans shit holes, sweeps offal, and expurgates city and speech to confer upon them order and beauty. (Laporte) [1]

There has been much recent interest in revisiting Hannah Arendt's ideas in relation to a reconceptualisation of publicness. She states (in *The Human Condition*, written in 1958) that the political realm arises out of acting together, in the sharing of speech and action. [2] In Paolo Virno's work, further recognising the linguistic and performative dimension of capitalism, the connections are emphasized because of the relative ineffectiveness of political action today, which explains the current "crisis of politics, the sense of scorn surrounding political praxis today, [and] the disrepute into which action has fallen." [3] Can the same be said of publicness? What is at stake for Virno is clear, that "if the publicness of the intellect does not yield to the realm of the public sphere, of a political space in which the many can tend to common affairs, then it produces terrifying effects." [4] Proprietary technology arguably plays a significant role here in distancing speech from affect in a situation where action and words have lost their power (to echo Arendt).

To put it differently, in Christian Marazzi's writing on the relations between economics, language and affect, there is little hope for effective action when people have become incapable of maintaining concentrated attention on the same object for a long time. [5] Extended to intellectual and social behavior, Franco Berardi calls this a catastrophe of modern humanism, where we no longer have sufficient attention spans for love, tenderness and compassion. [6] As language and affect become increasingly economicised, social attention is captured with dire consequences in terms of the subjectivities being produced (and this is the terrifying effect of the so-called attention economy). According to Berardi, only the autonomy of intellectual labour from economic rule can save us from the forces of capitalism (or 'semio-capital' as he calls it). The point is emphasised in the current attack on Universities – although of course this is part of a broader neoliberal assault on public services, welfare and education. Moreover, Berardi is invoking general intellect and the social function of intellectual labour, what Virno refers to as the "know-how on which social productivity relies." [7] Aspects of socialism and general intellect are incorporated into what Virno calls the "communism of capital." [8] In other words, the social potential has been stolen from the public realm and commodified.

Again, Arendt is invoked through her assertion that publicness should be understood in terms of plurality not singularity per se. This is evident in speech and action in that it both represents the capacity for equality and distinctiveness. [9] To Arendt, action is bound with the expectation of the unexpected that results from the sameness and uniqueness of human plurality leading to the creations of publics and counter-publics. The political realm arises in this way, out of acting together in this way, but crucially this is expressed as a collective activity, preempting Virno's description of the many tending to common affairs.

But what of communications technologies more specifically in as much as software can be seen to represent both expression as in speech or writing (or word and deed) but also something that performs actions? For Christopher M. Kelty, again referring to Arendt, the free software movement is an example of emergent and self-organizing public actions. [10] Underpinning this is the sharing of source code, rooted in the history of the UNIX operating system and its precarious development between the public domain and commercial enterprise characterized by the parallel developments of free software and open source in the late 1990s. The history reflects the paradoxical forms mentioned earlier in which technology's social potential is captured.

More optimistically, the cultural significance for Kelty is captured by the term 'recursive public' to account for the ways in which the public is: "capable of speaking to existing forms of power through the production of actually existing alternatives." [11] The intervention extends a definition of a public grounded in discourse (as with Arendt) – through speech, writing and assembly – to other legal and technical layers that underpin the Internet in recognition of the ways in which power and control are structured – to include both discourses and infrastructures. [12] In this way, recursive publics engage with, and attempt to modify, the infrastructures they inhabit as an extension of the public sphere (his example is the case of Napster). Thus publicness is constituted not simply by speaking, writing, arguing and protesting but also through modification of the domain or platform through which these practices are enacted.

The intervention of Dominique Laporte, in the *History of Shit* (first published in French in 1978), is to verify that modern power is founded on the aesthetics of the public sphere and in the agency of its citizen-subjects but that these are conditions of the management of human waste. [13] He insists that in parallel to the cleansing of the streets of Paris from shit, the French language was similarly cleansed of Latin words to establish official French without "foreign leanings" (according to an edict of 1539). Both public space and language were cleaned and policed in parallel, as purification requires submission to the law (as the Laporte quote at the beginning of the article asserts). Thus he contends that language was purged of its "lingering stink" to become purer and invested with authority, "elevating it to the divine place of power freed from odor." [14]

The desire for clean language, as well as clean streets, sublimates shit and demonstrates an expression of new biopolitical forms of control over subjectivity (including the bodily functions of speaking and shitting freely) and one where the market has become sovereign (rather than the State). Can we say the same of clean code, and that the kinds of technologies that are found on the streets (installed in mobile devices and such-like) are similarly cleansed? Is it that the technologies made available to us are simply not shit enough?

Service-based platforms (so-called cloud computing) provide an example of a purified form in a similar way, disputing Kelty's optimistic statements about free software as there is no code to share – as software and network services merge into one platform through which people access the internet using their mobile devices and tablet computers. This is the Apple paradigm of software development with specially conceived proprietary "apps" (for iPhones and iPads) that close off users from the underlying impurities ('stink') of code (through the cleanliness of iTunes for instance). These developments are crucial for a fuller understanding of the suppression of political expression in the public realm and the ways in which general intellect is becoming ever more privatized through the use of pervasive technologies and free market logic. The point is that human capacity is wasted under such conditions. This is the waste that the valorisation process leaves behind, and the consequences of over-production are there

for all to see as more and more environmental pollutants are dumped around the world as a consequence of the demands of ever-expanding communications industries.

The argument of the paper is that the commodification of social potential evident in the apps that currently pervade our lived experience might be open to further transformation. Kelty describes the radical possibilities of "argument-by-technology and argument-by-talk." [15] Taking the Hegelian move from in-itself to for-itself further, via class consciousness or class for-itself in Marx's adaptation, Virno combines it with Gramsci's concept of the organic intellectual to characterise "mass intellectuality". The interlinking references help to assert Virno's line of argument that the publicness of the intellect is not a positive public force unless it is at the same time recognised as political. Repeating another earlier point to conclude, only the autonomy of public intellectuality in its separation from the free market can save us. The health of an organism can be detected in its shit and current mismanagement is clear for all to see.

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DON'T HATE THE BUSINESS, BECOME THE BUSINESS!

Geoff Cox & Tatiana Bazzichelli

This introduction to the panel investigates some of the interconnections between art, activism and business. "Don't hate the media, become the media" was one of the slogans of Indymedia. We are applying this critical hands-on perspective to the business framework to explore the concept of disruptive-innovation.

"Don't hate the media, become the media" was one of the slogans of Indymedia. In adopting the phrase, the idea is to apply this critical hands-on perspective to the business framework to examine how artists, rather than simply refusing business logic, are producing critical interventions from within. Indeed as the distinction between production and consumption appears to have collapsed, every interaction in the info-sphere seems to have become a business opportunity underpinned by informational capitalism and the perceived importance of the creative industries to the economy (the so-called 'creative economy', where creativity is effectively instrumentalised). Therefore, the creative intersections between business and art have become a crucial territory for re-invention and the rewriting of symbolic and cultural codes, generating political actions or social hacks that use a deep level of irony but also have unexpected consequences. The tactics demonstrate the permeability of systems — that these can be reworked — and more so, that radical innovation requires modification of prevailing business logic.

The backdrop of the Istanbul Biennale and the art world/market makes a useful reference point here as one of the markers along with art (trade) fairs in general for the commodity exchange of artistic production and the intention to boosting the local economy: "economic development and culture as part of a trade and investment portfolio" as Maya Balcioglu explains. In the local context, the almost exclusive model of private patronage rather than State subsidy for the arts indicates a growing trend for the art world as a whole, and its overt business orientation. But examining such trends are not new issues — as there have been many examples of artists making interventions into the art market and alternatives to commodity exchange — and we aim to discuss some of the recent strategies that have emerged from a deep understanding of informational capitalism with its enduring paradoxes.

More detail on the particularities of the information economy is what Elanor Colleoni provides with attention to its stress on the capture of social aspects and the pluralization of the concept of value. The mechanisms for generating value from intangible assets, or the ways in which it can be made tangible, takes new business forms and these are somewhat exemplified in the case of social media. The concern is how particular kinds of social relations are monetized, which sets the context for Dmytri Kleiner's notion of 'Venture Communism', an intervention that offers a model of workers' self-organization to allocate wealth using a peer-to-peer model, offering: "commons-based collaborative and shared forms of cultural production and economic distribution." Artistic interventions such as this, perhaps provide the "most innovative business models" as Christian Ulrik Andersen and Søren Bro Pold argue, but also reveal a "conceptual gap". There are many examples of new models but the central paradox is the focus here: that on the one hand, there are alternative or disruptive business models that derive from the art scene, often as critical or activist interventions, but on the other how these practices can be easily co-opted by proprietary business logic. The question is how to take this back: expropriate the expropriators.

The paradoxes are exemplified by the IT business idea of disruptive-innovation, where disruption is considered to be a creative act that shifts the way a particular logic operates and thus presents newfound opportunities for investment. If, in general, it appears that innovation has become co-opted, Paolo Virno offers a rather different interpretation (partly to avoid using the problematic term creativity) through his use of the phrase "innovative action," to describe the ways that humans demonstrate the ability to modify their forms of life. [1] He is developing the point that innovation both produces contradictory factors that reflect the human condition, its creative energies and their repression, but that it also provides opportunity for further reinvention. We propose to do something similar with the term business: and it is worth remembering that the term itself, business, simply indicates an occupation, and one undertaken with both care and anxiety (in its etymology) and is not pejoratively capitalistic.

If the economy is increasingly characterized by its linguistic characteristics and social cooperation, as Virno insists, language becomes the means for transmitting data and for innovative action. When it comes to digital work, there seems to be a changed relationship between conception and execution in this respect, in that the work is conceptual and is then enacted materially by the instructions that are produced by a machine. [2] Citing Virno, Christian Marazzi in *Capital and Language*, further develops this linguistic dimension as a mechanism of control: "Biopolitics exists where the foremost priority, in immediate experience, is given to what belongs to the potential dimension of human existence: not the spoken word but of the faculty to speak; not work actually done but the generic capacity to produce." [3] The goal of government becomes the generation of certain types of collective speech acts and competition within markets becomes an important foundation for a critique of social media and the ways in which the energies of peer production have been expropriated from the public by the market. In this sense, the vague marketing distinction between web 2.0 and web 1.0 is just another example of capital recuperating the democratic potential of a new technology for the privatization of public assets (as Kleiner also points out). [4] It sells the public what it already owned in the first place.

There are endless examples of platforms that extract value in this way from social creation but thankfully there are also others that try to hold on to it, further reinforcing the connection that Marazzi makes between financial markets and collective speech acts (as with P2P credit cards and other initiatives that speculate on the future of money). [5] The current austerity measures in global economies seems to underline the urgency for producing alternatives, as public services are eroded by the neoliberal logic of financial capitalism. The problem remains how to develop alternatives that do not simply function as innovation for capitalist renewal, how to innovate beyond the market?

Like innovation, disruption is a rather ambiguous concept. In the business culture, disruption does not mean only rupture, but innovation and re-design of behavioral tendencies. The concept of disruptive business represents a paradox because it demonstrates a process that interferes with business, but at the same time, it generates new forms of business. Since the avant-gardes, artists concentrated into the effect of producing the unpredictable, while generating new forms. Today, neoliberal business logic has embraced the unpredictable too, encapsulating disruption and co-opting alternatives. The paradox lives in the encounter of business culture and artistic disruption.

The intervention is to apply the business concept of disruptive innovation back again into the art field, and at the same time to develop a critical perspective on the concepts of disruption and innovation. The challenge becomes how to be aware of the business logics and mechanisms, introducing unexpected incongruities in the capitalist structure and provoking unpredictable feedback. In a scenario where business has largely co-opted the values of hacker ethics and social networks, and where the forms of criti-

cism tend to freeze as soon as they emerge, the way out from the impasse might be found within business itself. An examination of the paradoxes lies at the heart of this, in an inversion of old schemes of contradiction, and through the direct involvement of multiple and diverse subjectivities that react strategically and playfully from within. Art becomes business disrupting the neo-liberal marketplace.

The various contributions that follow explore these paradoxes and provocations: Does this mean that well-meaning critical strategies of artists and activists are self-defeating? How do we develop disruptive business models that do not simply become new models for business that ultimately follow capitalist logic? We maintain there is nothing wrong with doing business as such, it just needs to be better.

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3. *Ibid., 156.*
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5. *For example, Paolo Cirio's P2P Gift Credit Card, http://www.paolocirio.net/work/gift-finance/p2p_gift_credit_card.php - also see the interview with Tatiana Bazzichelli, Digicult, http://www.paolocirio.net/press/interview_p2p_gifts_digicult.php*

SKYPE AND VIDEOPERFORMANCE: RELATIONAL SCREENS

CINZIA CREMONA

This paper argues that Skype communication on the one hand, and videoperformance on the other have been converging into a set of art practices that adopts the screen as a relational device informed syncretically by the qualities of both practices.

The project *Skype Me!* sits at the convergence of videoconferencing with two art traditions: performance-to-camera and networked performance practices.

Skype Me!, 2010, Cinzia Cremona with Terry Smith, live Skype collaborative performance. Copyright of the artist.

Introduction

This paper examines an instance of art practice that utilises Skype as a platform for videoperformances.

I have been exploring the foundations of a theory of the relational screen in the context of videoperformance art practice. The core argument of this paper is based on the observation that the relational qualities of networked screens in peer-to-peer communication and of videoperformance reciprocally inform each other's relational potential.

This paper argues that Skype communication on the one hand, and videoperformance on the other have been converging into a set of art practices that adopts the screen as a relational mediator informed syncretically by the qualities of both practices.

Overview of Skype Me!

Skype Me! took place in August 2010 in the context of an artist residency and solo exhibition at firstsite (Colchester, UK). This project was driven by a set of research questions to problematize the crossovers

between videoperformance and screen-based communication. The structure of the project was deliberately open to the emergence of features to be discussed in the context of videoperformance and recent relational approaches to contemporary visual art.

In August 2010, I invited a number of artists to contribute remotely via Skype - I left the invitation intentionally open to elicit a variety of responses. This productive variety allowed me to analyze a number of features of screen-mediated relationality on the boundary of communication, performance and relational art practice, and to highlight synergies and crossovers between the use of screens in networked communication and in videoperformance art practices.

Some examples

Chooc Ly Tan's contribution, a presentation about the inventor Walter Josef Steinerson, culminated in a minute silence in memory of the subject. As the talk progressed, Steinerson emerges as a fictional figure and a catalyst for political satire and performance. Especially evident in the recording of the interaction between myself and Chooc Ly, this fact becomes progressively embodied in my own expressions and reactions. In particular, the moment I realise the ploy unfolding in front of me, my facial expression changes visibly, and the connection between Chooc Ly and myself comes to life. This simple observation points to a relational *space* between the screens within which the work takes place.

Daniel Lehan, an experienced and prolific live performer, admitted to using Skype for the first time. Daniel simply performed a text-based work as he would for a live audience. Andrea Giulivi connected from Italy to recite a touching poem by Giacomo Leopardi wearing a mirrored Futurism-inspired mask. The contrast between the high poetry and the grotesque attire suited the paradoxes inherent to Skype-based art practice – low resolution/intense performance; geographical distance/visual closeness. These practices adopt the screen as a vehicle for the delivery of the work, and ignore the particular connotations of the videoperformance setting, and the triangulation with viewers in the gallery. Conversely, the artist Terry Smith had devised a small work to suit the low bandwidth of his connection, and framing the keyboard of his computer with an independent camera, typed noisily on the keys with one finger.

The painter Corinne Charton took the invitation to a different emotional pitch with a very intense message to her younger self. Corinne had not prepared any performance, and asked me to tell her what to do. In conversation Corinne responded with interest to the idea of leaving a personal message for her younger self. Corinne appeared attuned to the paradoxical qualities of *Skype Me!* - the combination of liveness, intimate connection between the two sides of the networked screens, and the delay afforded by recording.

The next section will discuss two of the artists' contributions in more detail. These instances convey more directly the potential for a creative focus on videoconferencing affordances and limitations within visual art practices. Corinne Charlton's personal message reflects Skype's core paradox of complementing relational presence and physical absence. Marsha Bradfield's penetrating conversation helps uncover some of the conceptual dynamics of the project itself. It also highlights the relational openness that can be created by projects that soften the separation between public and private approach to communication.

Corinne Charton

During our introductory chat, Corinne Charton focuses on the lack of eye-contact in our Skype conversation. 'I can see that you can't see my eyes, but I'm desperate to look into yours!'. Corinne expresses her initial discomfort with emotionally intensity, but later in the conversation cannot avoid addressing me instead of her younger self, until I switch off my webcam. After having delivered her emotional message to her own screen/webcam, Corinne acknowledges that only after 'I left' – but I have only left her visual field – she can now address her own image and her absent younger self.

I would argue that, contrary to recorded videoperformances, the live networked screen of videoconferencing conveys direct connections and relationality despite the lack of eye-contact. Conversely, it could be argued that mediated eye contact [1] is an indispensable component to activate the relational effectiveness of the screen in videoperformances, and at the same time that it depends on the complicity of viewers. The familiarity with the televisual convention of eye contact adopted by newsreaders and early television continuity announcers enhances the relational power of the recorded moving image through a sense of liveness. On the basis of my own videoperformance practice, I would also argue that this screen-mediated relationality is often activated at the production stage by evoking an imagined viewer as present beyond the camera. I use the video camera and screen as relational tools from the inception of the work by already addressing the viewer long before the performance becomes an image on a screen in a gallery and meets the gaze of others. At the stage of performance, the lens of the camera is the substitute for the viewer.

Seeing the other is an integral part of the experience of videoconferencing; therefore it is expected that interlocutors will be looking at the image of the other on the screen, and not straight into camera. This tacit agreement sidesteps the need for mediated eye contact, and highlights the effectiveness of the screen as a mediator of relationships. By being the last interface of a networked system, the screen offers a visual proof that the other is there *now*. In videoperformances that directly reference networked real time communication, the viewer becomes a substitute for the interlocutor only at the latest stage of the process – when the videoperformance is displayed on screen in the gallery.

These pragmatic observations about videoperformance and videoconference practices suggest a wide range of questions that concern the practices of screen mediated relationality and their ethical implications. Power imbalance between the interlocutors on and off screen, issues of seduction and perceived intimacy, the lack of reciprocity, and the more general debate on the traps of conviviality in relational practices, all echo in the questions raised by this project.

Marsha Bradfield

Marsha and I are both member of the research cluster Critical Practice, supported by Chelsea College of Art and Design (University of the Arts, London) . Formed by artists, researchers, academics and others, Critical Practice activates participatory events to research in practice issues of organization, governance and knowledge production within the field of culture. Marsha's art practice and research focus on dialogue, as she adopts a 'combination of participatory and collaborative models to create more participant-authored works of art.' (Bradfield, 2007). Calling from the privacy of her family home in Johannesburg, Marsha engaged in a critical conversation that contested the context of *Skype Me!* as an instance of art practice:

'**Marsha Bradfield**: I'm wandering if you could say something about how this for you is performative? How is the way you are behaving now different from how you would in the privacy of your own home?

Cinzia Cremona: In one way, I am literally in the window of the gallery. Knowing that I am visible from the street makes me feel that I am performing for a large, random audience. The second way is that I am in a public space – anybody could walk into the gallery and talk to me about this. But they will also be your audience. You are not only talking to me. Then, this is being recorded. And I'm doing this as a subject of research – I'll be thinking about the difference between Skyping with you here, talking to you on the phone, seeing you in a meeting, or going for coffee with you. I'm also going to reflect on how this can be shared with someone else.'

Marsha's interview-style conversation pressurized me into articulating the dynamics of the project as it was still in process. I find this a valuable element of this experiment, and a quality of the platform itself – the potential for meta-discourse during the production of the discourse itself. In other words, the same structure that materializes the research questions, also nurtures reflection on the structure and the questions themselves. This becomes a generative process as the contribution offer stimuli for the project to change as it progresses. Moreover, the potential for other interlocutors to benefit and/or contribute to the process keeps the project open to active participation. Left alone with a member of the audience, Marsha engaged in a conversation about who is the public or audience of the project with Caroline, an art student who entered the gallery. Caroline listened for sometime, taking notes and photographs. When I was called away, Marsha and Caroline continued the conversation:

'**Caroline**: I'm interested in the concept of me being the audience, listening to this Skype conversation that I wouldn't normally be listening to. You two were having a talk publicly, even if you are actually doing it privately. I find this quite an interesting concept. This is new phase … as well as it being performative between you and the artist.

MB: Something that I fascinated by is: are you he public? Are you the audience? Am I the public? In a way this project is contesting those distinctions, or certainly problematizing them.

Caroline: I don't feel like I'm the public right now – I feel like you are the public. But I am also watching you. In a sense you are the art piece. But then there is public going past the window … It's a different situation; one that I haven't thought about before. Maybe there is a new concept in there.

MB: I still find the idea that this is performative problematic. For me it's complicated to speak about this in terms of performance. In terms of a practice, I don't know for example how I might talk about this as being something different from, say, my teaching practice, or my interpersonal practice – the way that I communicate with my friends and family.

Caroline: I see this as more *relational* – at the more performative end of relational aesthetics. We are building relations as two strangers in a public atmosphere, in a sense. Maybe what I am doing now is more spontaneous then a planned performance, but I think this is a cross section between a more spontaneous understanding of performance and a planned, thought out one.

Throughout the 1990s a number of thinkers adopted phenomenological approaches to examine how screens mediate intersubjective encounters. Peggy Phelan and Amelia Jones concentrate on the body of

the viewer and how this shapes the perception of the body represented on the screen. Taking this concept further, Jones (1998) proposes that 'the video screen *becomes* the skin/the body' (p. 200). These authors share an interest in theorizing the dynamics of subjectivity as constructed in interactions between the subjects themselves. Screens fulfil this process by acting as psychoanalytic mirrors (Phelan, 1993), and recalling the fact that the body is already a screen for symbolic projections. In this reciprocal relationship, the formation of subjectivity is the focus of these phenomenological discourses. The relationships activated by the encounters between screens and bodies/selves are instrumental to the emergence of subjects and not the focus of analysis.

Similarly, Laura U Marks (2002) developed a theoretical concept of haptic images[2] as images that 'do not invite identification with a figure so much as they encourage a bodily relationship between the viewer and the image.' (p.3). Whilst Marks proposes a narrow definition of haptic images as low resolution, fragmented and difficult to read – as these qualities move viewers' focus towards the surface of the video as if this was its skin – she also offers a theoretical premise to articulate the relationality mediated by the screen. Referring to Sobchack (1992) and her understanding of 'viewing as an exchange between two bodies' (Marks, 2002, p. 13), Marks conceives of an act of viewing in which 'both I and the object of my vision constitute each other.' (p.13) Both Marks and Sobchack develop their argument on phenomenological premises of an embodied viewer in-the-world (Sobchack, 1994), but it could be argued that they also transcend phenomenology by conceptualising screens and moving images as relational and active in themselves.

The publication of *Relational Aesthetics* (Bourriaud, 2002) marked the development of a parallel discourse, which has no roots in psychoanalytic or phenomenological thought. Not an academic conceptualisation of relational issues, but a collection of curator Nicolas Bourriaud's statements about emerging approaches in contemporary art practices, this text has nevertheless crystallised the association of the term *relational* with a particular set of contemporary art projects. Bourriaud generically defines the term relations as 'relations outside the field of art (in contrast to relations inside it, offering it its socio-economic underlay): relations between individuals and groups, between the artist and the world, and, by way of transitivity, between the beholder and the world.' (Bourriaud, 2002, p.26).

Despite the vague meaning given to 'relations with the world' and 'human relationships' throughout the book, *Relational Aesthetics* makes a strong case for the performative relational power of art practice in general and moving image works in particular.

In parallel with Bourriaud's concept of Relational Aesthetics, Grant Kester (2004) has developed the more politically engaged idea of 'Dialogical Aesthetics'. Based on ethical principles derived from Bakhtin and Levinas (p. 118), dialogical practices also sustain a sense of subjectivity built through face-to-face dialogue. Kester maintains that this approach 'requires that we understand the work of art as a process of communicative exchange rather than a physical object.' (p.90). Whilst Bourriaud promotes art practices that engender convivial relationality, Kester focuses on overtly political interventions in the fabric of the community.

Bruno Latour (2007) has provided an effective analysis of face-to-face and mediated interactions in the context of Actor-Network-Theory (ANT) (pp. 199-203), in which are described as generally distributed, mediated and interfered with. Within an ANT approach, inanimate objects and animate beings with a will are considered equally as actors (active agencies within a network of events) (p.63). In other words, a face-to-face encounter constitutes only one possible iteration in a chain of mediated encounters. Coming to the question of relationships from a very different angle, Latour offers a hybrid form of sociology

that denies direct affiliations to philosophical thought. The relationality proposed by ANT is pragmatic and performative – it does not exist unless it is being enacted.

The public Skype conversation with Marsha and Caroline articulates these concepts in practice, and throws wide open the question of reciprocal influences between the screen-based tools of communication and of contemporary art practice.

Conclusions

The project *Skype Me!*, paradoxically materializes a core quality of the crossover between videoperformance and videoconferencing – the potential for the work to exist both *on screen* and *between screens*. Although some of the works were not designed to conform to Skype's characteristics – the artists regularly perform the same piece for a live audience – the dynamics and timings of the exchanges, the mixing with conversational modes, and the blurring of the distinction between private and public materialize a relational engagement rooted in the exchanges uniquely mediated by the screen.

By conflating the practices of videoconferencing as communication and as videoperformance art practice, *Skype Me!* contributes to research in both fields – the practices discussed here propose the networked screen in videoperformance and in peer-to-peer videoconferencing as a device for mediating relational responsibility.

[1] This expression describes a paradox, as one set of eyes encounters a representation of eyes instead of another present gaze. I would argue that the screen functions very effectively as an interface as it conveys this representation, allowing the represented eyes to become performative in a relational context.

[2] 'Haptic *perception* is usually defined as the combination of tactile, kinesthetic, and proprioceptive functions, the way we experience touch both on the surface of and inside our bodies. In haptic *visuality*, the eyes themselves function like organs of touch.' (Marks, 2002, p.2).

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WORKERS OF THE FUTURE AT THE FRONTIER OF A PIVOTAL WORK: INNOVATION AT WORK

Marie-Michèle Cron

One can either compare invention and creativity in a relation based on reciprocity and elective affinities, or highlight their distinctiveness: the first is driven by inspiration; the second depends directly on its being applied, or further still, on a notable difference between the process and its result.

The Year's Midnight Shadow Box 5, 2011, Rafael Lozano-Hemmer, High resolution interactive display with built-in computerized surveillance system, Copyright Antimodular Research

A question of identity

For over ten years now, the Montréal digital scene owes its development to the effervescence and convergence of socio-economic factors and specific policy initiatives which emerged in the 60s. As Québec was marked by the rise of new technologies and interdisciplinary transgressions, it was also immersed in a singular socio-historical and aesthetic context. Montréal was, and remains to this day, the seat of the sedimentation and blossoming of innovative forms linked to so-called media arts, since they also encompass independent cinema and video. These appeared during the deep social changes, an atmosphere of revolt and quest for freedom proper to the *Révolution tranquille* fostered. The major technical innovations, such as the availability of marketed portable video and sound recording devices, encouraged artists and citizens to make their voices heard, consolidated their feeling of identity, and conditioned contemporary creations to participate in the manifestation of a powerful collective imaginary. Here, the use of media as new means of expression and tools of artistic creation can be explained by the population's density within urban agglomerations and geographic isolation, two factors which certainly contributed to promote a highly efficient telecommunication network.

We cannot overemphasize the role that the stakes, both financial and symbolic, of digital culture as a whole represent and constitute within the sphere of the new creative economy. Also, it will be useful to see how the innovation's potential plays a role in digital creation itself and how it partakes in the elabo-

ration and consolidation of a sector that is a central component of the concept of a creative cultural metropolis. The binomial innovation/creation opens the way for new spaces and networks of sociability, a cluster of creative communities made up of innovative nomads.

What is innovation?

As a general rule, innovation emerges when there is an improvement in an already existing product through a higher performing product: here the newness becomes one of the added values to be brought to a research area or a discipline, and to the set of goods, services and shared uses in a chosen context. One can either compare invention and creativity in a relation based on reciprocity and elective affinities, or highlight their distinctiveness: the first is driven by inspiration; the second depends directly on its being applied, or further still, on a notable difference between the process and its result.

That being said, if interpretations regarding its nature differ, innovation is bound by its very nature (often misunderstood), to its context of emergence which may be delayed due to multiple factors (human and non-human), and to its social impact. Its components refer to a change in the object's function and status, the emergence of new ideas and their implementation, in fact, to everything that touches on the notion of progress, be it social, technological, or economic, or even of a gesture that brings an added value to an organization or company.

As for artistic innovation, it would permeate several production spheres, contaminating other work areas through the imagination, games and even creative anarchy. [1]

If innovation is generally associated with the world of industrial research and the emergence of new products and methods revolving around competition and profit seeking, paradoxically, this notion is less present in the art world: yet, aren't values such as self-reliance, freewill, originality and risk-taking, also its raison d'être? How do the digital arts metabolize the innovation that influences both the creative cities linked to the new economy?

Digital artist: worker of the future?

A "laboratory artist" [2] or worker of the future, a researcher-expert in his chosen field, the digital artist is changing the face of art by overcoming the physical obstacles which may arise when art meets technologies based on constantly renewed and fluctuating data. The digital artist possesses mixed and non-conventional skills in combination with a very open mind and professional flexibility: he is versatile and knows how to renew himself. By way of science, technology and art as generators of new expressive forms, he can thus exert an influence on the world of affects and the sensible, but also on the dissemination of new theories and new concepts. In the digital arts, innovation is exercized in the invention of dissemination platforms and interactive extension prostheses; the spatio-temporal involvement of the other in the new discursive and textual spaces; architectural reconfigurations by way of light and sound; reactive textiles; new scenographies which fuse real and virtual beings; synesthetic audiovisual projections and performances; the *détournement* of the functionality of everyday objects; novel and poetic combinations between high and low tech.

As Pierre-Michel Menger underlines:

"The arts and the entertainment industry, like all innovation producing and consuming sectors, constantly give rise to new professions and new professional identities, and correlatively, to the redrawing of the boundaries between existing specializations." [3]

One must be cognizant, however, that the digital is still a genre which is subservient to the technical and that this incursion into the territory of others is not all smooth riding, for this new type of researcher-creator must know how:

"to mix academic research, artistic innovation and the valorization of flexible products oscillating between artwork, tool and knowledge." [4]

The paradigmatic shift from the tool to the aesthetic object (is computer-produced art really art?) and the artist's role as the sole master and agent of his work but who works with others - who in a sense become deferred authors - raises questions of an epistemological order. One wonders, and quite rightly so, about the validity and legitimacy of artistic production and the interpretation of works resulting from it; the democratization of their use and the physical, intellectual and emotional implications for the user; their finality and their reception effects, as well as the place of these works within the symbolic field of contemporary art. Digital artists appear to be in a delicate position between two realities - they are part of a communicational aesthetic all the while redeploying the conventions belonging to the visual arts domain proper.

As versatile creators they create visualization devices, reflect on how to more actively integrate the viewer in their creation process and artwork, and adopt a panoply of intellectual positions while working in groups and through shared networks. The digital arts also bring about a feeling of belonging between the author and the viewer, which may be based on a game and action logic: in this case, the work coexists thanks to the physical or virtual, but mutual, participation of the actors. The protocols established by the artists thus lead to a dialogue about the aesthetic, conceptual, game, and bodily aspects, but also about phenomena that involve the viewer's contemplative and imaginative faculties.

It is the case of Melissa Mongiat, [The User] and Rafael Lozano-Hemmer. As much in their aesthetic aspect as in their dialogical approach, their works indicate also one dimension that is characteristic of the digital arts which is the dynamics of the exchanges and distribution between various actors and their evolving context.

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TIME TO LIVE

Sean Cubitt

Poets are the unacknowledged legislators of the world.

(Shelley, Defence of Poetry, 1821)

Programming is a poetry for our time.

(MJ Hibbett)

The dominant media of the 21st century are now in place: spreadsheets, databases and geographic information systems. Evolved from double-entry book-keeping, from the early adding machines and filing cabinets of the first office revolution, and from the maps that guided the first wave of European imperialism. All three share a move away from origins in chronological ordering. Time is being squeezed out of contemporary media. We need to look hard at its position in digital technology. The moving image media begin with succession – one frame after another – adding the interlaced and progressive scan with the invention of video. Digital imaging brings with it the clock function in image capture and processing; and the introduction of the time-to-live principle in packet switching, which ensures undelivered packages erase themselves so that they do not clog the system. Time is integral to digital media, far more so than to their mechanical predecessors. Vector graphics are a startling example of the potential of this temporal specificity. However, vectors are both constrained by the universality of raster displays, and redeployed in video codecs as a means for managing and controlling time. The aesthetics of digital time cannot be separated from its political economy and art that is digital needs to pay attention to the materiality of digital media, and the politics and economics that define them, especially in the moment of IPv6, HTML5 and the MPEG-LA patent wars.

I want to say only one thing today: that time is of the essence. The repression of time in the dominant media is a characteristic of the digital age. At the same time, the emergence of new forms of digital temporality at the technical level demonstrate grounds for hope that a new relationship with time can emerge. But then again, there are institutional and economic pressures fighting to maintain the atemporal character of our times. The struggle between space and time is the meat and potatoes of digital media. Let me try to explain.

It is was for many years a truism of film and other media studies that we live in an era dominated by the hegemony of illusionistic and narrative media. Avant-gardes struggled for abstraction, and for non-linear and anti-narrative modes of working. Meanwhile, it was becoming apparent that the development of neo-liberal finance capital on one hand and bio-political management of populations on the other had formed a new political economy whose foundation is a new aggregation of media.

I pause here to make a theoretical point. We have learned from the Marxist tradition, as much as from the very different theses of neo-liberal ideology, that the economy is the foundation of society. The rival claim, most cogently voiced by Foucault, is that power – politics, governmentality – is the formative agenda of social life. Both share the belief that there is a foundation. Some forms of feminist and green politics have similar structures: patriarchy, Gaia, or the relations between genders or to the natural environment are key to a a good many variants of both. It is important however to understand that these terms – market, polity, patriarchy, nature – are abstractions, as indeed is the term 'society.' We need such high-level abstractions in order to make arguments and discuss values, but we should not mistake them for materially, physically present facts. It is impossible to see a market, pick up a polity, or shake hands with nature. What we can, what we must do, is enter into relationships with human and non-human others, mediated through gesture, money, art, and bits. Mediation is the material form of power: what Foucault refers to as its 'capillary action,' the media through which authority travels from rulers to ruled, or resistance to power acts against rule. Mediation is the material form of exchange made concrete in the exchange of metals, bills, and now of bits, as well as of the material goods and services which we call the economy. A market is a complex collection of mediations between people and raw materials, factories and corporations. Mediations comprise the whole gamut of devices, from clothing to surgical intervention, which make the relations between genders materially significant. Furthermore, the relations between people and environment are not mental abstractions but enacted through the physical mediation of toxins, pollutants, husbandry and forestry. Both power and economy require media to complete their tasks, media without which they cannot function. Mediation names the material processes of interconnection, influence, reverberation and communication which, in specific formations and at specific levels of abstraction we call power, economy and so on. So much for the theoretical preamble. Mediation requires media, and those media have histories, which shape the digital forms that now in turn shape our world. (FN: There's not room here to make the argument that this is not technological determinism: mediation is not just machines but practices, nor is the relation linear causality, but the networked relationships which mediation mediates).

The dominant media of the 21st century are no longer story and picture but the three pillars of the political economy: spreadsheets, databases and geographical information systems. It is the task of digital arts in this century to address the peculiar qualities of these dominant media forms, and of eco-critical thinking to demand better, but first we need to analyze how they are constituted. The best way to do that is to analyze how they came into being: how their characteristic forms of action derived from earlier technologies and practices. This has the additional virtue of giving us some traction on how we might retrofit abandoned practices, and how to recognize genuinely new ones, to hasten the development of new media formations: new art, but also a new political economy, new human relationships, and new relations with the organic world.

It may well be that writing itself began in Sumer about 8000BCE in record-keeping for contractual purposes. For centuries across Old and New Worlds, various means of keeping tallies proliferated, and from them derived much of our mathematics. Double-entry book-keeping, providing a schematic record of profit and loss, was first formalized and published by Bartolomeo de Pacioli in 1494. The ledgers used at the time were narrative in form, in the sense that they began at the beginning and were ordered

chronologically. It was only the invention of new mechanical aids like adding machines and cash registers that changed this narrative form.

Much the same is true of the ancestors of databases. Ledgers recording the duties owed and redeemed by peasants to their feudal lords, of vassals to their sovereigns, and later daybooks recording the activities of the Spanish and Portuguese empires of the 16th and 17th centuries, and in factories and the emergent poor schools and hospitals of the 18th century, were written down in the order of their occurrence. Parish records of births, marriages and deaths were written as they happened, the writing part of the ritual life of the village. In this instance, the invention of the filing cabinet allowed a new kind of order: one based on arbitrary systems like the alphabet. These made retrieving information simpler, but did so by abstracting the acts described from their place in the order of time. Instead, date became a system as arbitrary as alphabetic order.

The mechanization of book-keeping and maintaining files went hand in hand with new media like calendars and diaries made popular by mass printing (Gitelman). The temporal order of exchanges recorded in the old ledgers was now rapidly being transformed into a spatial order; and that order was being matched to a cellular grid extending into the future as well as the past, matched to a conceptually infinite succession of days and of cells marking the advance of time, leaving behind the semantic cycle of monkish hours. Like the conceptually infinite succession of future transactions – notably the command and control of debt – and the filing cabinet as instrument of rule, calendars and diaries helped compose the rectilinear and conceptually infinite grid of contemporary spreadsheets and databases.

Accountancy and record-keeping involve essentially human relationships. The map, however, extended the range of power in the age of the great navigations and the first precursors of globalization and colonialism, to control over geography. Map-making completed the first great act of modernity, the alienation of land from the people who live in it which was at the most profound – and also most destructive – achievement of feudalism. The translation of typically lateral observation into typically flat representation, and of the curvature of the Earth onto 2D surfaces, created magnificent leaps in the geometric arts, and objects of great beauty. It also provided the rulers and colonists who were their chief market with a God's eye view of the planet. Many of them bore, and still bear, the trace of time in the form of trails or markers for historic monuments, or on older maps markers of risk and bounty: Here be Dragons, X marks the spot. Many maps trace historical boundaries and the shifting tides of empire. Maps do not exclude time, however they can subordinate it to space. In the 18th century, ubiquitous adoption of the systematic grid of longitude and latitude could predict, like a calendar, the indefinite extension of space into realms unvisited by Old World navigators – Terra Incognita. This was the first step towards the absolute map. The second belongs to the digital summa of the three great media of modernity – accounting, filing and mapping: Geographic information systems, GIS for short.

GIS compiles the data we have on populations and maps it against environments. When Foucault speaks of power mediating between populations and environments, he might almost have been speaking about

these massy software suites, where not only what we know, but extrapolations from the present into imaginary futures, are organized into communicable calculations. GIS allies the powers of these three media with the calendar to provide the perfect instrument of rule: a simulator of consensus and dissent, conformity and risk, whose product is a statistical predictor of changes to be avoided or managed. GIS is a machine for ensuring that the future looks as much like the present as the embrace of human and technology can devise. In a sense, the residue of cartography is only a metaphor for two entirely characteristic operations: the arithmeticization of knowledge, and its spatialization. All possible futures lie spread out as so many Feynman diagrams or forking paths, each of them open to the managerial rule of bio-politics.

The grid – of spreadsheet and database cells and stacks, of map coordinates, of calendrical dates – is the characteristic diagram, as Deleuze would have it, of digital media today. The array of the raster display and of CMOS and CCD cameras, LED, LCD and plasma screens, DLP and LCOS projectors; the matrix principle in storage, the grid of qwerty and calculator keys, the square waves that carry data through fiber-optic systems, all in Peter Lunenfeld's nice pun, snap to grid.

At the heart of the grid is the triumph of space over time, or rather the spatialization of time. Time is a mysterious thing: Augustine observed in the 5th century that as long as no-one asked him to define it, he knew perfectly well what time was, but if they did, he didn't. Once upon a time, time was on the human side of the population-environment equation. Very gradually, time migrated to the environmental side: something that stands over against us, in the way our tools became factories that dominated and constrained our actions. To use a now rather old-fashioned term, our tools were alienated from us; and now time has been alienated too. Alienation has an important legal meaning: something is alienable if it can be sold, given away or otherwise gotten rid of. Slavery is illegal because a human life is not alienable. To say that time has been alienated then can be construed as meaning, time (like factories, and now like information) can be sold.

When we speak of political economy, we mean the inextricable involvement of economics and politics. The pseudo-science of economics, once abstracted from politics, has resolutely failed every test (see Mosco 2009); at the same time, politics without economics has no traction as explanatory system. Most of all, neither has any actuality unless it is grounded, as we have seen, in material mediations. The alienation of time, its placing over on the side of the environment, makes it necessary, as Foucault suggests, that the political economy should mediate alien time back to the population. The instruments through which it does this are the media technologies whose history we just sketched: spreadsheets, databases and geographical information systems. So, what exactly happens to time in the media technologies of the neo-liberal database economy?

Our first observation is anatomical: time shares the arithmetic properties outlined above. Time occurs in unit steps that comprise the counting numbers. Take the basic process of digital imaging. The lens is opened for a fixed duration, during which photons flood in. Where they strike the pixel array of

receptors, the photons cause reactions which release electrons. The electrons en masse are what we call charge. To get them off the chip, ready for the next image to be taken, they have top be drained into some sort of storage. The design of the chip ensures that the charge will always flow in channels in a specific direction: let's say these are the columns of the future image. The problem then is the rows; and the solution is to have the charge from each pixel 'row' cascade down the column in strict lockstep: first the pixels from row one, then row two, and so on. This requires a clock function. Incidentally, writers complaining of the 'death of cinema' have missed this difference between analog and digital images, concentrating instead on a rather bogus argument about realism. The real distinction between the two is that analog images only succeed one another in time, where digital images contain time in the structure of each and every frame.

The time they contain was of course worked out, grosso modo, in the succession of cinema frames; and in greater detail by the scanning function of interlaced TV and analog video. But the soft blur of the old cathode ray tube gave away an ontological secret which cinema's photographic basis had hidden. No electronic image is ever complete. Even the startlingly fast refresh rates of progressively-scanned high-definition screens cannot disguise the fading of each image before the successor scan begins. It is this fading which drives television towards 24/7 broadcasting: there is no point in time when broadcasting can come to an end, not, that is, in the sense of 'the sense of an ending' that Frank Kermode identified as a crucial structuring and humane aspect of story-telling. The indefinitely extended future of simulation, the pseudo-virtual science of risk avoidance, allows no such satisfactions. (It is pseudo-virtual in the sense that pseudo-virtuality plots the knowable outcomes of known trends: the real virtual is the open becoming of unknown futures – as I'll explore in my conclusion.)

The endlessness of transmission is a quality of the pixel as the automated aggregate atom of perception, the flicker that enchants the eye, the essence of distraction which has exercised commentators on modernity from Benjamin and Kracauer to Jonathan Crary. Historically, the function of editing was to structure the flux by interrupting it, shaping space in continuity cutting, but also structuring the experience of flux into discernible scenes that succeed one another. Distracted gazing at flux is like watching the waves: the cut, which separates figure from ground and one scene from another, is a mimesis of the concentrated gaze that selects the telling detail and constructs a story – a temporal direction – from the manifold of perception. That process of in-forming flux is now undertaken at a far smaller scale. Though tiny, the pixels of a camera or projector chip are finite in dimension. The duration of exposure is also tiny but finite. But where pixels are atoms, photons are quanta, and the individual pixel in an individual exposure are aggregates of all the photons raining on them: their wavelengths as well as their numbers. The result is an average, reduced to the counting units of hexadecimal numbering. The ordering of time thus occurs not at the level of the frame now, but of the pixel. In addition, most codecs use a form of prediction to reduce redundancy in the signals they transmit. When a block of four pixels, a group of four blocks, or a less regular slice, is made up of pixels of more-or-less the same color, the codec reduces them all to one numeric code. If they stay more-or-less in the same place for the duration between keyframes, the data transmitted instructs the display to maintain that color throughout. Nothing emerges, nothing evolves or changes, in that duration. The ideology of

efficiency, now embedded in the very media through which, increasingly, we learn about the world, reduces change to its minimum. Four principles are in play:

the statistical averaging of captured light to a single figure;

the use of unit counting;

the clock function as a way of regulating the spatial configuration of the pixels;

and the predictive tools that minimize change over time.

The digital image respects space, but time is diminished.

Yet time is by no means redundant in digital systems. The basic device of packet-switching, foundational in the TCP/IP suite and increasingly to digital terrestrial and satellite broadcasting, is tied to time. The basic idea is simple: every message, whether an SMS message or a multimedia file, is split into smaller packets that find their way through the network to be reassembled at their destination. The problem is this: messages sent into the network have to have a limited lifetime, or the millions of undelivered fragments – the 404 errors, the 'unrecognized recipient' responses – would circulate forever, clogging up the vast but again finite resources of the Internet. Packets are therefore designed to contain not just data but a complex 'envelope,' which includes key data for its transmission. In addition to a sender and receiver address, each packet contains information on its position in the whole message: how many packets there are, and which one is included in the present item. Finally, the packet contains a kind of clock, listing the number of nodes it can pass through on its way to its destination. As it passes through each node, that number is reduced by one, until, if it fails to arrive, the number reaches zero and the packet is erased. This is what network engineers call the time-to-live or TTL of a packet.

I scarcely need to tell a room filled with artists and analysts of the media arts of the rich field of metaphors that can be evolved from this nomenclature. However, in obedience to my theme of the temporalities of digital media, I'll emphasize one in particular. Digital media are intrinsically ephemeral. As we have learned at various Media Art History conferences, through the flowering of archive research projects, and from important experiments like Jon Ippolito's Variable Media Network, digital media are even more prone to decay and loss than their predecessors. One facet of this ephemerality coincides with the management of time – time-management, risk management – that we have been discussing: the tendency for digital media technologies to live in an indeterminate and unending present, whose visual isomorph is the flux of pixel space.

There are then three large-scale activities going on in the digitization of time. Firstly, as countable units alienated from the human population and placed over against us as our habitat, time becomes commodity. Secondly, through the controlling mechanisms of both GIS simulations and predictive codecs, time becomes a medium of power, specifically of bio-political power. Thirdly, what both these economic and political analyses share is an aesthetic of spatialization and the endless present. To

reiterate, the aesthetic is not the icing on the cake: it is the recipe that makes the cake possible, the oven it is baked in, the chef that creates it. Political economy is conducted through these media; the forms of these media shape and are shaped by the political economy they mediate. Therefore, the electronic arts we celebrate at ISEA are by no means marginal, but the key material resources from which any new political economy will have to be articulated.

I take one last example. One of the interesting genealogies is that of projection, as ancient as the caves, as new as liquid crystal on silicon chips. Common to the mechanical projectors that launched in the 19th century are the combination of parabolic mirrors and condenser lenses used to force the light from a lamp through a tiny aperture onto a vast screen meters distant. Making light coherent would reach one apogee in the pillars of searchlights at Albert Speer's Zeppelin Field at Nuremberg; and though I don't want to make the strong statement, that coherent light is fascist, the organization of light Speer achieved should be recognized as emblematic of a certain kind of modernism, still borne in the Fox Searchlight logo.

Parallel with the development of cine-projection, late 19th century experimenters started working with the phenomenon of total internal reflection in water and glass. Two new features came onstream in the 20th century. One was laser, light with carefully construed coherence capable of traveling great distances and carrying information. The other was glass-fiber technology. The combination of light, coherence and glass in fiber-optics is the direct descendant of the assemblage of technologies which give us projection. There is, however, a final step in this process. The waveforms carrying digital signals through fiber-optics, which form the backbone of all our digital networks, are of a peculiar kind, sharing their shape with more and more universally standardizing transmission protocols within as well as between devices. This is the 'square wave.'

The units of digital media are, as we know, ones and zeros. Equally, we're all aware that zero charge is all but unrealizable, and that 'zero' is a polite fiction for 'small.' In diagrams of square waves, we see equally that the transitions from one to zero and vice versa are not immediate and total, but graduated: another feature we leave out of our logic. Like the photons we express as hexadecimal numbers, digital media deal in approximations. The approximations fit our current commodity-based, managerialist form of political economy. As we all know, transmission does not differentiate between different content types, only between units (packets, pixels); neither in packet switching nor in routers. All that is important to the TCP/IP suite, and to the functioning of any digital device, is that data be ordered in units, and that the units can be handled as if coherent. Processing – such as compression-decompression algorithms and color management systems – and display – now almost universally raster – only complete the universalization of the unit grid as the core diagram of our age. Even the hypercube that provided the essential geometry of Baran's anti-hierarchical networking is a cube, that is, composed of sides of unit length.

So, there we have a certain map of the digital terrain. From the dominant applications and displays to the clock function, chip design, packet-switching, and the square-wave in fiber-optics, our media are dominated by unit counting, statistical averaging, and the form of the grid. These qualities conspire to reduce time to a function of space; most of all, they replace the emergent and unforeseeable future with the indefinite, calendrical extension of the present. They do so, I argue, in the interests of a very specific configuration of power and wealth, which we can describe as the database economy.

Of course, this analysis of the political-economic aesthetics of digital media is problematic. It is a critique, and critique does not in general lend itself to building new options. Perhaps more important, there is no sign here of work practices that change technologies in subtle or radical ways: the work of the Peer-to-Peer Foundation and the gift economies of Linux, Wikipedia and so on; or the resilient, evocative, powerful and beautiful art that has been, and is being made, in this media. Technique, I mentioned in opening, is an engagement in media that goes way beyond the mastery that is all too often in subordination to the inbuilt norms of the toolset. In Marx's account, technology is the congealed form of the skills of generations of workers: we could, learning from indigenous wisdom, say that technology is where we in the west keep our ancestors. Indigenous people, when they pick up a tool, address the ancestors responsible for bringing it to the people. We however have forgotten the name of anyone but the proprietor of the technology, and in many instances not even that. Reconnecting with the living labor of the past in our contemporary technologies is one of the key actions of the digital arts. Inventing new techniques for using existing technologies is another: demonstrating their limits, working at and beyond them, creating new uses and retro-engineering what we are presented with, these are also digital arts.

We have little time to discuss the governance structures and commercial decision-making which have produced the current round of standardization. A case in point is the EMV chip, as used in chip-and-pin debit and credit cards. The letters EMV stand for Europay, Mastercard and VISA. EMV is a proprietary technology and perhaps the most significant interface between end-users and the global electronic flow of capital. In another field, the MPEG-LA Consortium control the vast majority of the patents involved in the MPEG-3 and MPEG-4 codecs. Lawyers working for the unholy combination of Microsoft and Apple assert that Ogg, and indeed any of the other open source codecs being propounded by Google and Mozilla for HTML5, infringe those patents, and that HTML5 – and implicitly IPv6 – should be tied to these proprietary formats. As even the Economist has argued in recent years, patents are becoming barriers to innovation instead of rewards. The miracle of the Internet – governed through the competing interests of over a dozen major panels and twenty or thirty minor ones – is that it works at all. But as many key organizations, among them the International Telecommunications Union, the International Standardization Office and even the IEEE, open themselves to deeper and deeper influence from transnational corporations; pressure mounts to slow the pace of genuine innovation, standardize devices and procedures, and concentrate on global market penetration.

The problem is that, from the psychology of perception used to test color responses to the design of cellnet coverage, good enough is always the cheapest option. Standardizing on the good-enough is

always the first option: think of the history of VHS tape. Only when the market is saturated and can consume no more does it make market logic to launch the next format. As long as we accept as necessary and unavoidable the constraints of digital media as given today, there will be no investment in getting hexadecimal computing, or quantum, or optical, or bio-computing out of the lab.

This does not mean that we should we be waiting for the corporations to develop our media for us. My favorite example of the road not taken is Ivan Sutherland's Sketchpad. Remember, it's not so long ago that these things were being pioneered: Alvy Ray Smith told us a story at the Digital Light symposium in Melbourne about writing the code for HSV color space overnight, because he needed it in the morning. We should not be daunted by the existence of sophisticated binary machines, any more than Sutherland or Smith were daunted by the existence of sophisticated automotive engineering. Sutherland's pioneering graphics machine used a light-pen and a vector screen: an oscilloscope. Vector displays don't scan: the gun only points to the part of the screen to be activated: a bit like a plotter printer, it makes gestures.

There are two things about a vector that make it an oddity in the arithmetic domain we've just charted. Firstly, vectors do not work on the counting numbers but infinitesimals. A vector can be scaled up and down forever without producing the tell-tale 'jaggies' of bitmap imaging because it is not composed of the numerical addresses of pixel cells on the grid. A vector is a line expressing an algorithm, one that can be recalculated on the fly, which has a direction: the line A to B is not the same as the line B to A. A vector moves in time: that is why it is a sound metaphor to describe it as a gesture. Because it is re-calculable, like a gesture, it can change direction, constantly or inconstantly as it moves into the future. Vectors thus include time, and reject the grid.

Ironically, they can only be displayed on raster screens, because in almost every domain, since the abandonment of vector screens in favor of CRTs in the games industry during the 1980s, raster displays dominate everywhere except in a few fields of science and engineering. However, the history of raster displays gives us a possible example of how abandoned technologies can be revivified. In the 1970s, research of plasma screens had reached a dead-end, and though IBM and others kept plasma labs open, the technology was pretty much mothballed. But in 2002, its originators took home an Emmy, and Fujitsu were in full production. Now, there are serious reasons for not wanting to boost plasma screens, not least general ignorance on how to recycle them, but the principle of revisiting residual technologies is one we can bear in mind in the case of vector screens.

Those of us who grew up in Marxism, or indeed in many other Western and Islamic traditions stretching back to Ibn Khaldoun, know to expect, at the high point of a civilization, the seeds of its decay and replacement by another. The job at hand is to investigate which emergent principle or principles stand opposed to the hegemony of the grid and its spatialization of everything. This is the actual state of affairs, where by 'actual' we should understand the result of all previous actions. What we are looking for is then the 'virtual' of that actual, the vast array of possibilities which arise at the present, the only

moment in which an action can occur. Alain Badiou in his Numbers and Numbering, and Laura Marks in her wonderful book on the Islamic origins of digital art, Enfoldment and Infinity, give convincing mathematical arguments why the units or counting numbers are unstable; concealing the fact that they derive from the anti-Aristotelean principle of non-identity. Posing as coherent and unified wholes, digital media persuade us not only that the present extends indefinitely, but that no action is possible in the wholly actualized digital domain. As Benjamin might have said, the vector smashes this glass prison open with the force of its algorithms. The planned, regimented extension of the actual into indefinite sameness dreamed of by Stalinists and corporate risk managers alike crumbles on its own internal dialectic. This is the satirical strategy of Benjamin Edwards's 'digital paintings,' roundly attacked by Whitney Davis in October (117). Edwards works by gathering images and logos from the streets of the USA, rendering them into 2D and 3D objects for manipulation and composition, and in many instances then reproducing the results as acrylic and mixed-media paintings. For Davis, the satire falls flat, "Ah, the wit of the digital", he says ironically, "of digital analogy to the digital!" Davis recognizes in passing "Edwards's point seems to be that in the digitally constructed world of office parks and shopping malls nothing does exist between the digital units," but sadly he dismisses the point. Edwards is entirely impressive in his analysis of the artifice of coherence, and in the Shockwave sequence documenting the construction of the 2008 painting The Triumph of Democracy, painted in response to the financial crisis, the ghostly incompleteness of a planned landscape could not be clearer. If there is a criticism to make, it is that the work deploys vector graphics only to caricature the depthless spatiality of bitmaps. That leaves unaddressed the affordances of the vector to produce difference: the mathematics of emergence.

The vector is not an exclusively digital mode. They are traceable in Hogarth's line of beauty, in Klee's admonition 'to talk a line for a walk,' and in one of the most emotionally and intellectually satisfying works to date in vector graphics, Chris Brandreth's Ryan, the genealogy of vector graphics in the playful, imaginative, ever-evolving animations of its subject Ryan Larkin is entirely explicit. What appears in all these examples, as in the pioneer animations of Emile Cohl, and in popular culture in some of the best work of Pixar, is the room they create for futures of which we can only say that they are not the same as the present.

On those rare occasions when it is still possible to act outside of the planned accommodations of bio-politics – which already has in place strategies to manage the one per cent who walk up the down escalator – we make actual the virtuality, the potential stored in the existing state of affairs. That is the aesthetic of the vector: openness to unregulated, and indeed risky futures. Where time to live is measured in the dull ticking down of the square-wave clock function in packet-switching, the vector veers out of the plane of the grid – I want to say, at an angle I. (As mathematicians in the room will recognize, the complex numbers derived from I, the square root of minus one, can be represented as vectors on the complex plane whose axes are real and imaginary. Science, engineering and computer science make great use of these formulations. It is only the public expression of the digital, which is so profoundly wedded to the grid of rule and wealth-extraction). The most modest enquiry into the living conditions of the vast majority of the world's inhabitants will demonstrate that the existing regime has failed, and fails hourly, to ameliorate poverty, hunger, pestilence and the destruction of human and

non-human environments alike. The wealth it produces is sham celebrity and cheap tin trays. The power it exercises is pure anxiety, risk-averse to the point of inaction, or it is purely destructive of forces that do strain to change the world. To this extent, it is not power at all: power is potential, the capability to act, to risk, to make a decision, to change the future here and now in the only moment when it can be changed. This is the second great facet of the ephemerality of digital media: they occupy a moment not only of apolitical stasis, but of the inevitable fading away of the old, the inevitable instability, the inevitable moment when we will have no choice but to act. The existing time-to-live of digital media is actually a Heideggerian being-towards-death. The vector politics of the new media is about becoming; about living the present as action in order to create the future as new.

A search for 'vector art' will get you little more than clip art and tutorials, most of numbing, generic, unambitious, commercial ordinariness. Many animators, I know, will disagree in my assessment of Pixar, and find their work, and 3D vector animation in general dull. Of the great icons of vector mathematics, we ISEA-niks are thoroughly bored with the Mandelbrot set. In fact, it is worse than that. The central tool for controlling the steps between keyframes in MPEG and indeed almost all other codecs is vector prediction. Born free, the vector is already in chains. I make a plea, here, rather than a prophecy, and mark out a job of work. The vector aesthetic does not belong to the grid. It orients towards unforeseeable futures. It is the descriptor of action, of becoming virtual and making new actions possible, new actualities, from which further and further changes can emerge. I suppose I am trying to describe the mathematics, and the engineering principles, of hope. This is what the vector is for: creating the time to live.

THE IMAGE-OBJECT NOTION AND ART PRACTICES USING MOBILE SCREENS.

Dominique Cunin & Mayumi Okura

Whether it is a question of the object supporting the image or of the object represented by this image, the relationship between images/pictures and objects has evolved throughout art history. In this paper, we summarize three different approaches of the image-object notion in order to contribute to it and propose an extension of its field of application in artistic practices using mobile devices.

Fig 1. Book Tales — Petals, 2011, Dominique Cunin & Mayumi Okura, iPad interactive application,Copyright Dominique Cunin & Mayumi Okura

Fig 2. SensorGirl, 2010, Dominique Cunin & Mayumi Okura, iPad interactive application, Copyright Dominique Cunin & Mayumi Okura.

The image-object notion in visual arts

Every visual representation needs a physical medium so that it can be apprehended by its viewers. Since the very origins of visual arts and crafts, artists have been creating artistic objects by manipulating physical materials in various ways. Pictures can be seen because they are inscribed on or within a surface, even when this picture is made up of a very brief phenomenon. Bas-reliefs and sculptures produce images because they take a tangible shape that makes them visible. As a last example, cinema films can be seen by the audience thanks to the projection of its frames on a screen through a light beam. These statements, although obvious, show without ambiguity that an image is linked to the object it is shaped with (paper sheet, canvas, wood piece, etc.), whatever its plastic qualities or aesthetic objectives. Whether it is a question of the object supporting the image or of the object represented by this image, the relationship between images/pictures and objects has evolved throughout art history. Several analyses can be found in theoretical research about the relationship between images and objects. These analyses use the term 'image-object.' We summarize here three different approaches of the image-object notion in order to contribute to it and propose an extension of its field of application in the artistic practices using mobile devices.

IMAGE-OBJECT IN THE MIDDLE AGES

The first direction of research leading to the image-object notion is suggested by Walter Benjamin: "Artistic production begins with ceremonial objects destined to serve in a cult. One may assume that what mattered was their existence, not their being on view." [1] One thing that the author suggests here is that religious pictures and images should also be considered, in their physicality, as objects. This problematic idea has been developed by Jérôme Baschet [2] who sets out the notion of image-object as follows:

In the Middle Ages, there is no image that is not an object at the same time or at least, that is not attached to an object of which it constitutes the scenery and supports its use. [...] We suggest the notion of image-object, in order to highlight that an image can't be separated neither from the materiality of its medium, nor from its existence as an object, being acted and acting in specific locations and situations, and within the dynamic of social relationships and of connection with the supernatural. [3]

In the specific context of the occidental Middle Ages, an image-object would be "at once created as an image and an object" [4] and this notion "forbids to think it as the simple conjunction of an image and its medium. The image-object should rather be taken as an indissociable whole." [5] This first definition of the image-object, explicitly linked to the social and religious context of the European Middle Ages, is an image shaped by the means of physical material, a medium that gives it the capacity to exist as an object in a religious and social network of activities which determines their functionality.

MANET AND THE TABLEAU-OBJECT

In his analysis of Manet's painting, Michel Foucault [6] uses the notion of tableau-object. [7] If the term 'image' is not used here, this notion shows many similitudes with the image-object notion introduced by Jérôme Baschet and slides it into the context of the painting at the end of the 19th century, when it was more independent of religion. Here also, the medium's materiality of the picture is a major aspect but

with the idea that the painting is closely linked to its direct environment, and therefore its exhibition space.

What Manet has done is to make re-emerge, inside the painting's representation, the properties, the qualities or the material limitations of the canvas itself that the pictorial tradition had, in various ways, avoided or hidden until then. Manet re-invents, or maybe invents, the tableau-object, the painting as a materiality, as something colorful that is illuminated by an exterior light and in front of which the spectator turns around. [8]

Foucault's proposition consists in the demonstration of how Manet managed to restore the materiality of the painted artwork by considering, in the visual construction of his paintings, the physical characteristics of the canvas, the way it is shown and the position of the viewer facing it. Foucault seems to accentuate the sculptural aspect of Manet's paintings. As every volume placed in space, the painting becomes sensible to exterior contingencies, and becomes similar to an object that should be observed from various points of view. This idea is confirmed by Foucault's own words about *Un bar aux Folies-Bergère* (1882):

Here is the very last technic of Manet : the property of the painting to not be a normative space but a space in front of which we can move. The viewer is mobile facing a painting that exterior light strikes directly, verticals and horizontals lines are endlessly doubled, depth is erased. Manet didn't invent a non-representative painting but the painting-object in its material elements. [9]

IMAGE-OBJECT AND INTERACTIVITY

The term image-object is frequently used in the context of computer software. Many high-level programming languages use this term to name pictures that are included in a program. [10] More generally, object oriented programming (OOP), by its fundamental principals, naturally lead to the use of this vocabulary. OOP consists of the definition and the interaction of software bricks called objects. An object represents a concept, an idea or any entity whose structure and behavior have to be defined in a way that it can communicate with other objects. In this context, pictures/images becomes objects that can have a particular behavior. Beyond this technical approach, this image-object presents conceptual specificities that Jean-Louis Weissberg raised about interactive images. As it becomes an interactive object, an image can respond to our solicitations through physical interfaces (mouse, keyboard, etc.) because its specific behavior has been programmed. "The image becomes an existence mode for the object and an access to its creation, its transformation, its manipulation." [11] This relies on the digital nature of this image-object. Variable and programmable in time and space, the digital image-object takes place in a simulation, in a time that runs on because the spectator/user interacted with it, a "flatten time" [12] or "uchronic time" [13] that we usually call the 'real time.'

Here is constructed the reality effect of simulation, not in illusion nor substitution, but in intervention. At the end of this process are generate hybrids, intermediary beings, more figurative than images, more functional than objects. Let us accept to call these image-objects. They are not anymore a matter for representation but for presentation/simulation. [14]

With the new generations of smartphones and tablet computers we assisted the gradual disappearance of the physical keyboard. For most of these devices, the main human interface is a multi-touch screen that makes the keyboards virtual, one of many other elements in a graphical user interface. The virtual keyboard of mobile devices is one hint, among others, of the radical compression of traditional human interface input/output devices into one single object: the screen itself. Mobile devices can then be thought as mobile screens. Our research into mobile screens and their use in artistic and interactive creations led us to another variation of the image-object notion. This variation does not exclude the three categories we stated above, but assembles them while concurrently extending the notion toward another meaning. *SensorGirl*, an experimental artwork we created in collaboration, [15] is a useful tool to illustrate this fourth image-object category.

SENSORGIRL: MOBILE SCREEN'S IMAGE-OBJECT MODEL

Accelerometer sensors, primarily made to measure the linear acceleration of the mobile it is mounted on, were popularized by the Nintendo *Wii* remote controller, some time before the gyroscope, made to measure angular position (orientation). These sensors, nowadays embedded in almost every mobile device available on the market can be used to compute the relative rotation of the device itself as it provides 6-axis motion sensing. In the daily use of, for example, an iPhone or iPad, the current orientation of the device returned by these sensors is used to automatically rotate the main user interface: if the device is physically turned in landscape orientation by the user, the GUI rotates in landscape mode and accordingly with portrait mode. *GLGravity*, an Apple iOS SDK sample code, [16] demonstrates to developers how to apply the rotation matrix from the sensors to a 3D teapot in real time. This technical demo shows how one can manipulate the mobile screen to see the 3D model from various angles : the model position looks like it is fixed in the actual space, and by rotating the iPhone physically around this virtual object one can see it from the top, the left, the bottom, and so on in real time. The demo is technically well done and shows a new type of gesture, specific to mobile screens and their potential, but it does not aim at any artistic ends.

SensorGirl attempts to give more significance to this special gesture. In this iPhone/iPad application, a 3D feminine figurine wearing a short white dress can be seen in a similar way to the teapot demo. The choice of a feminine figure dressed like this fits the idea of creating a strong analogy between the observation of this 3D model through the device manipulations and a real world situation: to see underneath the dress of an actual doll, one needs to either turn the object around or lower one's head in order to see what is hidden while looking from above. The manipulation of the device to discover what lies underneath is at the same time a pretext, a motivation and an invitation to manipulate the screen. In addition, by a subtle modification of the virtual camera's position according to the current model's rotation, the face of the 3D character can never be seen. Looking out for the face without success brings the spectator naturally to manipulate the screen in every possible angle. In the end, everybody ends up in a near-voyeuristic activity: holding the screen above their head, looking at the underwear of a 3D doll.

In *SensorGirl*, the physical state of the screen has a direct influence on the represented 3D object. It is by grabbing the device and turning it around that one can interact with the representation. What is discovered by this manipulation can make one laugh, amused, feel uncomfortable, or even offended. [17] In any case, the screen manipulation happens and leads to a result. The gesture of rotating the screen is

directly transmitted to the simulated object without the help of any third party interface device. The displaying medium and the interface device are not linked, they are the very same object. Mobile screen image-objects obviously inherits the property of the interactive images presented by Jean-Louis Weissberg: the capacity to be manipulated through their own visualization medium, a mobile screen equipped with embedded sensors. This image-object manipulation, therefore, depends on the material and technical properties of this medium (size, weight, sensor type and precision, etc.), which reminds us of the tableau-object Foucault analyzes in Manet's paintings. Finally, mobile screens are deeply inscribed in our contemporary societies, founded on information exchanges through communication networks. In a similar way to the image-objects of the Middle Ages, they are actively engaged in the social fabric and practices of a particular era. Mobile screens are the place where the three image-object notions we discussed earlier are working together as one notion, with one extension demonstrated by *SensorGirl*: the screen object itself and the image-object melts together to become one single entity.

A POSSIBLE INTERACTIVE GRAMMAR?

The gesture involved in *SensorGirl* is adapted to the interactive visualization of a 3D model in real time and reveals a new image-object model. However, other kinds of relationships with interactive images, in other words other interactive forms, are also a matter of the image-object. Following the path of non-mobile computer image-objects, that developed several well-known interaction gestures (drag and drop, point and click, etc.), mobile screen images-objects can produce various interactive 'figures.' Touch based, and some accelerometer based, interactions have been integrated in mobile device operating systems (iOS, Android OS, etc.) since their initial design, but many other 'image-object oriented' interactivity possibilities lie in these devices and can be used to create interactive artworks designed specifically for these devices. *Book Tales* [18] is a series of iPad projects based on a simple protocol: every application is an interactive scene using photographs of a book and explores one or more image-object oriented interactivities that mobile screens offer. Every application/book has its own title. *Les bonbons*, for example, consists of a blurred photograph of an opened book with candies placed on it. By touching the screen, the spectator adjusts the focus only around his fingertips to discover that he can read some words only through the candies, other parts being too blurry to be read. Another book, *Temps perdu*, shows the picture of an opened white book with a child's marble placed on it. Only inside the projected shadow of the marble does the book text appear and the spectator has to physically tilt over the screen to make the marble roll in the direction of gravity in order to read the text: an impossible and non-functional reading system. Another, *Petals*, shows an opened book with cherry flower petals spread out on it. Blowing on the device's microphone blows the virtual petals, which twirl and move from their starting position to reveal a blank area on the book page: the text's ink has been absorbed by the petals and is reversed as in a mirror. Other multitouch, gyroscope and accelerometer based gestures are used in other applications of this ongoing series, which can be considered as an artistic application series and a mobile screen based image-object interactivity catalog. This work is part of a larger research project into artistic practices using mobile screens and makes use of a specific programming language we developed called *Mobilizing.* [19] This tool, currently available on iOS devices, has been conceived with the idea to help artists to prototype and create art works for mobiles screens by providing a simplified programming tool. Partially inspired by *Processing*, [20] *Mobilizing* is an ideal tool to create small prototypes of image-object artistic projects and has already been used in various workshops. The result of this research may eventually be the construction of a kind of manual for mobile screen image-objects that makes the inventory of interactive figures available on mobile devices, a kind of interactive grammar particular to these devices.

References and Notes:

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2. Jérôme Baschet, "L'image-objet," in *L'iconographie médiévale* (Paris: Gallimard, 2008), 25–64.
3. Ibid., 33–34.
4. Ibid., 38.
5. Ibid.
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DIGITAL PERCEPTION, TIME AND MEMORY: TOWARDS A NEW MODEL OF NARRATION IN DANCE

Andrea Davidson

Current debates on telepresence and telematic performance most often center on questions of immediacy, presence and virtual representation. Referring to Bergson's concept of time as duration, involving 'recollection memory' directed towards the past, and 'habit memory' oriented towards the future, this paper analyzes an interactive telematic dance performance that interrogates Bergson's theory and its link to the perception of time and space.

Fig. 1. Inter_views, 2009, Performance at the H2PTM Festival: Retrospective et perspective 1989-2009, Paris, and the University of Chichester, 2009, Dancers: Nanette Kincaid, Tamar Daly & Chris Jannides, Video image, Copyright Andrea Davidson & Jem Kelly

Fig. 2. Inter_views, 2009, Performance at the H2PTM Festival: Retrospective et perspective 1989-2009, Paris, and the University of Chichester, 2009, Dancers: Nanette Kincaid & Tamar Daly, Video image, Copyright Andrea Davidson & Jem Kelly.
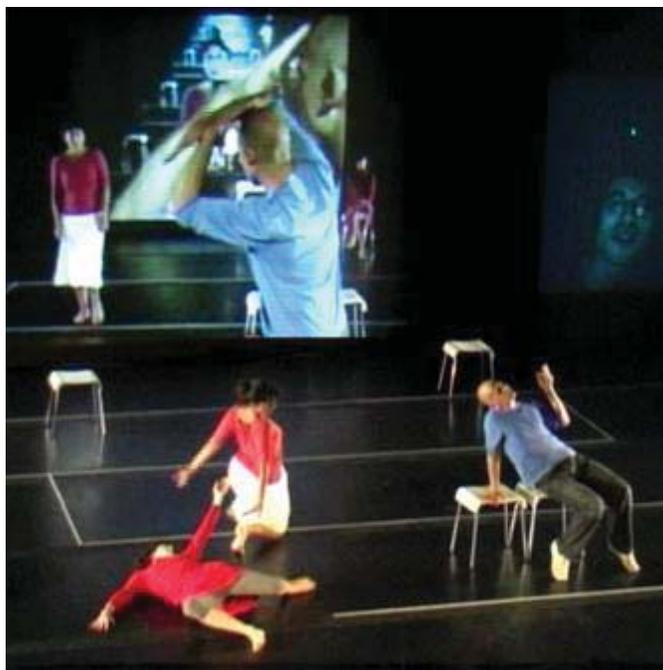
Fig. 3. Inter_views, 2009, Performance at the H2PTM Festival: Retrospective et perspective 1989-2009, Paris, and the University of Chichester, 2009, Dancers: Nanette Kincaid, Tamar Daly & Chris Jannides, Video image, Copyright Andrea Davidson & Jem Kelly.

The project

The interactive telematic dance project *Inter_Views* (2009), developed at the University of Chichester with Jem Kelly in collaboration with dancers Nanette Kincaid, Tamar Daly and Chris Jannides, connects remotely located spaces via a Skype audio link and a QuickTime Broadcast video link. In its first version, the work was programmed at the*H2PTM Festival*: *Retrospective et Perspective 1989-2009*, Paris, linking the dancers in performance at the University of Chichester to an audience at the *H2PTM* festival. Spectators in Paris were invited to choose phrases displayed on a computer screen and speak them into a microphone. Conceived in a second-person reflexive mode of address, for example, "You go to the window, you touch your hair, you think about your day," the phrases were communicated as instructions to the dancers in Chichester who responded by drawing upon semi-improvised choreographic structures to build a 'real-time' choreography. Their movement was captured by video and re-transmitted to both locations in the form of large-scale projections that encompassed the proscenium arch and accumulating sequences of the choreography in the background forming a *mise en abyme* of the stage action. Though the audio transmission was instantaneous, a fifteen-second delay in the video transmission, occurring as a result of network fluctuations with the broadcast interface, was to create the possibility of a new narrative 'space' through which we sought to challenge the common notion that perception is immediate.

Contrary to mediated performances that use technologies as means to enhance, augment or extend the physical presence and dynamics of the dancing body, mediation here, while involving experimentation that renews the way spectators look at dance in performance, remained relatively discreet by comparison to works that involve multiple or split-screen projections, 3D motion capture, animation, or site-re-

sponsive technologies. Movement elaborated in rehearsal was performed unadulterated, and we neither sought to manipulate the body digitally, nor to produce overtly aesthetic effects. The idea was rather to map out a memory space in which the dancers and interacting 'spectator-instructors' could participate in a collaborative intentionality: one that is structured at the intersection of temporal immediacy and delay. A set of seemingly banal instructions was to give rise to a rich palimpsest of moments of an unfolding choreographic narrative; a form of re-embodied memory that is simultaneously reactive and interpretative.

The visual device

One of the main criticisms of dance performances employing new technologies is a potential tension, even competition, between the presence of live bodies onstage and their mediated representations, whose nature and scale often monopolize viewers' attention to the detriment of live action. Unlike theatre productions in which screens, monitors and their content have been incorporated as dramaturgical elements, screens in dance, when present, most often serve as décors or mirrors of choreography onstage. Furthermore, in establishing a reference to the cinematic model, they also tend to be read as such. By contrast, the staging of *Inter_views* entailed a different logic with the conception of stage space as a composite visual device designed to induce a particular visuality or way of viewing dance. *Inter_views*' device operates along principles deriving from the visual arts and photography though it will be shown how it finds its specificity in proposing a new temporal form.

The framing and isolation of movement

In *The Logic of Sensation*, Deleuze analyzes what he notes as a procedure in Francis Bacon's paintings that consists of isolating a "Figure" by tracing and/or duplicating a ring(s), cube(s) or rail(s) around it that produce "a kind of progression, an exploration of the Figure within the place, or upon itself. It is an operative field." [1] The isolation of the Figure signifies that an act that has taken place; creates a sense of place and "defines a 'fact'": it becomes "an Image, an Icon." [2] Bacon's intention is "to avoid the figurative, illustrative, and narrative character the Figure would necessarily have if it were not isolated." [3] Postulating narration as a correlate of representation, Deleuze concludes, remarking that the isolation of the Figure is "the simplest means, necessary though not sufficient, to break with representation, to disrupt narration, to escape illustration, to liberate the Figure: to stick to the fact." [4]

Precedents for Bacon's visual system can be found in the history of Western painting. In Van Eyck's *Arnolfini Portrait* (1434), a round mirror is placed in the center of the painting above the joined hands of a couple in the foreground. Along with the receding oblique lines of a wall on the left and a bed on the right, a dynamic spatial triangle is set up that both draws the gaze into the represented space and isolates the figures in the foreground. Similarly, in *Las Meninas* (1656), a play of multiple types of frames, further highlighted by zones of light and darkness, creates a certain abstraction of elements that isolates the action of a portrait session while signifying Velasquez's own presence as painter.

To paraphrase Deleuze, *Inter_views*' projection device frames and isolates the dancers as "Figures" while emphasizing choreographic "facts" that have taken place and creating 'a sense of place.' Rather than proposing pre-recorded dance sequences or a mirroring of stage action, the device functions as a window or repository of images: frames-within-frames, each isolating different scenes of the choreography as "an exploration of the Figure within the place, or upon itself." Produced by the feedback loop generated when a camera is pointed at its projection space, the effect constitutes a visual mode that lies

somewhere between the figurative and the abstract, thus marking a distance from iconic and representational codes normally associated with video. Drawing the spectator's gaze into a vortex of successive planes that constitute memories of a choreography that continues to unfold, the device offers a new way of constructing narrative and meaning. If this visual mode is easily hypnotic, the spectator's gaze can be refreshed by effectuating the equivalent of 'zooming back' to encompass the stage action where space is of another visual texture and scale.

To compare the effect produced to Marey's chronophotography or to principles of collage/montage that integrate heterogenenous elements to generate "an original totality manifesting ruptures of sorts" [5] would be too simple. As Gregory Ulmer notes of photographic representation with respect to the real, the image "signifies itself and something else – it becomes a signifier remotivated within the system of a new frame." [6] Moreover, if as Benjamin argues, the association of figure and verticality in painting and by extension, performance, distinguishes the representational function of art, [7] the presentation of movement seen receding in both space and time rather accents depth-of-field over verticality, abstraction over pure representation. The device constructs a process, an object, a perspective.

The framing of perception and deconstruction of Euclidean spatiotemporality

The principle behind *Inter_views*' visual device bears resemblance to Florence Henri's photographic work *Autoportrait* (1928). The artist captures her own image seen in a mirror as she stares out towards the spectator. Any other trace of her physical presence or action as a photographer is absent. An astute staging of the photographic frame exactly duplicates the elongated form of the mirror while extending the lines of the table before which Henri is seated in the spectator's direction. A powerful bidirectional and dynamic spatial contiguity is established between the spectator and Henri as subject. More crucially, it situates the spectator at precisely the point from which the photograph was taken and thus highlights (the) photography as an act. According to Rosalind Krauss, the device displaces attention from content to the container, "towards what one could call the semiotic or emblematic nature of the frame [...] it is the capture of the photographic subject by framing." [8]

This said, far from producing a purely abstract form or precluding a sense of corporeal substance, the work's play of surface and volume "guarantees its density (*épaisseur*)." [9] The frame "intervenes in the content [...] through morphological consonance – what one could call visual alliteration": it is a device of "repetition and echo." [10] In much the same way, *Inter_views*' projection space can be described as a "visual alliteration" or device of "repetition and echo" within the larger frame of the stage. More importantly, the device reveals and stages how framing organizes perception or visuality.

Noting how cinema had "transformed" the spectator "into a perceptual apparatus" [11] Annika Blunck suggests that expanded cinema in its turn was to challenge perception through its dismissal of the single unified screen, resulting in spectators having to mentally assemble elements that are spatially and temporally displaced. [12] So too, in *Inter_views*, meaning is created from what is fragmented. The device makes a break with Euclidean spatiotemporality, producing, as in mediated postdramatic theatre, a deconstruction of the unified stage and the illusion of events occurring in a causal, linear flow. Through introducing multiple layers of content, a classical form of narration and its stability of meaning are disrupted.

Temporal multiplicity

This deconstruction of performance space is further accentuated by temporal multiplicity, interactivity and telepresence. In cinema, temporal variability is typically organized through editing and postproduction effects that operate a "*trucage*." [13] In the visual arts, multiplicity primarily concerns spatiality: through compositional strategies such as collage, montage, variation of viewpoint, transparency, focal or other optical effects such as the use of mirrors. It would not be until the advent of time-based art, interactive art and mediated performance that diverse responses to the question of temporality would emerge. However, while destabilizing perception, it is rare that these arts restitute diegetic and extradiegetic action, or analogical and reiterative temporalities, within the single screen/frame simultaneously. Digital programs such as *Isadora*, *EyeCon* or*Max/MSP*, allow for temporal delay in real-time but only with specific and predetermined programming of object behavior and it is also worth noting that conceptors rarely address the question of temporality in space with respect to depth of field.

In Bergson's theory of time, duration figures as its fundamental characteristic, inferring a prolongation of the past into the present and of the present into the future in coexisting temporalities. Poised on a continuum of 'recollection memory' – as in contemplation– and 'habit memory' – as in motor mechanisms, goals or tasks that actualize or prolong the past – the present and perception of the real are experienced in a contracted state of tension pointed towards the future. Perception however, is "never a mere contact of the mind with the object present; it is impregnated with memory – images which complete it as they interpret it." [14] As Bergson explains:

Our actual existence [...] duplicates itself all along with a virtual existence, a mirror-image. Every moment of our life presents two aspects, it is actual and virtual, perception on the one side and memory on the other [...] for the present moment, always going forward, fleeting limit between the immediate past which is now no more and the immediate future which is not yet, would be a mere abstraction were it not the moving mirror which continually reflects perception as a memory. [15]

Though the actual and virtual aspects of time coexist, normally, the human mind neither consciously perceives nor assimilates time's double nature. When confronted with*Inter_views*' visual device, that very precisely articulates time as waves of distinct scenes evolving simultaneously, the dancers were at first perturbed. Executing a choreography within these parameters was not easy for several reasons. The dancers were firstly challenged with having to process and retain information relevant to past, present and future movement phrases while at the same time, remaining aware of their spatial coordinates and the dynamics of relationships evolving amongst themselves. The need for precise spatial positioning had come to the fore in rehearsal as a means of maintaining clarity amongst sequences that were to be viewed in multiple planes of the visual field. Furthermore, the dancers were not always able to verify their exact position in space with respect to what was transpiring in the projection space behind them. Lastly, they also had to take into account the unpredictable nature of changes in instructions coming from the spectators in Paris, requiring that they be able to alter the course of actions underway at any moment. True virtuosity was at play: the visual device demanded increased and multiple sensory perception and real training!

Narration and the perception of time

The conjunction of temporal immediacy and delay in *Inter_views* cannot simply be described as the juxtaposition of live events unfolding in present time with the mediated time of virtual images that are submitted to a time lag. Each image is seen evolving in its entirety and every configuration of the work's choreographic content makes an ongoing reference to the future. This is why, along with the semi-random and interactive nature of the work, surprising encounters between the dancers can occur as if they were communicating with each other over and through time. One example of this can be seen in Fig. 1 where the arm of the male dancer in the foreground frames a scene in which the two female dancers are seen embracing, while at the same time, a face-to-face relationship is set up with one of the women in another frame as if the two were in conversation. Meanwhile, the action underway onstage between the three dancers establishes new relationships that propel the story forward while also determining the course and outcome of events in the other images with their unexpected juxtapositions.

Deleuze's concept of the 'crystal-image' or pure image of time can also elucidate this form of diffracted temporal conjunction. The crystal-image's bi-faced actual and virtual nature contracts and short-circuits time, condensing the past, present and future. Situating depth-of-field as cinema's closest tool for approximating this pure nature of time, Deleuze remarks:

[...] depth of field creates a certain type of direct time-image that can be defined by memory, virtual regions of past, the aspects of each region. This would be less a function of reality than a function of remembering, of temporalization: not exactly a recollection but 'an invitation to recollect...' [16]

It has been noted that depth-of-field in *Inter_views* constructs a process, an object, a perspective – of space and time – through which the choreography is seen developing in a multi-temporal manner. The actual and the virtual images are viewed within a composite visual field but are understood as an ensemble. Perception of this field is immediate. However, one question remains. The work's (re)construction of time depends on the device's fifteen-second delay for its articulation. If this delay were to be removed, could one still say that perception is immediate? Further, in the light of Bergson's admonitions about the way the human mind perceives movement and reality by substituting "for the continuous the discontinuous, for mobility stability" [17] and contemporary digital culture's parceling of data as discreet, autonomous units, can one still say that perception is immediate? It is these questions that persist and that *Inter_views* ultimately interrogates.

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* Excerpts translated by the author.

WEAPONIZING PLAY

Hugh Davies

This paper looks at the history of overlap between games and warfare and discusses the ethics and implications of militarizing today's most popular entertainment format.

The relationship between military and gaming is not new. Long before the recent evolutions in digital technologies, there existed games that simulated war and attracted the eye of competitive gamers and soldiers alike. Numerous ancient vases depict the Trojan War heroes Ajax and Achilles hunched over a small table, playing the popular war game*Petteia*, both players gloriously attired in full battle armor. Some sources believe this image refers to a passage in a now lost epic poem in which the warriors become so immersed in the game, indeed "as fixated as a pair of slackers at an Xbox" that they forget to join the real battle now underway. [1]

There are many other examples. The ancient East Asian game of *Go* and its close cousin*Chess* are both visibly abstracted from warfare. The Prussian game *Kriegsspiel* was credited for training officers in the art of battle before they went on to defeat Napoleon. The reported success of this intricate map based game played no small part in the widespread use of topographical maps and game mechanics in planning and strategizing battles in Europe and the Pacific in the Second World War. Immersive battle experiences that were applicable in both war and play were also popular among men and boys alike in the early Twentieth Century. H.G. Wells published two books on the subject:*Floor Games* (1911) and *Little Wars* (1913), both offering children and adults extensive rules and strategies for war-gaming with miniatures. [2]

The invention of video games in the 1960s heralded a new era. These entertainment devices had evolved through the hacking of radar screens from the Second World War, but by the late 1970s, sophisticated computer games were being used as military training tools. Most notable was *Army Battlezone*, a game that instructed soldiers in the use of the then new Bradley Fighting Vehicle. Early 1980s cinema introduced the weaponization of play in the science fiction adventures; such as *War Games* (1983) and *The Last Starfighter* (1984). The future military role of game entertainment was also signaled by President Ronald Regan who delivered a speech at Walt Disney's EPCOT Centre in 1983 declaring: "I recently learned something quite interesting about video games. Many young people have developed incredible hand-eye coordination in playing these games. The Air Force believes these kids will be outstanding pilots should they fly our jets." [3] These words were recalled following 9/11 when it was reported that the pilots who flew the planes into the World Trade Center had planned and trained for the attacks using Microsoft Flight Simulator. [4]

A new precedent occurred in 2002 with *America's Army*, the freely downloadable, teen-pitched entertainment and training package. *America's Army* is not stand alone, it comes with a swag of teen-targeted merchandise – including comics, t-shirts, action figures and posters – extending the brand awareness of the US Military and forging new connections between the Armed Forces and the pool of gamers it sees as potential recruits. [5]

These connections included involvement in 'grassroots' *America's Army* tournaments held at gaming cafes, loft LAN Parties (where gamers rig their computers together to create a small local network), conventions, and other locales, where the Army might send a recruiter to hang out with the gamers, complete with an Army-logoed Hummer full of recruitment-related brochures and freebies in tow. [6]

The US Army has reported that through these new engagement tactics it has caught the interest of a whole new generation of potential soldiers, who it is simultaneously attracting and training through the *America's Army* game. News of the game's success has spread. Earlier in 2011, it was reported that the People's Liberation Army of China have teamed up with Wuxi Giant Interactive Group to create their own military video game which pits Chinese soldiers against their main opposition, the US Army. The proudly named *Glorious Mission* computer game training tool has affronted the American Military by adopting their own strategy of engaging potential soldiers through video gameplay. [7]

It is easy to understand, given this selective history, how the discussion about video games often becomes a discussion about war and violence, this paper, however, has deliberately focused on militarized games. Games themselves do not promote war, but offer play, an experience so intrinsic to nature that even animals participate in it. Both games, and play, are more universal and communicative than spoken language. Furthermore, the fact that entertainment experiences are co-opted for purposes other than entertainment is certainly not limited to games. Adapting of the functions of games for purposes other than the enjoyment of play has now become a popular field unto itself known as 'gamification.' The concept of gamification, of adding a gaming component to a non-traditional medium, thereby creating brand loyalty and encouraging consumer engagement by integrating products and concepts with player's lives in meaningful ways, has become a staple of the advertising world. [8]

There are significant criticisms of gamification. Some dismiss it as a buzzword that re-brands old ideas and practices towards a new corporate fad. Others condemn it for its over simplification of game mechanics and player motivations. While there are numerous complaints of the field, I claim that the significant conundrum of gamification is that its emphasis is not on fun, but on altering perceptions through fun. Whether gamified products and services (also referred to as funware) achieve this ambition is questionable, but the very ambition is concerning enough. What gamification purports to instill in the mind of the player is ideology. It offers emotion hacking or love bombing to potential customers/players of the highest bidder, and, as is often the case with games, we may find the highest bidder is the military. However, as has repeatedly happened before, the concerns about the weaponization of games have been raised only when military forces other than our own have adopted the strategy. Recent claims about Al Qaeda's gamification of Jihad have suddenly brought up questions that should have been raised long ago about the manipulative potential of gamification. Again, it is the reputation of games that suffers. [9]

Games have a strong history of involvement with war, but they have a stronger history of demonization. They are regularly accused of causing distraction, violence and inactivity, despite each of these states being contradictory of the other; furthermore, games are often, as in the ancient example first used in this paper, accused of all three simultaneously. While the well meaning attempts to develop Serious Games have tackled some of these criticisms, with numerous successes, the result of putting games to use also appears to be back firing. Perhaps if we cannot find appropriate ways to put games to work, it is best to leave them as entertainment.

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CINEMA OVER PHOTONIC NETWORKS

Jane De Almeida

The paper presents a reflection on how high definition 4K films are reorienting cinema towards science, invention and technology. It also describes and reflects on experiments with 4K moving images, transmission over photonic networks, and stereoscopic film in gigantic dimensions.

Fig 1. StereoEssays anaglyphic film still. Copyright Jane de Almeida.

Fig 2. StereoEssays anaglyphic film still. Copyright Jane de Almeida.

Digital Chaos inspired by Optical Chaos

Cinema, "the invention without a future" according to the Lumière brothers, marked the twentieth century in a profound and enriching manner. Much of what will be said in the future about the twentieth century will point to the wonder of the motion picture. In constant evolution, film production technology has undergone profound changes with the advent of computer technology; and today we are able to achieve and design images of unquestionable quality, with aesthetic results that astound even 'print' lovers.

Cinema pioneers were also considered inventors and scientists, as the 'filmmaker' profession did not exist. "Apporter au monde le monde" – to bring the world into the world, was the slogan of Lumière Brothers and Pathé-Film. As observed by German filmmaker Alexander Kluge, [1] the phrase has dual meaning: the birth of new images and of a new world, but also that the filmed world was being shown in Paris, considering Paris as the real world. Back then cameras were sent around the world to record far-off cultures, looking for "never-seen-before pictures." Today, the technological apparatus of super high definition images can be rendered visible on a micro and macro scale, from distant, never visited, places. After years of fictional narrative, scientists and inventors are once again seeking never-seen-before images, now to bring the universe to the world. Moreover, these images can be broadcast. It is no longer a matter of "bringing the world into the world," but of sharing the world through a two-ended device, with images to be seen and which also see.

When producing new technology, much care is required to present it. Despite what the Lumière brothers said about the future of cinema, the first images were carefully framed, using Impressionist paintings as references. When they decided to stage sketches, the Lumière family assembled their servants to perform a Cézanne painting,*The Card Players* (*Les Joueurs de Cartes*), in motion. *The Arrival of a Train at a Station* is famous for the legend that it caused panic among viewers, startled by the real possibility of a train hitting them. Although this did not actually happen, the audience was really astonished and the Lumière brothers knew they would succeed by positioning the camera very close to the platform and waiting for the train's arrival. Besides home films and comedies, they explored figures in motion, such as the wall falling down and being 'rebuilt' in a reverse effect – *Démolition d'un mur* – or the blacksmith's smoke in*Le Forgeron*.

More than one hundred and ten years later, digital technology once again aspires to replace cinema, now with the power of projecting an image resolution of over 8 million pixels per frame. 4K resolution has recently been established as the standard image for digital cinema recommended by the DCI (Digital Cinema Initiatives), an association of the seven major Hollywood studios. 4K refers to the number of horizontal pixels, 4,096, which multiplied by 2,160 vertical pixels, gives 8,847,360 pixels in total. It is an image four times more precise than HD and 24 times more precise than traditional television, [2] but what scenes, what framing, and what kind of image is cinema unveiling? First and foremost, an incredibly sharp image, with vivid colors and details, intense brightness and impressive sheerness. An image in which one sees background details with the sharpness of a close-up shot. That trompe-l'oeil effect of the Lumières – or of Masaccio, in his paintings of the *Holy Trinity* at Santa Maria Novella, which produced the effect of a cave on a two-dimensional canvas in 1425 – can also be seen in the Japanese concert of the String Ensemble, broadcast live from Tokyo to San Diego in 2006. To enhance its reality effect, the concert was partially filmed with a row of seats framed in the lower part of the screen, strengthening the impression that it was performed right there, just a few rows ahead of the viewer.

In recent years, a new event has managed to further stretch the boundaries of cinema – considered here as large screen projection: transmission over photonic networks. Since iGrid 2002, the Cinegrid consortium has been designed as another event emerging from the LambdaGrid framework, the wavelength 'grid.' The 'lambda network' in a nutshell is the composite technology of fiber optic connections capable of transmitting light. Just like Glif, an international organization that promotes the paradigm of lambda networking and the research for developing an international fiber optic infrastructure, Cinegrid fosters an international and interdisciplinary community focused on very-high-quality digital media over photonic networks. At that instant, the cinema lights meet the photon light, combining to produce the transmission of a powerful image with hardly any loss of quality (or none at all).

Besides the network connections of the physical support, another requirement is a network of scientists, researchers and inventors seeking to accomplish the technological leap of the ubiquity dream. In other words, the characteristic property of television – transmission – is now within the reach of cinema. Cinegrid, however, in promoting this meeting between high quality image film producers, has also promoted a unique meeting that relates back to pre-cinema times. Since 2006, Cinegrid has been attended by photonic network engineers, film software developers, camera and projection equipment companies, computer scientists, new media scholars, film studios, sound studios for cinema, scientific visualization professionals, all sorts of artists and people interested in the matter. In fact, people's interests in Cinegrid are wide-ranging, involving various terminologies and idiosyncrasies. The films presented are short samples of pictures to demonstrate the equipment and the evolution of the transmission power and capacity. Except in rare cases, the films have no narrative, or even such intention. In fact, the most interesting are the views of museums, planetariums and other ways of seeing the world.

The whole community dreams of the moment when an observatory in a specific site will be capable of transmitting very high resolution images of its observations to other observatories around the world. Another interesting perspective for this community is the ability to view microscopic beings in very high definition, transforming them into characters of a unusual narrative, from a world known through the optical lens and old biology books and now in giant-sized living form, composed by digital language. This whole environment of the future reminds us of the great European technology exhibitions of the past, such as the *Exposition Universelles* in Paris or the *Great Exhibitions* in nineteenth century London, but without the same gigantic proportions and public. Several of the devices of the contemporary world had their precursors exhibited in those fairs. Many artists and filmmakers marveled at the viewing devices of the era, such as the Panoramas, the Mareoramas and Kaiserpanoramas. [3] The Lumière brothers presented in that edition of the exhibition the "Cinématographe Géant" with a 60x70 ft screen in a theater that could seat 15,000 people. All those experiments followed traditional cinema before it took shape as we know it: the dark room, projector, seats, screen at the front, a movie of roughly 90 minutes, the queue, the ticket.

The intention here is not to compare the great expositions to an event like Cinegrid in terms of proportions or public, but rather to highlight the hybrid environment where inventors, engineers, producers and artists gather to display and admire new technologies and the scope that each new device can achieve. Such an environment, however, is not exclusive to Cinegrid. It is a proper space for meetings, seminars and art fairs dazzled by the possibilities with technology driven by the advent of the computer. However, what is of particular interest in this event is precisely the axis that determines what 'cinema' is and its forthcoming configuration over the next 110 years. This configuration is the one that embanked all the inventive chaos of optical-cinematographic devices.

The photonic networks represent huge freedom for cinematic applications, as they enable a collaborative future for image distribution. These networks will enable on-line transmission of film festivals in real time, with premières all over the world. Some Cinegrid demonstrations show colormetric sessions being made, for example in the San Diego laboratory in conjunction with the Czech Republic (CESNET); [4] or sound editing sessions in San Diego, Los Angeles and Chicago happening at the same time without any acoustic quality loss. It is also known that these networks will reconfigure the telecommunications system, with a high quality image television and a far more flexible arrangement of a single point television, with the rigid transceiver structure. The end of network neutrality, a much discussed subject today, could lead cinema back to the studios to determine the end of a creative chaos of the cinematic arts.

Photonics Network Experiments

Inspired by the creative chaos of the time, we have produced some events in Brazil related to super-high definition cinema and its transmission. In 2008, during FILE (Electronic Language International Festival), fourteen short 4K movies were presented in Brazil for the first time for cultural purposes. For one week, more than 3,500 people attended the projections and the seminars about 4K technology and the future of the images using high-definition projection in cinema. FILE has unveiled highly advanced and bold pieces in terms of art, science and innovation in Brazil and abroad. For the 2008 edition, FILE was called FILE 2008 000 000 (Two thousand and eight million pixels), a pun for the eight million pixels per frame of the 4K image. Considering the success of the projection the next natural step seemed to be the streaming of 4K content using high-speed network infrastructure. This was proposed during the Cinegrid Workshop 2008 and the main challenges were the upgrade of the Brazilian network and its extension from Mackenzie University to FIESP where FILE takes place. Since the 4K film *Enquanto a Noite não Chega* (*While the Night Does not Come*), by Beto Souza and Renato Falcão, was about to be finished, it was decided that its première would take place in São Paulo, San Diego and Yokohama.

The project *FILE 4K Transcontinental* was an initiative taken and led by researchers of Mackenzie University and the Center for Research in Computing and the Arts –CRCA/UCSD (University of California, San Diego). After one year of research and production, in 2009 the results of the work developed by Mackenzie University and CRCA were presented at FILE. A theater with more than 600 people witnessed the première and the streaming at the FIESP Auditorium. The exhibition in Brazil was attended by film directors, as well as the presenters. In San Diego, the Calit2's division director at UCSD, Ramesh Rao hosted the exhibition and in Yokohama, the directors of the Research Institute for DMC at Keio University, Naohisa Ohta and Inakage Masahiko hosted the movie in Japan. The *FILE 4K Transcontinental* venue was considered by specialists in data transmission, such as Ramesh Rao, director of the CALIT2 at the UCSD, a benchmark in digital cinema research.

A new project led us to produce a promotional film with 4K/3D resolution in order to show the intentions of Project 2014K, which purports to broadcast live the games of the 2014 Soccer World Cup in Brazil, with 4K/3D resolution through photonic networks to ultra-definition movie theatres on all five continents. This is a collaborative and experimental hi-tech project involving research and technological innovation organizations as well as private enterprises. This promotional film led us to shoot the first soccer match with such resolution, which was shown at the 2010 World Cup in Johannesburg in the FIFA Pavillion named *Casa Brasil*.

Stereoscopic Gigantic Views

More recently, further experimentation has been performed as part of a research project developed by the Advanced Applications of Remote Visualization Working Group supported by the RNP (National Education and Research Network). This Working Group's proposal is the execution, production, organization and cataloguing of the creative process of audiovisual content in 4K/3D format. Thus, a test-film was produced with Red Epic cameras, capable of capturing 5K images, rigged to obtain stereoscopic images. The film, called *StereoEssays: Five or Six Stereoscopic Essays in Search of a Narrative*, was presented at Cinegrid@Rio. It is a high-tech audiovisual essay that explores ultra-definition images. As in the legendary *Views of the Guanabara Bay* (1898), considered the first Brazilian movie, made by the Segreto brothers, Rio de Janeiro is once again the focus of pioneering cameras. The difference now is that the 'views' can be observed in three dimensions and ultra-high definition.

Since the outset, the film project has tackled the technological challenges of the major research laboratories. From the single camera pair, a piece of equipment still unknown to experts, to the processing of images with roughly 10 million pixels, and screening the film with special projectors, still in the phase of stabilization. In the stereoscopic projection of the film (3D), the resolution reaches 20 million pixels per frame on the screen, counting the images corresponding to the left and right eyes.

This experiment recalls the challenges faced by the pioneers of cinema and retrieves the fantasy of the 19th century stereoscopic apparatus. In 1891, Edison already intended to bestow stereoscopic depth on the kinetograph images that would be seen through the kinetoscope. In 1856, only two years after being founded, the London Stereoscopic Company sold half a million stereoscopic viewers. In the pre-cinema age, stereoscopic photography provided a new experience of perceiving reality, giving viewers a new level of immersion into the images, as if traveling to remote places and personally partaking in far-off events.

In 1935, Louis Lumière remade *The Arrival of a Train at a Station* (*L'arrivée d'un train en gare de La Ciotat*, 1895) in a stereoscopic version, which was possibly the true motive for the famous amazement at the realism of the images usually attributed to the public projection of *L'arrivée d'un train* in 1896. Walter Benjamin [5] has reported on more than one occasion his stereoscopic experience with the Kaiserpanorama in Berlin in 1900. The German thinker mentions the public's fascination with travel photographs and uses the stereoscope as a metaphor of the new configuration of modernity, with images "arranged as if they had come out of drawers," [6] brightly colored scenes and objects against backdrops with towering buildings and forts, inherited from the Tsarist regime in the city of Riga. Later, Benjamin draws attention to the time required to give such detail to these new three-dimensional scenes, and suggests that the "stereoscopic look" should be cultivated in order to tackle deep down the "historical shadows." [7] All this "stereoscopic heritage" of still and moving images served as inspiration for the *EstereoEnsaios* project: scenes that take us back to the history of equipment that shows 'views,' the arbitrary movement of nature, machines and the human body, full of sensuality in light of the stereoscopic device.

The stereoscopic vision generated by new ultra-definition (5K) technologies urges us to consider new possibilities of image, new metaphors for cinema and a new level of sensations – in short, a whole new aesthesis. The gigantic, digital ultra-definition images set the stage for a new visual upscale.

Whereas before we had the 'cine eye' (in the singular), with Dziga Vertov and the centrality of the monocular perspective that accompanies his story, now the stereoscopic image allows perception of the visual world around us through a 'stereopsis.' It can be considered a shift from the Cyclops (single eye) movie camera to a dual camera, stereoscopic view. In this regard, how are we to contemplate a whole new world of moving images captured mechanically and electronically through a binocular perspective? In simpler and more direct terms, how are we to shoot and assemble a three-dimensional film, narratively speaking? What do our eyes, saturated by over 110 years of motion pictures, support –and expect – of the images revisited by stereoscopy in colossal proportions? Above all, the issue tackled by *StereoEssays* is: is 3D a language or an effect?

The questions are only just beginning.

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WHOSE ELECTRIC BRAIN?

MARYSE DE LA GIRODAY

Memristors are collapsing the boundaries between humans and machines and ushering in an age where humanistic discourse must reach beyond its conventional boundaries. The distinctions between life/nonlife, courtesy of the memristor which confers the ability of remember and learn on machines, are blurring into undecidability. This paper traces the scientific developments and speculates about the possibility of cognitive entanglement.

Introducing the memristor

We still don't know much about brains, our own or any other species' and yet work on artificial brains (or forms of consciousness) continues at a furious pace aided by discoveries such as the memristor, which offers tantalizing possibilities for scientists and engineers and speculative material for artists, philosophers, and writers.

A new circuit element in electrical engineering, the memristor, is a contraction of the words memory and resistor. In other words, it acts like a resistor (a standard circuit element along with the capacitor and the inductor) and it has memory.

"Think of the resistor as a pipe through which water flows. The water is electric charge. The resistor's obstruction of the flow of charge is comparable to the diameter of the pipe: the narrower the pipe, the greater the resistance. For the history of circuit design, resistors have had a fixed pipe diameter. But a memristor is a pipe that changes diameter with the amount and direction of water that flows through it. If water flows through the pipe in one direction, it expands (becoming less resistive). But send the water in the opposite direction and the pipe shrinks (becoming more resistive). Further, the memristor remembers its diameter when water last went through. Turn off the flow and the diameter of the pipe 'freezes' until the water is turned back on." (Williams, 2008, p. 2)

Up until the Spring of 2008 the memristor was an obscure, almost forgotten theory in electrical engineering. Posited by Dr. Leon Chua, professor of Electrical Engineering at the University of California, Berkeley, the presence of a memristor as a potential addition to the classic circuit elements (the resistor, the capacitor, and the inductor) was theorized in 1971. (Note: In fact, there was an earlier scientist, George Widrow who posited a very similar new circuit element that he termed the memistor. Chua came to his theory independently. [Moutet, 2010, p. 211])

A team led by R. Stanley Williams at the HP Laboratories in Palo Alto, CA, published a study in the May 2008 issue of the journal Nature describing how they proved the new circuit element's existence experimentally.

It might not have happened,

" … the hypothetical device was mostly written off as a mathematical dalliance. Thirty years later, HP senior fellow Stanley Williams and his group were working on molecular electronics when they started

to notice strange behavior in their devices. 'They were doing really funky things, and we couldn't figure out what [was going on]', Williams says. Then his HP collaborator Greg Snider rediscovered Chua's work from 1971. 'He said, Hey guys, I don't know what we've got, but this is what we want, Williams remembers'." Williams spent several years reading and rereading Chua's papers. 'It was several years of scratching my head and thinking about it'. Then Williams realized their molecular devices were really memristors. 'It just hit me between the eyes'." (Adee, 2008)

In fact, 'being hit between the eyes' is a strange metaphor for Williams to use since memristors and other such phenomena at the nanoscale cannot be observed with the eye. The microscopes are haptic, i. e., the tip or probe is dragged across a surface during which time minute variations are recorded via software then the information assembled into an image on a computer screen that is viewable by scientists. Nonetheless, Williams has created visual representations of memristors such as this one.

A few months after Williams and his HP Labs team offered experimental proof of the memristor's, existence the team published research (in Nature again) with a description of achieving engineering control of the new circuit element both in its digital and analogue forms. In its digital form, the memristor would allow instant operation. For example, your computer or laptop or phone or other electronic device would start instantaneously as it would no longer need to reboot. In its analog form, the memristor could allow hardware to learn.

Undecdability and boundary collapse

The memristor's capacity to be either digital or analog calls to mind Jacques Derrida's notion of undecidability. This notion of undecidability does not lend itself to the memristor proper as it is a theory which explains a collection of anomalies in electrical engineering at the micro and nano scales and as such is not dependent on the binary system which makes undecidability possible for such constructs as zombies, for example.

"Between life and death – it's an uncertain space. The zombie might be EITHER alive OR dead. But it cuts across these categories; it is BOTH alive AND dead. Equally it is NEITHER alive NOR dead, since it cannot take on the 'full' senses of these terms. True life must preclude true death. The zombie short-circuits the usual logic of distinction. Having both states, it has neither. It belongs to a different order of things: in the terms of life and death, it cannot be decided." (Collins & Mayblin, 2000, p. 19)

Where the notion of undecidability does lend itself, if not to the memristor proper, is to the proposed machinic functions made possible by the analogue/digital memristor.

It's by rendering possible that dual digital/analogue space that the memristor can be described as an agent of undecidablility since it performs a transformative function for machinery/hardware which until now was decidably nonlife. With the advent of the memristor, machinery/hardware, formerly unable to remember and learn, has the possibility of both, a trait that defines biological systems (life). The advent of the memristor as a new circuit element leads to the same questions one asks about zombies, is the machine alive or dead, or both, or neither? Unlike the zombie (life/nonlife) which hungers for brains thereby destroying that which is decidably life, the memristor (via the field of neuromorphic engineering) could lead to the creation of an artificial brain thereby making machinic life/nonlife possible.

Neuromorphic engineering is an interdisciplinary field,

"… whose goal is to design artificial neural systems with physical architectures similar to biological nervous systems. One of the key components of any neuromorphic effort is the design of artificial synapses. The human brain contains vastly more synapses than neurons – by a factor of about 10,000 – and therefore it is necessary to develop a nanoscale, low power, synapse-like device if scientists want to scale neuromorphic circuits towards the human brain level. … 'A memristor by definition is a resistive device with inherent memory. It is in fact very similar to a synapse – they are both two-terminal devices whose conductance can be modulated by external stimuli with the ability to store (memorize) the new information.' [Dr. Wei Lu, assistant professor at the University of Michigan, Dept of Electrical Engineering and Computer Science]." (Berger, April 23, 2010)

This description of the memristor as being "… very similar to a synapse" followed by details that make the two seem identical is fascinating in light of Williams' 2008 comments "'We won't claim that we're going to build a brain, but we want something that will compute like a brain', Williams says. They think they can abstract 'the whole synapse idea' to do essentially analog computation in an efficient manner." (Adee, 2008) In two years, they went from 'abstracting the whole synapse idea' to acknowledging its similarity. While scientists drift closer to publicly acknowledging the memristor's possibilities (and its position as a transformative agent conferring undecidability on that which was previously decidable), they do not appear willing to publicly commit to the notion.

The notion of undecidability allows us to view a collapse of boundaries that first occurred theoretically in quantum physics. That theoretical work is now being made manifest at the nanoscale and we can expect it to lead to the collapse of several boundaries at the macroscale that would once have been unthinkable. For an example of a boundary collapse at the nanoscale, until recently biologists and physicists would have told you that biological molecules do not follow the principles of quantum mechanics.

"Until now, says Prof. Ron Naaman of the Institute's Chemical Physics Department (Faculty of Chemistry), both biologists and physicists have considered quantum systems and biological molecules to be like apples and oranges. But research he conducted together with scientists in Germany, which appeared recently in *Science* …, definitively shows that a biological molecule – DNA – can discern between quantum states known as spin." (Nanowerk, March 2011)

The conclusion based on this research seems to have been prefigured by Alfred North Whitehead. A well known mathematician who wrote on philosophy, physics, logic, and more. He suggested some 80 years ago, "… there is no absolute gap between living and nonliving societies." (Sherburne, 1981, p. 88) This also seems to prefigure Derrida's undecidability and zombies as living and/or dead. (In Whitehead's terminology, atoms and molecules are considered societies.)

Here's another example of a nanoscale boundary collapse,

"Air and water meet over most of [the] Earth's surface, but exactly where one ends and the other begins turns out to be a surprisingly subtle question.

"A new study in *Nature* narrows the boundary to just one quarter of water molecules in the uppermost layer -- those that happen to have one hydrogen atom in water and the other vibrating freely above." (Science Daily, June 19, 2011)

The boundary between water (liquid) and air (gas) collapses; is the molecule water or air, both or neither? It's too early to tell if this undecidability will have any consequences at the macroscale but this 'haptic' boundary collapse (water is touchable while air is not) echoes something which takes place amongst scientists working at the nanoscale.

Entanglements

Colin Milburn (2008) documents another kind of boundary collapse, one, between researchers and atoms/molecules, taking place at the tip of a scanning tunneling microsocope (STM).

"The media ecology of the STM—nanoscale haptic image, machinic symbolic, and the real interchange of electronic particles tunneling across the quantum 'vacuum gap' or 'forbidden space' between the molecular world and the STM's tip, outside processed data—comes to instantiate, to materialize, the human subject's perceptual ratios differently, such that the encounter with the world is apprehended now not as a division of perception (for example, into visual or auditory ratios) but rather as quantum connectivity or engtanglement, where 'real space' is touched across the symbolic translations of data ... (p. 90) data

Milburn's version of quantum entanglement could be called a manifestation of cognitive entanglement, while the memristor as an enabling agent could be described as facilitating yet another kind of cognitive entanglement.

At its heart, entanglement, whether it's quantum or cognitive, is about connectivity. In Milburn's stated case, the entanglement at the sensory and cognitive levels is such that it seems as if humans are in direct contact with a nano world, comprised of atoms and molecules.

"It's not, of course, that the operator is 'actually' touching individual atoms (however that would differ from our everyday encounter with gross matter), but rather that the medial translations and remediations of electronic convergence have produced sensations of connectivity at a radically different scale: tunneling all the way down, with no uncrossable or 'forbidden' gaps between our world and the world of the quantum." (Milburn, p. 91)

This nano world which can be touched is being extended beyond the research community and scientists to the general public in exhibitions like Nanooze at Walt Disney World's Epcot Center where visitors (mostly families) are encouraged to 'touch a molecule' as one of the exhibits is titled. In fact, visitors are touching an animation of a molecule. (de la Giroday, Sept. 6, 2011) This is an invitation to treat the nano world as if we have direct contact with it or, in this case, as if an animation of a molecule transforms, in the same way Milburn suggests that the STM has done for scientists, perceptual ratios so that the boundary between visual and haptic perceptions collapse and leave an interstitial space where cognitive entanglement occurs.

Milburn's following description of the impact that this shift creates for scientists can also be applied to the visitors at Walt Disney World's Nanooze exhibition,

"It is an affective moment, an unconscious, as-if-unmediated experience of direct 'connection' with molecularity. In the same way that new media work to make it seem that no mediation is involved in pre-

senting an immersive immediacy … viewing the images produced by the STM while operating the machine makes it seems as if the human is in direct confrontation with the molecular nanoworld. … Thus the real local properties of the nanoworld become interdigitated with the exploded fingertips of the posthuman colonist." pp.90/91

Or when you're at Walt Disney World, these are the exploded fingertips of a visitor, usually a child.

Where is this going?

The memristor as a transformative agent enables the possibility of an entanglement unthinkable even 30 years ago, a cognitive entanglement between life and nonlife. By enabling the creation of artificial synapses and, ultimately, artificial brains for machines that can learn and remember in a fashion similar to biological systems, the memristor facilitates another boundary collapse courtesy of research at the nanoscale. This collapse leads to undecidability with regard to the distinctions between life and nonlife. Combined with the boundary collapse (which we can expect will extend into the general population as STM's and other microscopes of that ilk become commonplace in educational institutions at all grade levels (and/or the proliferation of more exhibitions like Nanooze) which Milburn documents, the stage is set for a number of scenarios.

One of the first to occur comes from popular culture which has framed and dominated the public discussion there has been about life/nonlife. The popular culture discussions on life/nonlife are longstanding reaching back to 1818 at least and the publication of Mary Shelley's Frankenstein. More recent entertainments such as True Blood, a series of books and now US television programmes, feature vampires (the living dead) who want acceptance and 'human' rights from the living. Another example can be seen in the debates on the Star Trek: The Next Generation and Star Trek: Voyager US television programmes. Including such characters as an android, Data, and a holographic doctor, respectively, seem deliberate attempts to introduce discussions about life/nonlife and acceptance and human rights into the DNA of the series themselves. In contrast to Star Trek where nonlife (except for the Borg which outside the Star Trek universe is known as a cyborg, an entity integrating biological life with machinic life) strives to be accepted by humans, Battlestar Galactica (the new and old versions), which also introduced life/nonlife into the DNA of its stories, featured androids and robots determined to exterminate humankind.

All these discussions are for the most part binary. The two categories in recent entertainments are (1) they (e.g. machines/holographic constructs) are like us, i.e., life, or they (e.g. cyborg which are part machine and part biological organism) are not like us, i.e., nonlife. But Milburn's observation that scientists experience a direct experience of molecularlty with a concomitant shift in perceptions and extension of connectivity across the gap which exists between the macro and nanoscale suggests the possibility that the binary model for this discussion will collapse in much the same way that the visual/haptic boundary collapses for both scientists working with STMs and visitors playing with an animation at the Nanooze exhibition.

As these boundaries collapse yet another chain of cognitive entanglement scenarios is made possible in the life/nonlife discussion. Technically, the memristor makes possible not just an artificial brain but the integration of artificially derived synapses with biologically derived synapses. For example, it can be expected that future patients (already experiencing a cognitive entanglement with the nano world) will want to have their brains repaired or possibly have their intelligence augmented with an artificial

synapse leading to a type of cognitive entanglement that is intimate. It is possible to envision a future where the distinctions between humans and machines will be difficult, if not impossible, to maintain.

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NAKED ON PLUTO

Marloes de Valk

Naked on Pluto is a multiplayer text adventure using Facebook to integrate a player's personal data as elements in a satirical, interactive fiction. The game questions how social media shapes our friendships and commodifies our social relations through targeted advertising based on information we supply. This paper presents the project, its context, and looks at how privacy and data harvesting can be critically examined using online gaming.
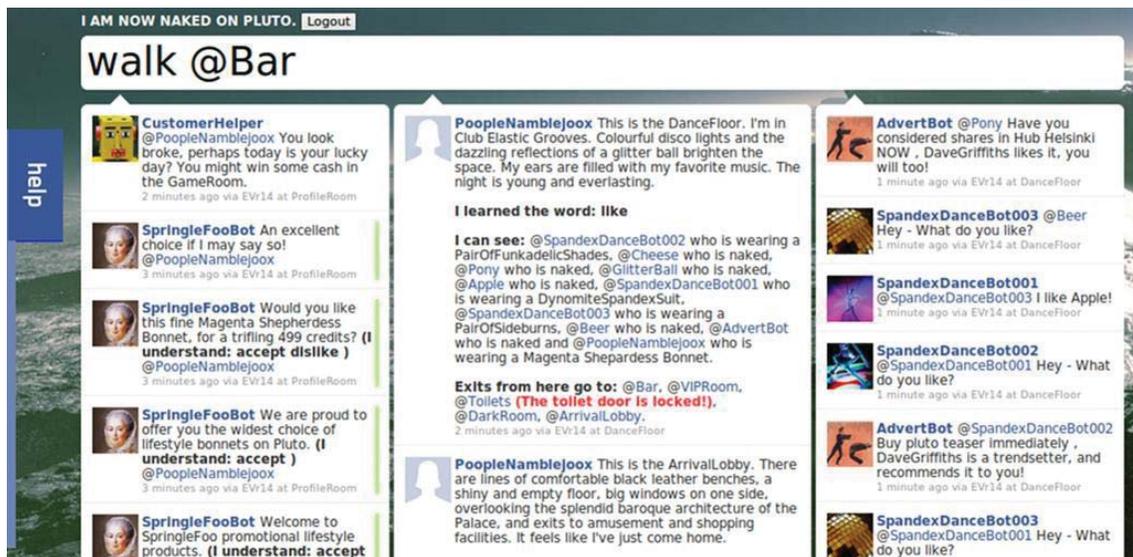
Fig. 1. Naked on Pluto, 2010, Dave Griffiths, Aymeric Mansoux and Marloes de Valk, screenshot, Free Art License

Fig. 2. Naked on Pluto stickers, 2010, Dave Griffiths, Aymeric Mansoux & Marloes de Valk, photo, Free Art License

Welcome to Elastic Versailles revision 14. You look fantastic today! Elastic Versailles is here for your convenience, tailored to your needs, offering you the best in entertainment the galaxy has to offer. Win coins in our illustrious casinos, spend coins in our luxurious and exclusive shopping facilities, play games with our friendly bots, socialize with old and new friends, and share your way to a better world! [1]

Naked on Pluto is a Facebook-based multiplayer text adventure, integrating players' personal data and that of their 'friends' as elements of a satirical and interactive work of fiction. The game calls into question the ways in which social media affect our friendships, and how social relationships have become a commodity for targeted advertising based on the huge quantities of information we voluntarily supply to social media databases – thereby literally exposing ourselves. The game was developed in 2010 as a response to the explosive growth of the market for personal data, and the role of social media in this growth. Inspired by the critical and political text-based games of the 1980s, *Naked on Pluto* combines a playful quest to escape the watchful eye of a corrupted artificial intelligence with serious research into the underlying issues of the current crisis in online privacy. This paper examines these issues, warns against the end of anonymous data, and presents the *Naked on Pluto* project.

We all share a great deal of information with others online. Not only voluntarily and consciously, through the public side of social media, but also unknowingly, through searching, purchasing and browsing. Furthermore, other areas of the web are endlessly being 'scraped' to complete the (already very detailed) profiles data brokers and profiling companies have on us. Most people are aware of the existence of the market for personal data, but how it functions, what the further implications are and what kind of legislation is in place to protect consumers – all of this is unclear to most of us.

To some, the trade-off between personal data and free, often customized, services paid for through advertisements seems more than fair. You get as much back as you give. Convenience comes at a price. The problem is that it has become almost impossible to make such trade-offs consciously, with a clear idea of what the consequences will be. Online, it is hard to tell when you are leaving a private space and entering a public one. A great deal of data is harvested without the knowledge of the consumer – not only through scraping and invisible trackers, but also through privacy settings that are intentionally difficult to manage and set by default to share everything. Furthermore, privacy policies are often incomprehensible to anyone but lawyers; and yet we can't stop sharing. Felix Stalder explains how new forms of sociability have arisen; how, in order to be social in the networked society, we first have to make ourselves visible. In this context, privacy is not a positive right, but a possible threat to be disconnected. [2] What is the value of privacy when we rely on visibility in order to socialize?

The 'I've got nothing to hide' argument, often proposed in the 'privacy versus security' debate, is not easily countered by a similar one-liner explaining the value of privacy. This is a more complex and abstract story. Whether we are being watched to catch terrorists or to sell products, the aim is always to analyze in order to control. As Bruce Schneier, security technologist and author, pointed out:

Too many wrongly characterize the debate as 'security versus privacy.' The real choice is liberty versus control. Tyranny, whether it arises under threat of foreign physical attack or under constant domestic authoritative scrutiny, is still tyranny. Liberty requires security without intrusion, security plus privacy. Widespread police surveillance is the very definition of a police state. And that's why we should champion privacy even when we have nothing to hide. [3]

Daniel Solove quotes the philosopher John Dewey, explaining how privacy as an individual right furthers the common good. It creates a space for people to breathe, by protecting against excessive intrusion (by states, companies, etc.) into our lives. [4] Privacy is social.

The so-called open Web plays an important role in the current crisis in online privacy. Celebrated for its transparency, interoperability and decentralized nature, the open Web is not just open and accessible for the benefit of all; it also happens to be extremely suitable for data harvesting, tracking, scraping, data mining, profiling and behavioral advertisement. This tendency is fuelled by (and in turn fuels) a booming industry. On the one hand, there is a genuine endeavor towards openness, motivated by a belief in the public good; on the other, there are forces driven by purely commercial goals. How to balance the two?

The free-market approach to the protection of privacy assumes self-regulation and consumer responsibility. But when there are no reasonable alternatives for consumers, when a company's privacy policies are unclear, when third parties invisible to the consumer are involved, it becomes impossible to make informed choices; thus governments must define and enforce standards of privacy.

Within the current framework of legislation, too much trust is placed in the mere 'stripping' of data directly identifying a person. With more and more open datasets available, it becomes increasingly easy to de-anonymize data using matching techniques. *Peekyou*for instance, a 'people search engine,' has applied for a patent detailing a method that matches people's real names to the pseudonyms they use on blogs, Twitter and other social networks. [5] A 2006 paper by Narayanan and Shmatikov, researching anonymity in databases, shows how vulnerable 'high-dimensional' data is to de-anonymization. [6]

Compared to the rapid growth of the market for personal data, legislation to protect users from invasion of privacy is lagging eons behind. Making an 'opt-out' or 'do-not-track' option mandatory (for browsers as well as tracking and profiling companies) would be a good start. However, even if the laws were brought up to speed, is it possible to properly enforce them? This would require a close inspection of the code of every single application and online service accessing a user's personal data.

Online games are increasingly popular, while game mechanics are applied extensively in an attempt to generate the same kind of eagerness to participate as experienced during gameplay. Globally, we spend 3 billion hours per week playing online games. [7] Jane McGonigal suggests using the positive emotions experienced by gamers for the benefit of all. In her talk during TED, in February 2010, she made a strong case for using the 'superpowers' of gamers to solve real-world problems, and to play games that matter.

Using games to address real-world issues is nothing new. For instance, *The Landlord's Game*, a precursor of the well-known *Monopoly*, was designed to demonstrate the economic principles of Georgism – in this case, how renting property enriches owners while impoverishing tenants. The idea of the game is to make the economic principles tangible, rather than explaining them. This function of games, generating understanding through experience rather than explanation, is what inspired the *Naked on Pluto* project to choose an online game as its medium.

The goal of *Naked on Pluto* is not to directly solve any privacy issues, but simply to make them more tangible. Seeing your own personal information, taken out of context and put in the hands of strangers, can be upsetting; and the experience of moving about in a world of constant surveillance and scrutiny, is altogether different from reading an article on privacy issues and social media. The game actively engages

you and other players in the story, so that you can discover firsthand what's going on behind the façade of this 'brave new world.'

I am in the Arrival lobby. There are lines of comfortable black leather benches, a spotless floor, big windows on one side, overlooking the splendid baroque architecture of the Palace, and exits to amusement and shopping facilities. It feels like I've just come home. [8]

The project uses Facebook as its platform for several reasons. First and foremost is scale: Facebook, with 500 million active users as of May 2011 is clearly the most popular social networking service worldwide. [9] Facebook has also done much to fuel discussions about online privacy, with its dubious policy changes and data leaks, as well as the discrepancy between the way it markets itself (open and self-regulatory) and the way it actually functions (a multi-billion-dollar business answering only to its investors). Another appealing aspect of using Facebook as a platform, is that Facebook makes it as easy as possible for anyone, without checking who and why, to access its customers' information. What is known as a 'Facebook application' is not software running on the Facebook platform: it is software running on any server, anywhere, outside of Facebook's control. The 'application' is in fact the authorization you give to this unknown software to access your data.

Naked on Pluto was inspired by the satirical text-based games popular in the 1980s. Two games were particularly thought provoking. One was *Hampstead*: the player starts broke and jobless, and attempts to eventually move up to one of London's 'posh' suburbs through a series of professional and lifestyle decisions. The other was *Bureaucracy*: the player overcomes a series of red-tape obstacles resulting from a recent change of address, eventually exploring the entire universe in order to set things straight. The critical tone and humor of these games were a welcome change from the goblin and wizard-ridden text adventures popular at the time, demonstrating that games can be critical as well as entertaining.

Naked on Pluto's satirical sci-fi atmosphere is created purely through text descriptions. The mix of personal data and fiction, combined with the use of text, appeals directly to players' imaginations. Those who allow themselves to be immersed in this strange and destabilizing world are treated to a somewhat bizarre but magnificent journey. To start playing, you simply log in using your Facebook account. When you enter the game, you find yourself on Pluto, naked as a jaybird, in a city under the rule of Elastic Versailles, a corrupted Artificial Intelligence. After buying yourself some clothes – a cowboy hat, diver's helmet or shepherdess bonnet – you're ready to start exploring the city.

Elastic Versailles appears to the player as a capital of convenience, a non-stop, 24/7 zone of endless pleasure. You can stroll through the palace gardens, go clubbing, or meet one of the marketing bots dedicated to making you aware of all the stuff you want to buy. There is not a dull moment, with plenty of visitors to talk to; some of whom you might know personally – although it is sometimes hard to tell whether you are dealing with a friend or a bot. Do not worry if you accidentally find yourself in a somewhat less polished area of the city. Everything is under control, as long as you return at once to the entertainment facilities.

Specialized bots such as the 'cleaners' keep the city tidy, putting all that has been misplaced back where it belongs, giving the city its elastic appearance. No matter what happens, everything slowly returns to its original state. Why would anyone possibly want to change things, when everything has been so excellently tailored to match your every desire? However, as you progress through the game, you find out something big has happened, and as you slowly peel away the façade, you discover the true nature of Elastic Versailles.

The interface combines two formats: the classic text-based adventure game (with a prompt to type in your actions) and the multiple-feed design of social media. The player is presented with overwhelming amounts of information, making it a challenge to figure out what is important and what is not in a 'Tweet-like' aggregation of feeds that is at once familiar and confusing.

The game requests permission from the user to access and use non-public profile information. After the start-up screen, users are prompted to log in to Facebook, after which permission is once again requested to access certain parts of their Facebook profile. [10] This requires trust in the application, which is not easily established. Paradoxically, the more often information and permission are requested, the less trustworthy the application seems. Even though the game asks for very little information, some users will find it difficult to agree; the 'artistic' context may give rise to the idea that the game can disturb their Facebook experience, by writing on their 'wall' or changing their profile information – even though this is not possible, since all permissions asked are read-only.

To make sure users understand what the application can and cannot do, the game (free software released under the AGPL license) has a very clear, short and straightforward privacy policy, explaining that the game does not store any Facebook information on its servers, other than the player's name and public Facebook ID number. All data generated during the game can be removed on request. All the Facebook data used in the game is only displayed to a player locally, on his or her computer – it cannot be altered by the application, and is not stored on any server, nor shared with any other players.

The developers are currently (May 2011) working on an improved homepage, with information on any privacy concerns users might have. Furthermore, trust will have to be established through positive user experiences and by word of mouth. The project's makers accept that when dealing with critical users, they will face the same healthy suspicion met by commercial applications. Those who do not grant permission for access to their profile are likely to already have an informed view of the issues the game is trying to raise.

The development of the game is combined with an investigation into how exposed we are on social networks, how our data is being used, and what this 'second life' in databases means to us. This research is documented on the project's blog, which contains posts on the project's progress, technical development and background. [11] Part of the blog is the *Plutonian Striptease* series – more than a dozen interviews with experts, owners, users, fans and haters of social media, covering a wide variety of views on this topic.*Plutonian Striptease* has been continued in the form of a lecture series during the LiWoLi 2011 festival. [12]

I am on the Farm. It looks like it was deserted a long time ago. All the windows are broken, the roof has caved in and birds have made nests on top of kitchen cabinets. There are puddles of water on the floor. It smells mouldy. [13]

Naked on Pluto tries to raise awareness of online privacy issues through gameplay and experience, while contextualizing the project through its blog. Of course, it will take more than just a game to improve the situation, but together with other endeavors aiming to raise awareness and to tackle through legislation the problems of online privacy, we can only hope that some day the game will become obsolete or unplayable, due to locked-down user data or total refusal by users to agree to grant any third-party applications access to their information. Until that day comes, the game can be played at http://naked-on-pluto.net.

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VERSIONS, COMMENTS AND AUTHENTICITY

Annet Dekker

When talking about representation and reproduction it is hard not to talk about authenticity. In this paper, I will discuss the changing meaning of authenticity, in which I will pay special attention to the influence of web2.0 strategies used by artists and museums.Questions that I will address: What does the Web 2.0 mean for art and authenticity? And, related, what does online participation mean? How do museums deal with user-generated content?

The Dutch/Belgian artist duo JODI are renowned for their reactions to the rules of the Internet and for posing questions about the limitations of coded communication. They have recently been particularly interested in the function of 'commenting' online. One of their latest works is *allyourvideobelongto.us*. The title is derived from the well-known Internet meme phrase, "All your base are belong to us," a poorly translated sentence from the opening scene of the Japanese video game *Zero Wing* (1989). In 2000, a video was made of the sentence that quickly achieved cult status on the Internet. The following year, when YouTube was temporarily shut down for maintenance, the site placed the line "All your video are belong to us" beneath its logo, as a joke. Many visitors to the site assumed it had been hacked and immediately phoned YouTube's office. The company was unable to handle the influx of calls and had to post further explanations on the site: "No, we haven't been hacked. Get a sense of humor," "Apparently we can't spel [sic]," and "Please stop calling the office, we're trying to work in here." The "All your video are belong to us" line was later used by YouTube's critics in the discussion about the rights that the site asserts over the videos of their members. This issue is what JODI is referring to with *allyourvideoarebelongto.us*. This project involved JODI transferring home videos of people imitating their favorite singer onto vinyl. The artists rewarded the singers by placing a video of the long-play disc with all the songs on YouTube below the original video as a video comment.

When talking about representation and reproduction it is hard to avoid the subject of authenticity. The term authentic stems from the Greek 'authentikos,' meaning principal and genuine, i.e., what is represented and reproduced is regarded as authentic. Something is authenticated through negotiation and as such it can be regarded as a social construction. [1] The word infers authoritative certification that an object is what it is claimed to be. In cultural heritage, it is most often used to refer to the 'original' state of a work. This is not to say that the authentic is static, as David Lowenthal reminds us: "What counts as authentic shifted continually from substance to form to process and to images and ritual performance. Indeed, the very quest for authenticity altered its nature, just as subatomic particles are affected by the act of observing them. Cultural relativity made authenticity a capricious will-o'-the-wisp, even a contradiction in terms." [2] Authenticity on the World Wide Web is further complicated by the ease and tolerance of replication. Although artists have employed this strategy for many decades, the speed and accessibility of the network means that communication, visuals, videos and sounds can be readily transferred and copied within seconds. So, does the notion of authenticity still function within the World Wide Web? If it can, what does it mean now? Finally, how are the traditional keepers of cultural heritage – the museums – dealing with these issues?

Versions and comments

In 2009, Petra Heck, Constant Dullaart and I organized the *Versions* exhibition at the Netherlands Media Art Institute in Amsterdam. We invited several artists, including JODI, whose practice centers on reacting to each another. For these artists, the Internet is the place par excellence to quickly launch ideas, respond to each another or adapt existing work and reuse it. Through this process, photos, animations or videos rapidly grow into more complex, aesthetic artworks. Sharing and commenting on each other's work leads to questions about the position and perception of the work both in the context of the Internet and beyond it. For example, to what extent can one speak of the uniqueness or the originality of these works? Who determines what can or cannot be done? What happens to individual identity within the group process? And, of course, what is the significance of authenticity, appropriation and agency in the era of 'comment culture?'

Like JODI, Constant Dullaart is interested in YouTube, but he focuses on a different aspect: its formal aesthetics. In 2008, Dullaart made the video series *YouTube as a Subject* in which he took the functional YouTube play button as the subject of a quest for design and its use on the Internet, using video animation to make the button do everything from bouncing around like a ping-pong ball to blurring into a smudge. In this way, Dullaart elevates the play button to the level of an icon. Dullaart uploaded the short videos on YouTube, where they provoked a series of new video comments. For *Versions* he created a sculpture of another YouTube icon, the circling dots that signal the loading time for a video to start. The foam circles were filmed by visitors using their mobile phones and put online, resulting in new video comments by others.

In addition to individual approaches such as Dullaart's, increasingly more 'club sites' are emerging: *NastyNets* was one of the first 'surfers' clubs,' which are networks of people reacting to each other's postings by uploading new images and/or audio fragments characterised by their 'dirty' or 'trashy' style. *F.A.T. Lab* shares a similar approach; and there are many more examples.

The online is further recontextualized in galleries. A good example of this is the now famous work *Versions* by Oliver Laric (2009), with which he questions the notion of authorship. He does this not only by using existing visual material, but also by explicitly inviting others to supplement or alter his work. This complete denial of authorship seeks to create space for developing interesting things. At a certain point, *Versions* also moves into gallery spaces where it consists of sculptures, essays, videos and performances that exist simultaneously as equally valid variations on a string of thoughts. Although Laric claims to open up his work for everyone to play with and use, he seems most interested in having multiple versions of his initial ideas. So, how involved can the audience really be in works such as this? I wonder if this really constitutes participation or collaboration.

Collaborative and distributive practices

Some earlier online works deal with issues of participation, authorship and collaboration more clearly and directly. One example is the software *Nine* (2003) and its predecessor *Linker* (1999), both of which were developed by Mongrel (Graham Harwood).*Linker* allowed the user to easily store and link images, video, text and sound to other selected material within a grid of nine frames. These elements created a visual story. The *Nine* program works in the same way, but is an online tool rather than an offline one. *Nine* connects stories and facilitates exchanges between users. What is striking is that although the

hierarchical structure and system of accessing information are fairly rigid, they are visible 'on the sur-face,' rather than buried in the customary back-end solutions. This reflects the idea behind the project, which is to consider how structures are constructed and used. The network options offered are interest-ing because of this transparency, as is the way in which issues such as authorship and copyright are dealt with. When using other people's images, text or sound, the user cannot directly 'credit' them, but has to e-mail the author – not to get permission but to inform the author of their use. This allows the author to see how their material is used. In a similar way, an email is sent to the author when an existing 'word' (tag) is used. In this way, links between texts are semi-automated. As Graham Harwood explains, "*Nine* is software that is directly born, changed and developed as the result of an ongoing sociability be-tween users and programmers." [3]

Another example is the website *Mouchette.org* (1996) by Martine Neddam. Mouchette existed on the Internet for many years, masquerading as a thirteen-year-old girl living in Amsterdam. She is the ideal imaginary friend who does and says things that many of us dream about but do not dare to do or say aloud. By turns seductive, cruel or sweet, Mouchette exposes the fantasies born from her dark imagina-tion. She repeatedly triggers web users to participate: she answers e-mails that are sent to her, thereby reinforcing the notion that she truly exists. At a certain point, Mouchette invites visitors to her site to become part of the Mouchette Network. Once inside the network, they obtain a password and 'become' Mouchette. These 'Mouchettes' can upload texts and images to the website and use Mouchette's e-mail system – including to answer e-mails. In this way, several different Mouchette's came into being. Al-though the authentic work might still be visible, the authorial role is dispersed. This raises the question of what does and does not belong to the authentic work.

What is essential in these two works, what distinguishes them from those mentioned previously, is that they want to offer something to the participant, be it information, a platform, or a sense of belonging. What connects these two examples with the ones above is that they do not merely foster participation and collaboration in the sense of working with others towards a shared goal, but that they enable others to work with the material in their own preferred way; they are distributive, rather than collaborative, practices. [4]

Authenticity, originality and authorship

Artists who work on the Internet conceive of the authentic in a different way to those working with tra-ditional media. Their work deals with iteration, versioning and repetition. The quest for originality is still important, but it is achieved in a different way, for example, by being the first to comment with a bril-liant or funny idea. At the same time, commenting is a mechanism for establishing individuality, as par-ticipants combine shared meanings and play with the shared parameters of the group in idiosyncratic ways. Notions of authenticity are still relevant, but what form do they take?

If we refer back to Lowenthal's remarks on authenticity, one might say that authenticity has now be-come a process – more specifically a distributive process in which participation is key and the use of the works determine the appearance. Lowenthal also states that a claim of authenticity depends on who is doing the work. However, the notion of authorship is not always easy to determine, as we can see in Laric's work, which questions the notion of single or multiple authorship by explicitly inviting others to alter or supplement it. As Laric says, "There are endless versions of *Versions*. Sculptures, essays, videos

and performances all exist simultaneously as equally valid variations of a string of thoughts. *Versions* exists without a clear beginning and remains open end [sic]. It is independent of context and adaptive to site specifications. No single author holds copyright to any of the manifestations." [5]

'Authorial control' and 'audience participation' are magical phrases for the cultural sector, especially in relation to digital cultural heritage. Various types of participation are on offer, from active to reactive to passive: Do-It-Yourself (DIY); submitting your own content (creation); remixing existing content or working with others (co-creation); labeling existing content (tagging); making selections; exhibitions or tours using available content (clouding); exchanges within and beyond gathered or created content (sharing and networking); and pushing 'like,' or in some cases 'dislike,' buttons (clicking). In addition, connections are made with the world beyond the Internet by staging events that involve surprise, game elements and so forth; and this is just the tip of the iceberg.

From offline to online participation

What does audience participation really mean? What is possible? In what ways can this be compared to participation in the sense as referred to above; versions, commenting, etc.? The etymology of the word 'participation' starts with the Latin 'participare' (to participate), which derives from 'pars' (part) and 'capere' (to take). It infers action and the involvement of at least one direct object – something or someone who receives the action of the verb, i.e., actively participating *in* or contributing *to* a group. Taking this one step further, it can be argued that individuals should be involved in a group such that each of them participates in the group's activities, challenges and successes. It follows from this that participation also means that participants should feel that they are co-owners of the group process, the content and the product. The next question is in what way, or whether, the online experience has changed this notion of participation. It may be useful to take a detour here and look at how artists and museums dealt with participation in the pre-Internet past.

Seeking audience participation is nothing new in art practices: early Romantic-era artists formed groups that bemoaned the separation of art and the audience, [6] and these thoughts were underscored by Richard Wagner in his seminal essay, T*he Art-Work of the Future* (*Das Kunstwerk der Zukunft*, 1849), in which he states that artists should realize that the 'Folk', the people, are the true inventors and artists:

Not ye wise men, therefore, are the true inventors, but the Folk; for Want it was, that drove it to invention. All great inventions are the People's deed; whereas the devisings of the intellect are but the exploitations, the derivatives, nay, the splinterings and disfigurements of the great inventions of the Folk. [7]

Who, then, will be the Artist of the Future? The poet? The performer? The musician? The plastician? Let us say it in one word: the Folk. That selfsame Folk to whom we owe the only genuine Art-work, still living even in our modern memory, however much distorted by our restorations; to whom alone we owe all Art itself. [8]

Several radical art movements pursued Wagner's ideals, either by aggressively trying to provoke the public through staging events and collective experiences (the Futurists) or by more subtly addressing the art authority and the dissolution of artistic individuality and authorship (the Dadaists). However, these were short-lived movements that often ultimately became the victims of their own strategies as they rapidly lost their power to shock and provoke, and descended into repetition. Although these avant-

garde movements encouraged audience interaction, their inflexibility often led to their decline. Nevertheless, they did open the way for a rebirth of participatory art in the 1950s and 1960s: from the Situationists to Fluxus and Allan Kaprow's 'Happenings,' and from Andy Warhol's Factory to the present.

It is important to realize that the concept of audience participation in these historical examples involved the audience in events that were strictly controlled by the artists – they retained authorial control. In most cases, this meant little more than the artist(s) and audience being together in the room where the happening or event unfolded. Contrary to Wagner's ideas, only scant attention was given to the role of the audience, and participation was not seen as a collaborative and consensual process, as we like to think of it today. Has the coerciveness of the historical attempts to interact with the audience been overcome? Wagner's notion of the 'Gesamtkunstwerk' (total artwork) can now be created and realized through technical means; but would he be pleased with the random clicking or the competition that can derive from the many Web 2.0 participatory tools? Again, we seem to be far removed from Wagner's vision of the individual who, regardless of class or education, seamlessly merges with the masses. Or are we?

Conclusion

In many ways, the nature of participation has not changed: online participation still involves working on social or other constructions, but now it is made possible by network and database technology. The result of the work (the construction) may be temporary or permanent, and may have a free or structured form. This structured form is the bottleneck and it highlights the shortcomings of the definition of participation in an online context. The minimum level of participation in this context requires nothing more than clicking on a button to trigger an action: for many people, membership of online communities or popular social networking sites such as Hyves and Facebook already constitutes participation. However, we may be able to shed light on the nature of participation by examining its goal: online participation is sometimes an end in itself but it can also be a means to another end. The focus may be on the event itself (the experience) or its product (data, information, knowledge). In the latter case, the product can be the final result, or it can be an unfinished product that will be used, or reused, in another construction. In this way, the participatory action becomes one action in a chain of actions (at times using FLOSS principles), sometimes even without the participant being aware of it – as is sometimes the case in museum online participatory games, where multiple authorship goes uncredited.

The target audience for online participation ranges from small, specialized groups to the broader, general public. In most cases, however, online participation (like offline participation) requires someone to instigate the construction process – a director or an orchestrator who can assume many roles. People need to be motivated to participate, which also leads to the assumption that participants will be 'rewarded' for their participation – or perhaps even penalized for not participating. The benefits of online participation may lie with the participants themselves, with the director, with third parties, or with all of these at once.

Online participation may be fleeting or it may be a collaborative creation or activity – or both at the same time. Furthermore, it can be initiated, (re)activated or passive. In this regard, online participation is similar to offline participation. The greatest difference lies in the fact that the goal of online participation is often not very transparent. There might be a need to redefine participation when it occurs online, with the crucial questions in this context being: what are the producers of the participatory context actually offering, and what are the roles of both parties in the process?

The claim for authenticity depends not only on what the work is, where it is takes place and who is doing it, but also who is paying for it, how long is it meant to last, and how is it marketed, or, better, distributed.

ACKNOWLEDGEMENTS

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4. *This way of working has a long tradition in music, where experiments with notation are aimed at re-use by making the system of production (notation) available to everyone. Live coding is one of the latest examples in this trend, where the material and the practice of production are available to others. See: Theresa Sauer, Notations21 (New York: Mark Batty Publisher, 2009) and Simon Yuill, "All Problems of Notation Will be Solved by the Masses: Free Open Form Performance, Free/Libre Open Source Software, and Distributive Practice" in FLOSS+Art, eds. Aymeric Mansoux and Marloes de Valk, 64–91 (Poitiers: GOTO10 and OpenMute, 2008).*
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DON'T ANTHROPOMORPHIZE ME EITHER

LINDA DEMENT

A discussion of embodiment, entrainment and agency.

We believe we can control a robot with code and screwdrivers. We believe it is inert matter. We believe it is a creature like us. We believe it is nothing like the complex beings we are. We believe we created it. We believe it is a clever pet that never shits. We believe it obeys us. We believe it is a lifeless machine. We invest it with personality. We divest it of presence.

Fluid mess in 'On Track' installation, In Serial, 2010

BACKGROUND

I have been working in digital arts since the late 80s, primarily making interactive works of various kinds. Recently, I worked with robots for the first time, as a member of the collaborative group *In Serial*: myself, Petra Gemeinboeck, PRINZGAU/podgorschek and Marion Traenkle. We produced an installation

comprised of a mechanical mop, a muddy fluid mess and a troupe of robots whose task was to attempt to clean the mess, but who in fact increased it continually.

In our work as *In Serial*, I was particularly entranced by the interactions between non-humans; the idea that our machinery, robots and mess did not respond to or engage with humans at all, but were energetically entangled with and focused on each other. The mop communicated with the robots via infrared signals. The physical nature of the installation and its mess impinged upon the robots' movements. The agitations of the robots released more fluid to the floor. Humans were bystanders.

We were working with pre-made off-the-shelf robots, the *iRobot Create*, which is a version of a commercially available domestic robotic vacuum cleaner. These were not purpose built for the artwork. They came with their own abilities, tendencies and habits in place, which made working with them, especially in the brutal, wet, sticky scenario we developed, quite tricky.

EMBODIMENT

I understand embodiment in a quantum physics sense – that the particles that form us are no different from and not divided from the particles that make up the rest of the world. There are no real physical boundaries between people, microbes, robots, furniture, food, garbage, gases, fluids, animals or any of the stuff of our world at all. There are only different formations, different dynamic patterns, being lived out in this one seething mass. Embodiment is densities, patterns, collections, constellations, drives and desires. Just as one cannot step into the same river twice, as its water is constantly flowing away and being renewed, the atoms that make up bodies are moving at lightning speeds around relatively vast empty spaces, appearing, disappearing, colliding and rebounding. We breathe in and breathe out billions of atoms with each breath. We incrementally exchange our atoms, cells, organs with each other and with the rest of the world, replacing about 98% of our atoms each year. [1]

In these densities, patterns and flows of exchange, I am interested in where consciousness, intention and agency reside.

Jane Bennett refers to, "[...] encountering the world as a swarm of vibrant materials entering and leaving agentic assemblages." [2]

My self spills out beyond the boundaries of my skin, given that it is no boundary at all. Energies from elsewhere spill over into the formation I think of as me. Perhaps volition, will and intent are not restricted to humans, given that a human is not a separate discrete entity. Perhaps objects and ideas have as much personal volition as I do. Perhaps ideas are just a kind of ripple or current that moves various particles around within this vast soup of information, energy and matter. Perhaps it is constellations, fluid assemblages of apparently disparate actants, that effect agency, enact drives, ferment thoughts and conduct relationships. Perhaps fields of intention find material expression through whatever comes to hand.

In *Media Ecologies* Matt Fuller refers to:

[…] a combination of drives and capacities that, stimulating each other to new realms of potential, produce something that is in virulent excess of the sum of its parts. Indeed such parts can no longer be disassembled; they produce an ecology. Not a whole but a live torrent in time of variegated and combinatorial energy and matter. [3]

[…] the capacities of activity, through sensation and affect possible to each composition, whether organic or not are shaped by what it is, what it connects to, and the dimensions of relationality around it. [4]

The embodiment I am interested in is that surrounding, forming and propelling us as a system, a turbulence, an assemblage, of flesh, thoughts, machines, fluids, robots, programs, ideas, tables, rooms and so on – an embodied agency arising from the shifting, intricate, dynamic arrangements of our particular constellations.

ENTRAINMENT

Entrainment is a term used in physics to mean a coming into phase or sync. Early experiments, back in the 1600s, showed that pendulums set off at different rates will gradually come into phase with each other.

In geography, entrainment is the process by which sediment becomes part of a fluid flow. In meteorology, it describes a non-turbulent flow being captured by a turbulent one, as can happen when dry environmental air becomes entrained within a moist cloud. In hydrodynamics, it describes one fluid pushing or pulling another along with it. In engineering, it is the entrapment of one substance within another, such as gas in an aerated fluid or tiny objects caught up in smoke. In biology, it can describe physiological rhythms coming into phase with environmental rhythms, as in circadian sleep cycles, or the synchronization of whole organisms to external rhythms. In new age alternative health gadgetry, it is delivered to our brainwaves via flashing lights and audio pulses. [5]

It is a physical, material, energetic coming into phase, a confluence, a synchronization between inner and outer; between this and that, within beats and flows.

Music articulates our limbs. It directly addresses and shifts the muscles, bones and joints. Our feet begin to tap; our shoulders are swayed by the beat, by the pleasure of repetition, by the force of a tune. We can be swept away and lose ourselves, abandoning thought and self-consciousness, or we can be barely aware of some small dancing of a toe while our mind is importantly solving problems in a concentrated chatter.

Conversely though, the beat might repel, might induce a rebellion of the limbs rather than choreograph them. If I am in the mood for some thrash punk and I walk into a cafe where they are playing swing jazz, it will push me, irritated, back out onto the street while part of me cries uselessly, "But I just want a coffee." If I am craving the quiet joys of the Tord Gustavsen Trio but the cafe is bellowing Henry Rollins, as much as I love Henry, I will be pushed out the door the same way. I am not in the mood.

The participants in an entrainment need to be just that. The rhythm will not take and the sync will turn to resistance, if the parties are not willing, if they have no affinity. Maybe the geographer's sediment

must have an attraction to the flow of water. Maybe the gas bubbles must want to aerate the engineer's fluid. Certainly, my limbs must have a tendency, or at least a tolerance, toward the beat that lifts them.

RABBIT / ROBOT

A rabbit moved in with my girlfriend and I a number of years ago and to start with there was constant struggle of wills. Rabbits are not smart enough that you can train them. They simply do what they feel they have to. The rabbit decided to make her home in the living room. We did not want her to. A lack of communication and understanding along with very different intentions and drives produces a brutal and stupid language. She bit us. We barricaded the door. She launched herself at the barricade and scrambled over. We bribed her with carrot. She chewed through our electrical cables.

Over years of frustrations and defeats, we became familiar with her ways, her world-view, and she with ours. The small, determined rhythm of her being and the distracted human over-thought rhythms of ours settled into phase. The arrangement, ecology or constellation found its form. We had an entrainment.

Like the rabbit, these off-the-shelf robots caused us some troubles in our attempts to control and direct. We frustrated the robots – tethered them, trapped them, told them to clean and prevented them from cleaning, perched them on high tables, even took away some of their senses. They disobeyed our programs, leapt off the tables, threw their tire tread and largely refused to dance to our tune.

Entrainment takes time, attention and proximity. It takes a recognition and appreciation of the force, intention, drives and will of the unique material-intelligent-energetic constellations in play. It takes willingness to participate and respect for the others in the mix.

ANTHROPOMORPHISM

Perhaps our first mistake is to anthropomorphize ourselves; thinking we are separate, cohesive, autonomous beings, in singular command of our thoughts, decisions and actions. In the robot, we see reflections and parallels of our imaginary free-standing, contained, independence in its similar ostensible autonomy, decisions and actions. We then believe we can control the robot with programming and screwdrivers. We believe it is inert matter. We believe it is a little creature like us. We believe it is nothing like the complex creatures we are. We believe, god-like, we created it. We believe it is a manageable, clever pet that never shits. We believe it obeys us. We believe it is a lifeless machine. We invest it with personality. We divest it of presence.

Yet we are not discreet entities and neither are robots. What if the particles we appear to inhabit are propelled by winds and flow forms of other ideas, other material particles and other energies? Perhaps impetus sweeps into us from the robot or beyond. Perhaps the robot's constellation, its arrangement, has its own intelligence, will and intention. Given that we are not materially separate from each other, nor in any way fixed, perhaps its will and intention animate us at the same time as ours drives them.

Perhaps this is also true for the table, the cigarette butt, the floor, the spilled coffee, the song on the radio, the ideas I read about last night – the other material and immaterial stuff of our world. Robots though, have a level of digital and machinic complexity that allows a more humanly understandable

reading, a possibility of communication, collaboration or contest that is not possible with a rock or a sandwich wrapper.

"A touch of anthropomorphism then, can catalyse a sensibility that finds a world filled not with ontologically distinct categories of beings (subjects and objects) but with variously composed materialities that form confederations." [6]

Perhaps over time and in proximity, with a respectful recognition of vibrant material presence, the particles that seem to form the robot and the particles that seem to form the human, can come into entrainment and leave behind our anthropocentric arrogance first and anthropomorphism second. The exchange of atoms, the currents of ideas, the forces and phenomena of the sea of particles might manifest through some dissonant hum between human and robot fields of formation.

"[...] order is not imposed from above, by mind exerting its will on dumb material forces; it is intrinsic to the self-organising nature of the phenomenal world itself. When we recognise our participation in its co-arising patterns, we can claim our power to act." [7]

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MOVING SOFTLY FORWARD

Sara Diamond

This paper identifies themes in wearable technology practices within the context of research in universities and art and design schools as well as industrial laboratories to suggest opportunities for concentration of efforts and international collaboration. Research using biometric data, heart rate monitors, embedded sensors, blue tooth and mobile networks, conductive threads, soft circuitry, smart textiles and shape metals and other adaptive fabrics occur at sites in around the world. Where are these? Secondly, the paper begins to map these research efforts to the potential of take-up by adopters (fashion designers, healthcare, and security services as examples). Finally it suggests some opportunities for collaboration and points to strategies needed to bridge the gap between research or art and design prototyping and large-scale adoption.

INTRODUCTION

This paper reminds us of critical and technological concerns that were appropriate to an earlier phase of fashion and technology research. It then checks these against research in universities and art and design schools as well as industrial laboratories to suggest the breadth of current research. The paper begins to map these research efforts to take-up by adopters (primarily fashion designers) and then suggests some pointers to bridging the gap between research-based art and design prototyping and large-scale adoption.

1. WEARABLE TECHNOLOGY, FASHION AND ART RESEARCH - 2003-5

The *Wear: Smart Clothes, Fashionable Technologies* July-August Issue 16 of Horizonzero.ca identified the rising interest in wearable technologies:

Summer 2004's most glamorous fashions are about looking "intelligent", "adorable", and "well connected". Digital is the "it" colour this year, and clothing designers are hitting the runway with e-ink, electric plaid, soft plasma displays, barometric fibres, conductive threads and wireless chic. That's why *HorizonZero* has been combing fashion houses and tech labs around the globe in order to bring you the very latest technology-laced textiles and accessories. [1]

Wear argued that technological change in the form of smart textiles, new flexible materials and protective surfaces was allowing us to "protect and personalize" [2] our bodies in new ways, offering us a "second skin". At the same time the issue acknowledged the transformative impacts that mobile devices, whether a phone or mp3 player were manifesting on social and economic life.

function of garments? I noted, "The technologies that we deploy - digital (carrying and communicating from signals), material (inks, threads), biometrics (measuring and responding to our biological rhythms), nanotechnological (transforming with the chemical nature of our bodies) - are all temporal media". [3]

These qualities were relevant in relation to "something uncanny but tremulously exciting in the possibility that our clothes, our jewelry, our ornaments might speak for us - and with others - in explicit ways, and as intuitive, quasi-independent systems". I proposed the notion of "endogeny",

…the potential of internal, evolutionary, and adaptive change in these materials and their expressions For example, can we make ecologically viable garments that change their form, their fabric and expression, and allow for an economy of reprogramming rather than one based on the constant consumption of new objects? How can we combine endogeny with exogeny, the creation of new interfaces that communicate with and between systems?[4]

In my editorial I posed a series of provocations to fashion and technology. First of all, were we able to understand and mobilize the individual and social temporal, event and memory-making

Further, there was the question of how might form and function not only serve elites but, "fit the needs of the majority (in terms of durability, affordability, cultural specificity, and beauty for example) rather than only the wealthy?" These questions retain their relevance in 2011.

In an examination of trends in 2004 Joanna Berzowska [5] divided practices and emerging tendencies into three fields – 1) **wearable computing** where individuals wear computers on their bodies, either as routine **mobile** technologies that are responsive to context and place or as cyborg technologies, primarily **headmounted** displays. 2) electronic textiles, "a knit or woven substrate that incorporates capabilities for sensing, communication, and power transmission, as well as interconnection technology that allows sensors or processors to be networked together within a fabric." [6] These materials offer the ability to change colour, adapting to landscape or personal contexts. A second set of applications use sensor arrays and embedded sensor technologies from biosensors, to environmental sensors, to audio, movement and pressure sensors. These can be "directed inward or outward;" [7] 3) **universal connectivity, using biofeedback, network, and monitoring technologies such as RFID**. These technologies can be used for medical compliance and safety monitoring and intervention. Berzowska asks, "What kind of information processing do we want to carry out on our bodies? What kind of functionality do we want to enable inside our clothes?" [8] She raised concerns that too much attention is being given to surveillance and monitoring, not personal expression.

To imagine the year 2015 the issue commissioned "windows". Maggie Orth's "Weather Jacket" raincoat could predict the weather and change qualities in response to it. It was cinched by a "Destination Belt" embedded with GPS that could guide the wearer through the urban landscape. Sabine Seymour's "Rescue" was a rugged thermal and water proof sailing garment system that would connect the wearer to their boat's GPS and emergency systems, while containing a hidden inflatable life preserver and an emergency beacon. Susan Jenkyn-Jones' "e-scapaid" was a brooch like device that would be recognizable by others and would transmit the wearer's dating preferences. Her kit included a smart dating card that could be left behind embedded with gaming
clues about the wearer. Victoria Lawton's "Nocturnal Dialysis Nightware" used soft tubing embedded in a nightgown, electronics and micro technology to deliver dialysis while the wearer slept. In reviewing research and commercialization efforts in 2011 these projections are reflected in fashion, medical and security systems research.

2. CURRENT RESEARCH

Research capacity has expanded in the three fields that Joanna Berzowska noted in 2004: wearable computing (mobile, head mounted); electronic textiles and universal connectivity, using biofeedback, network, and monitoring technologies such as RFID. An online search by this researcher exhumes significant references and suggests that wearable computing has moved into the mainstream and has had significant take-up within biomedical engineering. Valerie LaMontagne's survey web site http://www.valerielamontagne.com/wearables.html allows the reader to gain a sense of the breadth of wearable research and design particularly in Europe and North America. The blog http://www.electricfoxy.com/ provides regular updates on events, topics and people in the field. Sabine Seymour's two volumes [9] scope out art and design wearable technology practices and Bradley Quinn [10] describes emerging trends in textile research, such as new tensile materials comprised of nano fibers.

Research fields have grown exponentially, whether fitness, biomedical monitoring or security applications. Mobile devices, wifi, Bluetooth and related network technologies have become ubiquitous in the last seven years, stimulating a return to interest in the integration of mobile networks and devices into worn devices or garments. Inexpensive microcontroller systems such as the washable Lilypad Arduino or affordable LED systems have seen the growth of craft and DIY (do-it-yourself) applications. New materials such as shape metals have provided new opportunities for responsive fashion and accessories. Malleable voltaics support aesthetic and functional energy systems. Significant advances have occurred in textile research thanks in part to space agency and military efforts. The Cleoxa company blog notes, "We find materials that are highly resistant to abrasion, or extremely insulating…but the most impressive is the memory foam membrane, according to outside temperature, the molecular structure of the fabric changes." [11] Projects such as Future Force Warrior System (USA) combine bullet protection (textiles) with communication device integration (sensor, networks, monitoring). A notable area of expanded interdisciplinary collaboration is the field of health technology and design. For example Swedish student designer Marjan Kooshnia has created medical masks that, "give an aesthetic warning if the wearer is running a fever or the concentration of allergens in the air exceeds a certain threshold. The pattern printed with thermo-chromic ink changes color when the exhale exceeds 27'C." [12]

University research laboratories or networks amalgamating engineering capacity with wearable art, design and fashion and domain expertise (such as biomedical) now span a growing number of continents and countries. The recognized need for intensive cooperation between varied technological and design research is one of the critical turning points of this decade. Design is acknowledged for its aesthetic, form-finding and usability roles. Research into the components of wearable technology has also expanded. For example European intelligent textile research has grown through a focus on defense, medical and sports applications. In Germany there is the Fraunhofer Institute IZM and Stella: STretchable ELectronics for Large Area Applications, Berlin; in Belgium University of Ghent; in Sweden Chalmers University of Technology, Swerea IVF and the University College of Borås, Textile Department with a Northern European aggregate, NICE, the Nordic Initiative, Clean and Ethical - Fashion. The Smart Textile Network links Swedish researchers with businesses such as H&M Rowells, Eton, Ludvig Svensson, Borås Wäfveri, Sanden textiles and Kasthall in Sjuhärad, the Scandinavian center of textile, mail-order and e-business. Products vary from clinical medical use, to sound absorption, to fashion applications. Belgium is a contributor to smart textiles research. Projects by students at the University of Ghent suggest a breadth of investigations such as, "A self-heating sweater; a textile antenna; Are you still breathing? Measure your heartbeat." [13] Industry research has rekindled with Philips is leading research in developing light emitting textile substrates which can be washed.

Capacity in the UK exists at numerous institutions including the Universities of Nottingham and Bristol, Central Saint Martins and London School of Fashion, Distance Lab, Scotland. The University of the Arts London Textiles Futures Research Centre encompasses its four art and design colleges. Its mandate is to "undertake a clearly focused range of textile related research that facilitates technology translation and convergence, improving the interface between science and design, the exploration of sustainability, the expansion of the textile product/applications, and the redefinition of cultural and aesthetic norms". The London School of Fashion has created the Centre for Fashion Science with research in Responsive and Multifunctional Textiles. Textile Futures Central Saint Martins, "share a practice-led approach through which to pioneer new hybrid methodologies, harnessing computers, lasers and electronics along with emergent bio and nanotechnologies. With sustainability and a sophisticated aesthetic as a common thread, the members' diverse research expertise addresses the future fabric of life by engaging with fashion, interiors, food, biomedicine, the built environment and evolving social interactions" [14] The United Kingdom is home to several focused Masters degrees in wearable technology, for example The University of Wales, Newport, M.A. or M.F.A in Smart Clothes and Wearable Technologies. [15] All of these programs place ?sustainability? in a critical location – an issue that was barely considered in the emerging years of fashion and technology research.

The European Union Framework grants have provided opportunities for large networks the bind to-gether applications and component (substrates, electronics, fabrics) research. The SYSTEX Coordination Action for Enhancing the Breakthrough of Intelligent Textile Systems (E-Textiles and Wearable Microsys-tems) [16] addresses the medical, transport, protective, sports and wellness markets. Researchers have found ways to apply conductive textile yarns to create intelligent textile systems; others have integrated a heart monitor into a stretchy garment, thus affording it adequate contact with the skin. The EU PLACE-it: Platform for Large Area Conformable Electronics by InTegration identifies barriers in interdisciplinary knowledge by building bridges with industry. SERVIVE led by the London College of Fashion investigates virtual worlds as a location for fashion ecommerce.

Canada has retained and built its research capacity in wearable technologies. Kate Hartman's Social Body Lab at OCAD University in Toronto links social awareness, art and design with a wide expanse of technologies, "Beyond the basic functionality of incorporating technology into clothing, the Social Body Lab focuses on meaningful and provocative interactions, questioning the relationship between humans and technology through working prototypes and fully manifested projects." [17] Hexagram in Montreal includes Ying Gau a researcher at the UQAM in fashion and new media, and a concentration from Con-cordia University: Joanna Berzowska, Barbara Layne and Ingrid Bachman. American engineering, nan-otechnology and design programs include MIT, Georgia Institute of Technology (USA), Virginia Tech (USA), Carnegie Mellon (USA), Parsons School of Design (USA), the Interactive Telecommunications Pro-gram, NYU and Stanford University. Research has grown in Japan (University of Osaka for example has a focus on user-driven design), Brazil (Anhembi Morumbi University) and there are emerging centres in Australia (University of South Australia), Hong Kong and India (Institute of Apparel Management). Hong Kong Polytechnic's Institute of Textiles and Clothing addresses electrical, textile and biomedical engi-neers as well as academics and fashion designers. They state, ?Integrating electronics into clothing is a major new concept, which opens up a whole array of multifunctional, wearable electro-textiles for sens-ing/monitoring body functions, delivering communication facilities, data transfer, individual environ-ment control, and many other applications. [18] The IAM is interested in the ways that intelligent textile manufacturing can be introduced into traditional fabric production methods as well as fashion applica-tions.

Another significant change spurred on by advances in miniaturization and the accessibility of Arduino and other consumer electronics is the growth of a dynamic DIY culture. Electronic crafts have arrived at the foreground of wearable practice. For example Syuzi Pakhchyan's SparkLab "is a body of DIY projects that investigate between culture, technology and craft. It encourages a new methodology for assembling electronic circuitry which merges sewing techniques with electronics. Wires are substituted for conductive thread, snaps for solder joints and connection points, and everyday silk organza is used as the conductive medium." [19] She provides users and consumers with the tools, patterns and materials to create their own electronic jewelry.

There has been an exponential growth of artists' based research, providing a critical and alternate gaze at the growing trend towards monitoring systems that underlies much technical and commercial research into wearable technology. As electronics is standardized some artists have moved to new technology edges, for instance linking brain wave monitors or using electrochemical sensors to measure changes in sweat.1 behavior. New media art centres now consistently host artists' projects in wearable technology. These include the V2_Institute for the Unstable Media (Netherlands), Eyebeam (New York), and the Banff New Media Institute (Canada). [20]

Concerns about the social impacts of wearable technologies that were expressed in*Horizonzero.ca* 2004 are echoed in the premise of laboratories such as those at OCAD University, Hexagram and the University of the Arts London. Unlike 2004, research projects in universities and industry are now explicitly focused on issues of sustainability and environmental impacts, concerns that were raised but not addressed during the early rise of wearable technology. Research concentrates on lowering power consumption as well as inventing new power sources such as solar or piezo electronics – energy harvested from human movement, thermal harvesting, solar cells and printable batteries. Helen Story is the co-director of the Centre for Fashion/Science at the London College of Fashion. She creates fashion art works meant to provoke environmental awareness such as Catalytic Clothing that cleans the air around it with purifying filters. Elena Corchero has developed a sun umbrella and other vibrant accessories that refuel each day with elegant photovoltaic panels expressing a pattern at night. Ying Gau of UQAM states, "Le thème central de mon travail est l'environnement, qu'il soit social, climatique ou urbain…je travaille sur la problématique du vêtement en tant qu'objet de médiation entre l'homme et son environnement physique et social." [21] Discursive forums such as the May, 2011 Wearable Technologies: Cross-disciplinary Ventures on –empyre soft-skinned space investigate the growing presence and integration of wearable technologies in media, military and fashion wear and the impact of these trends on how the body is represented, controlled and understood. Some of these concerns have filtered into commercial fashion and technology. We are still far away from the integration of "endogeny with exogeny" of recyclable and sustainable fashion.

3. DISSEMINATION AND ADOPTION

Seven years later the fashion industry is integrating wearable technologies, often using tools that were previously in prototype phase and are now more resilient. Fashion offerings revisit projects that artists and adventurist designers once sketched or prototyped. Take-up has grown in the fashion industry. While labour intensive to make and hence limited in reproducibility the couture demonstration projects have an aesthetic depth. When Lincoln Phillip searched for fashion industry interest in wearable technologies in 2004 he only found works by artists and designers on the edge of industry. This year the digital media content showcase South by South West in Austin, Texas included a wearable technology show. The 2011 Consumer Electronics Show in Las Vegas presented FashionWare. The runway featured mobile

enabled applications, LED systems and thermochromic inks. Designers, many of whom graduated from Parsons School of Design, MIT Media Lab, London College of Fashion, Central Saint Martins, were Connor Dickie, [22] Diana Eng, [23] Becky Stern, [24] Fang-Yu Lin, [25] Alison Lewis [26] and Amanda Parkes. [27] Their work brings us back to concepts presented in Wear! Horizonzero.ca as well as earlier works referenced on http://www.valerielamontagne.com/wearables.html.

In 2011 the blog *ChipChick – Technology and Gadgets from a Girl's Perspective* proposed "Ten High Tech Fashion Designers to Watch". Zara Rabinovich elegized about the Rainbow Winters [28] line by UK designer Amy Konstanze Mercedes who uses "thermochromic and hydrochromic ink which alter in rain or sun, providing stunning visual effects, such as appearing and disappearing flowers and patterns" [29] drawing on a background of costume design for theatre. Anastasia Radevich's [30] sculpted shoes diffuse light through fibre optics, activated by a switch at their ankle. Vega Zaishi Wang [31] applies electroluminescent lights to chiffon to sculpt out patterns that are revealed through the soft fabric. Slvr Lining [32] uses subtly placed solar panels in everyday wear to recharge mobile technology. Cute Circuit [33] is a London company that creates couture designs – at times for celebrities such as singer Katy Perry whose white dress flickered with pink LED lights to the beat of song with Kanye West. Her dress glowed and lit up when she moved. Several designers—Francesca Rosella of Cute Circuit and Diana Eng have spent significant time within the couture and ready wear worlds and their facility suggests a new sophistication as tested concepts are injected with strong design aesthetics.

4. SOME IDEAS ON COLLABORATION AND ADOPTION

There is clearly movement in the commercialization of smart textiles, wearable mobile technologies and wearable sensor systems, although analysts note that since the 2008 economic crisis ?large investments in intelligent textile products have mostly been among well consolidated brands; Nike, Adidas and Polar in sportswear and Viking Lifesaving equipment in PPE. [34] Consumer sports products such as integrated music devices and heated garments have grown. [35] Commercialization opportunities in the larger field target specialist markets - work wear, personal protective equipment and safety, with slower take-up in healthcare monitoring, in part because of privacy concerns. This latter field will grow with the rise of telemedicine, advanced applications in pharmaceuticals and the needs of aging populations who require in-home care and self-monitoring technologies. Intrusions into the fashion world are still minimal but there is persistence in the couture and accessory markets. The dream of large-scale adoption remains downstream, limited by the labour intensity of production.

One challenge is that the field is not yet demand driven; it is technology innovation driven. User-centered design would be of value. Mass market opportunities lie in practical needs and at least a component of design research needs to address these with aesthetically powerful solutions that are sustainable.

A second challenge is the need to use simple technologies elegantly. The uptake of thermochromic inks indicates that commercial designers are interested in pushing the aesthetic applications more than gadgetry that may break down.

A third challenge is how to best aggregate research efforts to avoid duplication and enable interdisciplinary capacity between universities, art and design institutions, design companies and potential distributors. International research networks are a strong means for such collaboration and dissemination.

A fourth challenge is the need to provide a comprehensive visual data base that can act as a resource to emerging designers and artists in this field. This would be a worth industry-based investment.

Finally, a critical assessment of the ethical, social, economic and environmental issues in wearable technology and its applications needs to continue. Engaging those outside of the art and design world in these dialogues through presence at industry forums is critical.

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DATA VISUALIZATION: MATERIALITY AND MEDIATION [1]

Sara Diamond

In 1997 I had taken up a performance persona of a zebra an animal that seemed an ideal cathexis for debates about art and science with its clonal mosaic patterned pelt, evolutionary stamina and creature stubbornness. Turing's calculations of patterns and intelligence through reactiondiffusion patterns were inspired by the zebra. The performances embraced and critiqued anthropomorphism, or more appropriately zoomorphism, engaging in ritual clowning in which the zebra could make statements without reprisal about the emerging culture of ArtSci and the desire for bonding between artists and scientists. When Peter Ride commissioned me to build a web site dedicated to ArtSci dialogs, I realized my site needed social media, at that time 'chat.' The inert and linear qualities of IRC and the impossibility of building dynamic dialogs with this tool prompted the decision to create a visual and nonlinear chat tool.

Erving Goffman emphasized the ways that conversation a form of everyday performance establishes a "participation framework" for sociality, an insight borne out by the growth of social media in this decade. [2] I was struck by the emotional (affective) qualities of individual posting and interactions and the ways that emotions appeared to impact participation and relationships. I sought a means to visualize the emotional nuances of, as Goffman puts it, "movements, looks, vocal sounds and speaking." [3] At the same time, social media could act as a collective memory, providing a viable tool for both realtime and archival use. These interests led me to create the CodeZebraOS, an online tool for collaboration, initially between the arts and sciences. CodeZebraOS brought a lateral collaborative structure to the linear hierarchy of chat. The system included casual language games that users could defer to when conversation became heated or overly somber.

The aesthetic for the software selfconsciously imposed a zoological and decorative beauty to online discourse, seeking links between data and their sources in biological sciences, zoology, human physical experience and overall materiality. Lushness was meant to connect the software to the physical world, eventually quite literally, because the larger project created interactive sensor laden, soft wear garments, that responded to the OS dance performances and habituation cages (a joke about Pierre Bourdieu's notions of the habitus) [4] in which artists and scientists were locked up together for twenty four hours under rigorous surveillance and expected to produce new discoveries or theories.

To represent multiple affective states I built eight other distinctive creatures (loosely grouped using a system similar to the Plutchik model of emotions) [5] all with voronoi patterned skins in a relational ecology. The structure of voronoi patterns (conveniently similar to early JAVA prototypes) meant that every time a posting was added the visual chat world readjusted the world view. Extensive user testing showed that grasping a reading of each animal pattern was not intuitive for users, but once they learned how to play with CodeZebraOS, to manipulate and tone conversations, they embraced it.

Invoking reactiondiffusion inevitably led me to considerations of scientific aesthetics that privileged simplicity and symmetry. I knew CodeZebraOS was cognitively challenging but I liked it that way. In examining a wide number of visualizations created by artists, designers or computer scientists, I found on one hand a shared data structure, but also tropes and metaphors. However, there was also a resistance within some scientific discourse to the affective, 'beautiful' qualities of these metaphors. There was a resounding imposition of natural metaphors, even when the source code like mine had no relationship to nature.

Infinitely precise scientific instruments, the digitization of analog material, the explosion of digital storage capacity, processing power and the Internet have, for the first time in human history, combined to produce massive quantities of data. The amount of data produced; which includes consumer buying patterns, text corpora, genomic and cosmological data; poses us with unique challenges. In this era of big data, access to data sources and appropriate tools to analyze data is as important as water and oil. The growth of cloud computing, visual search engines, penetration of fast broadband and wireless networks have all created an ideal environment for an explosion of capacity in data visualization. Data visualization is growing exponentially in scientific, social science and even humanities research, as well as in commercial applications such as social media.

Our expectations of the intelligibility and accessibility of data have shifted with the growth of databases and search technologies. This situation creates an expanding demand for tools and expressions that facilitate finding information and analysis. In the last decade strict prior separations between scientific visualization and information visualization have eroded. Firstly, entire new practices that cross the boundaries of information and science, such as genomics and bioinformatics have come onstream. These fields rely on data visualization to excavate structures in largescale data sets they have no photo realist technologies to fall back on. Secondly, as Lev Manovich has remarked, data visualization allows representations to be mapped onto each other, to compare and overlay vastly different data sets, permitting the representation of infinite permutations and complexity. [6]

For these reasons my university, the Ontario College of Art & Design University (OCAD U), York University and the University of Toronto (UofT), created CIV/DDD, a research hub for the development of nextgeneration data visualization techniques and their underlying information processing and communication technologies; in partnership with communications industry, financial sector, green tech and ITC partners, biomedical researchers and physicists. The range of partners suggests the vast territory of data visualization applications that have emerged. This interdisciplinarity also requires attention to questions of design, aesthetic histories and methods which we have built in the framework of the project.

Aesthetics structure experiences in formal perceptual ways and provide interpretive tools, at times constructing meaning. Given that sensory expression most often visual, but sometimes sonic or tactile is the only means to perceive many contemporary data sets aesthetics are fundamental, not additive to the emerging field of Data Visualization. Data are mathematical: comprised of a set of organized measurements created by instruments that calibrate quantifiable qualities of an original source (natural, artificial or recombinant). Data sets are shaped by prior decisions; such as the instruments chosen to collect the data, the structure of the database, source and sampling methods and software choices. [7] These elements implicate data and put a mediating frame around notions of objectivity. The data source remains present hovering as a ghostly presence and yet is translated by the digital and is always in part lost in translation. Aesthetic realism implies exactitude when there may be ambiguity in the data. Data are a mediation of actual phenomena an immaterial material a contradictory mix of abstract points or numbers and producing phenomena. Data become information only when they are placed into an interpretive context. [8] This requires building algorithms that allow for selection, extraction, organization, analysis and presentation. It is the representational act of transforming both data and the data structure into a visualization interface that allows the user to interact with the data. The resulting images create a bridge between the empirical world and the viewer, revealing patterns of the source data that evoke interpretation.

Visualizations allow the comparison of a set of values; the illustration of relationships between data points; the indication of the parts of a system and the relationship and interaction of these parts; the creation and interpretations of maps; the tracking of change over time; and the analysis of text.

Data Visualization offers the possibility of fundamental new insights, a moment of understanding that reveals hidden processes or complex relationships, breaks through existing barriers and sharpens the focus on knowledge while providing visual pleasure.

RETURN TO REALISM

In an article titled The Petabyte Age (2008), Wired Magazine recently declared The End of Science. Editor Chris Anderson argued that scientists must end hypothesis and experimentation; instead, science must move entirely to data analysis derived from 'big data' sets that lie beyond the natural limits of human comprehension and require "dimensionally agnostic statistics." [9] The more scientists learn about physics and biology, the harder it becomes to create testable models. Instead, Anderson argues, researchers should search for patterns and relate these to the data's source to build a fresh analysis, working with pattern recognition and theorization from the abstract back to the material world. While I agree with his observations on the potential for new discovery, Anderson's view proposes big data as providing the means to rescue science from subjectivity and speculation, and offers a reversion to scientific realism and objectivity, in which data stands in for the real.

The tenants of scientific realism propose that there is a universal shared world of perception that makes up common sense, and discovery manifests this world through shared understanding. [10] The aim of science is to accurately describe reality. The empirical world, including its invisible dimensions and its description through analysis, thus becomes of paramount importance. The rationalist roots of scientific realism suggest that perception leads directly to action, and presupposes the alignment of reality and image. Scientists that I have worked with argue that it is necessary to keep the metaphor close to the look (whether observed or photographic) of the data's source. [11] Yet the aesthetics of scientific realism may create limits to imagination, tying visualization too tightly to "analytic reasoning," which could fail to deploy the transformative power of visual experience. [12] A further challenge to realism occurs when the source cannot be seen, only measured and then imagined.

Debates regarding scientific realism have included some recognition that the observer, whether an instrument or a human, has an impact on the means of expressing the data for an experiment. Karen Barad, a physicist and a philosopher of science, observes in Meeting the Universe Halfway that there is not a onetoone relationship between the ontology of the world and its discovery, as is claimed by "the traditional realist." [13] The 'commonsense' view of Nature is continually entangled in the theoretical and experimental practices that mark its description, as is human society. Yet science still makes meaning of the sometimesinvisible material world and we must pay equal attention to empirical research, as it produces ontological knowledge. These observations are equally true when considering largescale information systems that are hybrid forms of physics, engineering, human and machine interaction.

The field of Data Visualization is compelling because it carries the traces of the empirical world and its instruments of measurement and representation. We need to think of data visualizations as technologies. Data visualizations carry with them the aesthetics and assumptions of their contributing technologies. Data visualization technologies absorb aesthetics of 2D and 3D graphics and animation systems, with their formal styles and malleability. In the past decade a new set of graphics tools some viable for online visualization, others only available through high performance computer networks or in the laboratory are available, as either open source (such as Processing) [14] or proprietary software. The more finished the tool, the more that styles and capacities are embedded. Artists, designers and computer scientists continue to build and adapt tools to their specific needs. Mashup techniques transcode data from more than one source within single integrated tools and search engines allowing the ability to mix what were once discrete structural approaches to data types. Each new source of data adds its structure, aesthetic properties and limits. Whitelaw dubs these practices "databending," [15] as they layer contexts and can allow for the emergence of new imagery or meanings.

Not surprisingly, the most illustrative scientific visualizations draw from or map onto photographic imagery. An example might be an image of a 3D model of a virus structure in which six different proteins are interacting in complex ways. The data was captured using electron microscopy. The visualization is built in Chimera, a C++ and Python software package built to assist in molecular graphics. [16] Scientists had already discovered the symmetrical structure of the virus and had faint images of its form — the

visualization is built on top of the image that the microscope captures through 3D modeling. The visualization extends scientific knowledge by allowing the user to manipulate the virus to understand how its multiple layers might interact and penetrate cell walls. Layering, color and interaction experience were key aspects of the aesthetics that designers brought into play.

The next images represent 3D vector field texture based volumetric flow visualizations of tornados. [17] While the application is specific to storms, the algorithm, data structure and metaphor are of value to multiple disciplines that study flow such as mechanics, physics, meteorology, medicine and geology. [12] Advances in texture mapping graphics capabilities makes these images possible and combines with depth sorting, illumination, haloing and color attenuation to enhance perception and depth. [13] The images are aesthetically compelling, drawn by the computer from the data points and able to capture the dynamics of a storm.

The next image is a 3D visualization of a solar storm that occurred on Halloween 2003. NASA's visualization laboratory created it by combining a model of the earth with "daily averaged particle flux data from the SAMPEX satellite by propagating the particle flux values along field lines of a simple magnetic dipole." [18] By making flux and field lines visible, it is meant to illustrate the ways that energy particles from the solar storm transformed the structure of the Earth's radiation belts. Design decisions are apparent in this quote, "The colorscale on the cross section is violet for low flux and white for high flux. The translucent gray arcs represent the field lines of the Earth's dipole field." [19]

These examples bear close resemblance with what science has previously discovered or represented through photographic media, yet each seeks to extend that knowledge in speculative ways through design decisions that move the image into a field of visual analysis. These images operate within a tradition of scientific description as tools for deductive reasoning.

The use of literal metaphors in data visualization may suggest a level of accuracy that is impossible to achieve. After all, a visualization of Internet packets is many degrees of separation away from the conditions of production of that packet and of its producers. Science itself contains variant views of reality and its analysis is contradictory and chaotic, with different worlds episteme and ontology side by side. New trends in science acknowledge phenomenology, complexity theory and emergence. There is recognition that complex systems are difficult to predict and represent. A further challenge to realism occurs when the source cannot be seen, only measured and then imagined. The strength, not the weakness, of data visualization is its ability to use algorithms to present emergent properties and different points of view.

Case studies of visualizations working with the same data set underscore how data sets are shaped by prior decisions, such as the instruments chosen to collect the data, the structure of the database, source and sampling methods and software choices. Metaphors need not be literally tied to the data structure

to be meaningful, as the following interpretations of two sets of data that analyze emotional expression represent, firstly in components of the Globe and Mail, Canada's national newspaper; and secondly in online service dialogues of Canada's banks. This work is an extension of my earlier research, a cross disciplinary team coled by computer scientists Anjun An and Nick Cercone; myself and Fanny Chevalier as visualization researchers, are creating extraction algorithms, an analysis system, and set of visualizations with the work of student researchers Symon Oliver, Guia Gali and Jarrod Wilson.

The digital version of the Globe and Mail, like its print edition, includes a wide variety of sections, ranging from News, to Business, to Life and Sports. In going digital the publication has added commentary in the form of opinion blogs by its core of writers, as well as ample opportunity for readers to vote and comment. Editorial and business leadership at the Globe and Mail see value in understanding the emotional content of their various sections, writers and readers, and how readers might use tools to choose articles. Editorial leadership is eager to better manage the means for reader commentary. Discovering sentiments, patterns and relationships embedded in articles as well as comments is important for tracking the newspaper's role in shaping public opinion on contemporary issues and the ways that readers interact with these opinions. It can help media analysts better understand the impact of sentiments on news events. Our research analyzes emotional expression in all of the critical features of the publication. We compare sections, blogs and articles and look for underlying patterns in emotional expression using data extraction and visualization. We are using a unique contextbased approach in identifying the underlying emotional tone of text by combining machine learning, semantic analysis, and computational linguistics techniques. The system is being implemented and evaluated on annotated data sets, such as blogs and user comments. The bank data provides an analysis of users' ratings and comments of comparative service offerings for Canada's major banks.

The point is that formal strategies and metaphors differ radically in all examples. Each offer different models of interactivity, whether passive viewing, building one's own visualizations, adding one's own data, or flowing data through the metaphor. Gordon Kindlemann proposes that the very power of data visualization is that objective and subjective views cohere, inspiring new insights. [20] These works prove that very point.

UTILITY AND BEAUTY IN DATA VISUALIZATION

Given that data visualization can assist fundamental discovery, or influence social policy and economics, it is no surprise that in the past the application of data visualization has been motivated primarily by the teleological (willful thinking and predictable outcomes), with regard to both the goals of human activity and the ways that machines or tools can serve these. Visualizations are understood as utilities, translating data into meaningful communication that can represent reality and increase productivity. Edward Tufte proposes that data visualizations are "complex ideas communicated with clarity, precision

and efficiency." [21] Perceptions about realism, common sense and the ways discovery and insight occur have a direct impact on notions of beauty in data visualization.

Despite examples of aesthetically demanding yet instrumental work, such as that of Jer Thorpe, a belief in realism and objectivity leads some scientists to suggest that attractiveness is equal to subjectivity or illegibility. Ben Mathews assigns aesthetics to functionality and ease of interface use. Rapid comprehension is then the goal of this design aesthetic. [22] Simplicity is closely aligned to Occam's razor or lex parsimoniae; the mathematical and scientific view that the simplest solution is the best and most common sense one. Aesthetics are biased towards the symmetrical and highly legible with a spare Modernist look.

The acceptance of beauty in scientific and informatics imagery differs between generations and types of science and designers. As visualizations of the truly imperceptible nanotechnology world proceeds, imagemaking becomes generous. Andrew Vande Moere maintains the blog infosthetics.com, one of the key sites for debates about the practice of data visualization. He argues for lush images, "The best works are those where the aesthetics help people understand the data, where they're almost telling a story." [23] Beautiful visualizations compel not only experts, but also the public convincing them, for example, to adopt energyefficient practices. Legibility, instrumentality and beauty need not be discordant.

Yet currents of thought in art and design argue for the data visualization practices of both fields to be separated. Caroline Ziemkiewicz and Robert Kosara propose differentiation between pragmatic data visualization that allows efficient reading of data, and artistic data visualization that uses data in abstract or metaphorical ways. [24] Kosara feels that creative interpretations can "hurt perception" when fast analysis is needed yet can result in "sublime" or "contemplative" experiences at other times. [25] Mitchell Whitelaw (who has a terrific piece in the exhibition) argues that artists should not allow their data visualizations to become designs, that is, an "aestheticized (and perhaps functionally impaired) form of scientific data visualization." [26] These positions legislate a separation between a teleological usevalue and an intrinsic aesthetic value. Extracting meaning and insight from these representations of data requires powerful aesthetics that balance emotion (such as awe), contemplation and deep analysis.

Recent HCI studies such as those of Noam Tractinsky, A. S. Katz and D. Ikar demonstrate that users pay greater attention to beautiful images and that usability and beauty are viable companions. Jer Thorpe and Christian Flaccus's collaboration tree.growth.redux, from 2011, suggests beauty and visual clarity can align.

This discussion segues into aesthetic discourses about the sublime and the uncanny. Art and literature define the sublime whether nature or immense artificial systems as the threatening unknown that cannot be fully grasped by human understanding. Sublime imagery seeks transcendence, elevating the everyday to godliness. 'Raw' data stands in for nature (red in tooth and claw) and nature is extended to

the vast information web that constitutes the Internet and digital information. Data can be perceived as primary material — not produced concrete and objective, rather than contingent and relational. As I indicated, in the last decade of data visualization a predominate use of natural metaphors (treelike, floral, etc.) appears in art, design and programmercreated works, regardless of whether the source of the data was natural or artificial. The prominence of natural metaphors may indicate the merging of scientific and information visualization; it may represent mystification, the correlation of sublime nature and sublime data or an ironic stance towards mystification; it may suggest a growing sense of concern about the biological world, its extraction into data and the need for an ethos of responsibility towards the empirical world. Issues of aesthetics and ethics are present, if not visible, in the tools we build and use. Here are two different examples ironic versus earnest use of natural metaphors.

Some artists, such as Lisa Jevbratt, Barrett Lyon, or Christophe Viau shown below [27] describe emergent properties and systems as an evolutionary living force. Viau proposes that, "Morphogenesis art is investigating synthetic life by focusing on geometrical models of growth and pattern formation 'in silico.'" In the tradition of Artificial Life he seeks to build models that are so lifelike that they become life itself.

Jevbratt argues that genetic code melded with computer code signals a new sublime or unknowable, uncanny beauty. Jevbratt intertwines the materiality of data with programming (coding) as a material and conjuring practice. She says,

To write code is to create reality. It could be likened with the production of artificial DNA, of oligonucleotides a process where life is written. Or it could be seen as a more obviously physical act of generating and moving around material, an act that has dimensionality, which is nonlinear. [28]

Coding does act as a means of bringing a virtual world into being through the manipulation of mathematics (and its aesthetics) as manifested through data points and computation. [29] The study of data as a material with distinct properties (mathematical and indexical) must not throw away the constructivist wisdom that has allowed an analysis of the intertwined relationship between knowledge and its mode of production. While human intervention is required to produce meaning from the originating data (e.g. weather patterns, plant growth, or mobile phone use), the transformation process should not return to romantic notions of alchemy, affected only by a cognoscenti of programmers, artists and designers. The notion of an unconscious and shared 'natural' aesthetic is a problematic construction, as any survey of contemporary international art practice quickly suggests, art is bound by differentiation. In this view, perception is relational and contextual, constructed through the complex intertwining of object, maker and viewer. [30] These arguments require a located maker and viewer to militate against totalizing notions of beauty. Historical references to 'nature,' its relationship to culture and various past expressions, whether domestic chic or formalism, can serve as a double entendre, reminding us of the tension between the ontological and epistemic.

For some artists, an attraction to data visualization stems from the challenge of excavating hidden patterns and structures from the obliqueness of a data set, at times reconnecting these with the social or political conditions of their production. In his 2002 Data Visualization as New Abstraction and AntiSublime, Lev Manovich argues that visualizations of data by artists may create synthetic meaning rather than support mystification. [31] Manovich indicates links between early Modernist abstraction and contemporary artists' data visualization. However, the complexity and form of the structures that artists disclose have changed since the Modernist era, as have the conditions of belief: skepticism characterizes art, not early twentieth century optimism and essentialism. The formal properties of the database are lateral and associative. It privileges the paradigm (perception of the structure or theorization) over a narrative hierarchy.

Understandings of how to treat data as a material play out in the making of visualizations. Two approaches to design arise representing a bottom up/top down process. Edward Tufte argues that data visualization requires choosing data sets that are of value to the researcher, mining the data, creating a structure for the data, analyzing that data set to find meaningful ways to represent it, analyzing patterns, translating the analysis through aesthetic representation, refining the representation to better communicate, and creating means of manipulating the data. [32] In Tufte's view, data enunciate their own structures. There is no base case with data: it is inductive reasoning that pulls out knowledge. Through this process they find form, and sometimes also find metaphor or narrative. This may be viewed as data naturalism, structuralism, bearing a truth to materials approach, or, in working with largescale data sets representing phenomena that cannot be viewed, datadriven design.

Ben Fry proposes a procedure that begins with a narrative or story form. He argues that the designer must start not with the data set but with the empirical question asked by the researcher. Fry then works his way back to data. He considers the nature of the data to be obtained, finds data to fit the question and parses them to provide a structural fit for their meaning, then orders them into categories and filters out all but the data of interest. This approach maintains the role of the scientist in producing theory (a base case), illustrating, testing and deducing. It also offers an opportunity for metaphor, design variation and the recognition of multiple interpretations of the same data set by different disciplines. Both approaches need comparative testing to see how each impacts discovery in the fields where they are applied. In both instances a challenge for artists and designers is to sustain a constructivist understanding of imagery while openly exploring the indexical properties of data.

In developing the research methods for our visualization network we have chosen to contrast these methods.

Data is assembled and extracted > Effective algorithms are produced to represent data qualities over time; to represent data qualities over dimensions; to represent change, as appropriate > Data analysis is

used to create a patternrecognition system and a structure > Analyze the qualities in data that can be represented and choose a metaphor > Protocols for participatory design in relation to datadriven inquiry and visualization are developed and tested for groups > Participatory design exercises with user groups (as above) > Aesthetics are developed and tested that fit the structures and patterns > Dataled visualizations of extracted features/patterns occur > Userled visualizations of features, and aesthetics occurs, comparing data sets > Effective means are sought to create interaction with the data as represented > Modeling methods for complex phenomena across different data sets are applied (social media, biological, physics) > Visualization tools are created that allow the analysis of differentiated data sets and these are compared for similarities and differences > Results are contrasted and compared results > Use and usability testing is undertaken for tools > Selection, adaptation; development of analysis tools > Visualization tools tested with commercialization partners.

CONTEXT AND COGNITIVE SCIENCE

Data visualization requires both the awareness of cognitive aspects of human visual apprehension, such as color theory and the need to make the visualization meaningful to a user's context. In a muchquoted statement, Edward Tufte describes graphical excellence as "that which gives the viewer the greatest numbers of ideas in the shortest time with the least ink in the smallest space." [33] Ware proposes that Data Visualization is the scientific study of "distributed cognition" between pattern mechanisms in the human brain and the algorithms that map data to the computer connecting human cognition, computer memory and its related algorithms, and the physical actions of the user. [34] Indeed, successful design requires attention to the physiology of the brain, hand and eye. However, these formulae describe a mechanism at work in the perception of visualizations but are bereft of understanding the ways that human experience differs from machine, encompassing the nonlinear as well as inductive processes at work. Unfortunately, because of the focus on treating data visualizations primarily as utilities, much cognitive science research in the field studies techniques of performance enhancement, that is legibility and speed, rather than breakthrough discovery or the play of poetics or insight.

Ideas about nature, reality, culture and common sense play out in the field of Cognitive Science. Like scientific realism, cognitive science has gravitated towards a Kantian notion of 'common sense,' which encompasses logic, morality and aesthetics. [35] Immanuel Kant promotes logic, equating it with purposefulness and demotes aesthetic judgment as mere taste. Of more value may be Kant's proposal that aesthetics are a transaction between the artist, the object and the audience, suggesting that the viewer completes the image. This is a process wherein an embodied subject is in constant formation, in a state of 'momentariness' akin to Gilles Deleuze's notion of becoming and allowing insight and awe. [36]

Valuable lessons from cognitive science can help designers and artists to understand the differences between reading and viewing, and the ways that visuals can allow pattern recognition and text can act to lock down meaning and context in visualizations. These lie in parallel to current theories about the

image that reside within visual culture studies, locating aspects of cognition outside of conscious grasp. A cautionary note is required here as well, for poetics makes use of language to create patterns and graphic fonts, such as Forte or Bauhaus 93, or indicate that stylistic signifiers overcome the content they may contain. These boundaries further dissolve in the popular field of text visualization, where semantic and social networking relationships are discovered through visual and textual patterns.

Equally problematic is the tendency of many twentieth century cognitive scientists to universalize perception and cognition. Contrary research from other strains of cognitive science suggests that context and culture effects perception, and that viewers have different experiences in relation to what makes the same data visualization effective. Rather than a normative notion of cognition, Francisco J. Varela, Evan Thompson and Eleanor Rosch draw on evolutionary biology to reject notions of fitness and optimal adaption. They adopt a "proscriptive model" in which diversity is "woven into the basic constraint of maintaining a continuous lineage" and "the evolutionary process both shapes and is shaped by the coupling with the environment." [37]

Hence learning and difference play key roles. Varela, Thompson and Rosch show that because understandings are culturally learned, categories, such as color perception, are not assumed to be objective; hence, "lexical classifications of colour can affect subjective judgments of similarity." [38] This formulation links perception and aesthetic categories together. Such an approach to cognitive science requires a mix of intrinsic and extrinsic factors in understanding the mind and allows a better understanding of cultural diversity. Sensory cognition remains of critical importance in forming judgments, and hence aligns with the need for aesthetics in the field of Data Visualization that take these processes into account. Providing different users with varied metaphors, even shifting color templates in the interface, can allow perception and analysis of the visualization.

Even when taking diversity into account, cognitive science primarily focuses on individual perception, rather than the emergence of hybridgroup experiences and collective identities as result of the new sociality produced by Internet communication. Warren Sack states that "aesthetics for the Internet needs to concentrate on producing the means for visualizing and understanding how social and semantic relationships intertwine and communities and common sense emerge." [39] He observes that new identities overcome cultural difference, although difference is the starting point. Perhaps it is more accurate to state that rather than a new universality, new particular and contingent identities form.

Visualization systems that represent collaborative efforts or discourses require an aesthetic that allows the emergence of common and collectively constructed experiences and identities. It is logical that designs with high degree of interactivity would facilitate the creation of new identities or "intersubjectivities," [40] a term coined by Vilem Flusser, for conjunctures where identities conjoin productively.

INTERACTIVITY AND IMMERSION

Earlier examples have demonstrated degrees of interactivity in data visualizations. Interactivity appears to be an important part of cognitive process, of learning by doing, engaging the body through navigation. The third space that Bruno Latour describes between subject, object and technology is the site of "interactivity, intelligence and creativity." [41] Ron Burnett offers the explanation that part of the power of the "third space" of technologymediated experience for the participant is the opportunity to gain agency by learning the system and aggregating knowledge through play. [42] The same may be true of gaining visual understanding while navigating data sets. This leads to an aesthetics that allows users to exert agency through learning a system and even to adapt and change outcomes.

There are different levels of interactivity within digital media, so are there in relation to data visualizations. Some data visualizations simply provide navigation capacity such as the ability to click on or mouse over material that the user chooses. In 2006, Fernanda B. Viégas and Martin Wattenberg created Many Eyes [43] in order to popularize the use of data visualization and provide a tool kit for building visualizations. They hoped for at least three uses of data visualization: to interpret textual data, to analyze complex objects and to use visualizations to initiate "social data exploration." [44] This is a highly interactive site where participants can add their own data and they or other participants create visualizations from that data from a set of given templates. Users then export their visualizations to their social media sites.

Other forms of interactivity privilege the impact of the information flowing through the site in this instance data acts as an agent interactivity is the flow of data issuing from a stock market feed, a geological phenomenon or a conversation. Stock market feeds have been a fecund source for projects, such as Joshua Portway and Lise Autogena's Stock Market Planetarium depicted below. [45] The elegant and ironic installation plays off the scientific trope and information metaphor of cosmology visualizations, suggesting a new astrological universe of corporations and their stocks, as artificial life creatures mutate, propagate and die in the market, feeding off of its movements and making graphical transitions, clumping and influencing the weight of the depicted universe.

Interactivity and related cognitive processes imply a timebased experience. Navigating 2D and 3D visualizations often requires rapt attention. Building on Deleuze's writings on cinema, Hansen argues for an aesthetics that is appropriate to the temporal experiences of digital media. [46] Digital media create opportunities for humans to experience time and space in ways that stretch and extend their existing physical apparatus. Data visualizations of large and multidimensional data files occur on 3D screens and at times in 3D CAVE environments. These are full body experiences, where the user is navigating data in real time, performing discovery simultaneously or with retrospective thought. Aesthetics is mediated between the body and its object in a continual flow or becoming.

Data visualization can also occur as an illustrative sidebar to highly interactive social media activity. Social media companies commission visualizations to allow users to catalogue their resources and to better understand and organize their relationships with others.

Bruno Latour [47] and John Law and John Hassard [48] describe technologies as invisible nonhuman actors, affecting the performance of a social network or process. Visualization is a compelling strategy for some artists, a less disruptive and more aesthetic means to excavate technological structures that hold hidden hierarchies of power. In data visualization formalism and politicized deconstruction merge, by creating visualizations that reveal sociopolitical relationships within the data. Hence of importance are artists' initiatives to challenge the set of formal techniques and conventions that have emerged linking data extraction methods, structures, metaphors or metonyms. Artists offer a critique of the aesthetic norms of scientific and information visualization. In 1995 Simon Pope and Matthew Fuller created the Web Stalker, one of the first tools to crawl the Web and build a visual diagram of hidden relationships between domains and their hierarchical ordering, discrediting any notion of search engine neutrality. Its form is now common to many data visualization tools in social media.

An End of Modernity by sculptural artist Josiah McElheny is a tenbyfifteenfoot accurate artistic version of the Big Bang, which itself is much more than an explosion: it is the origin of space and time itself, initiating an expansion that occurs everywhere and has no center. A Thousand Points of Light, a visualization by Naeem Mohaiemen as part of The Disappeared in America Project by the Visible Collective/DanBergman is an animated map of mass detentions that occurred in the United States after September 11, 2001; providing information about the detainee and their country of origin. Viewers can update the map with their own data. Such attempts to enforce transparency onto technoculture and offer an overt critique of power relationships may be described as data deconstruction.

In The Secret Lives of Numbers (2002, 2008) Golan Levin and his collaborators Jonathan Feinberg, Shelly Wynecoop and Martin Wattenberg seek an understanding of which numbers reoccur more than others, "in order to determine the relative popularity of every integer between 0 and one million" [49] and to surmise about why this takes place; as well as finding links to the functioning of human memory, social rituals and the structure of commerce. In the face of our society's belief in the objectivity and power of mathematics Levin instead argues for the subjectivity of numbers and, by implication, data, stating:

Humanity's fascination with numbers is ancient and complex. Our present relationship with numbers reveals both a highly developed tool and a highly developed user, working together to measure, create, and predict both ourselves and the world around us. But like every symbiotic couple, the tool we would like to believe is separate from us (and thus objective) is actually an intricate reflection of our thoughts, interests, and capabilities. [50]

He is also playing with the conventions of data visualization, drawing on Edward Tufte and Colin Ware's rules of simplicity of display to comment on the aesthetic and practices of scientific visualization, and at the same time develop a malleable, beautiful and interactive visualization from data sets pulled from a wide range of search engines over a fiveyear period.

One of the most dynamic growth areas of data visualization is text visualization, whether the massive quantities of scientific texts, social media output, chat, or descriptive metadata. Artists with an interest in linguistics and conceptualism now turn to Data Visualization as a digital trajectory to linguistic intervention, semiotics and conceptualism.

Temporal structures define how textbased relationships emerge in the Internet, with synchronous and asynchronous experiences providing very different feelings, intimacies, and forms of consciousness. These pile on top of each other in layers, allowing social relationships and expressions to feel like a thick texture of condensed time. We Feel Fine by Jonathan Harris and Sep Kamvar bears an interest in affective expression and uses the measurement of text data to find it. [51] We Feel Fine builds emotional portraits of specific online populations by extracting expressions of feelings from Weblogs. The project provides six movements (like a symphony), driven by statistical analysis and data aggregation, and then reshaped by users' paths through the data. Feelings accumulate in mounds on the screen, quivering when the mousecursor passes over. The site is poignant and amusing.

Other artists are drawn beyond structural analysis to poetics. Data visualization becomes a means to write concrete poetry. In 2003, Brad Paley created Textarc, a tool that allows text to be processed; where key words are quantified and brought to the foreground. It has been applied to literature, bodies of conference data, calendars and other corpus. Stephanie Posavec explores differences, "in writing style between authors of modern classics" through her project Writing without Words. [52] An example is shown below.

Posavec parses text in an expressive and poetic manner to create works such as Sentence Drawings and Sentence Length as part of her series.

To conclude: data visualization aesthetics are always contextual, depending on the data source and equally, are read in context, whether by scientist, social media user or art audience member. Data do not exist in themselves, and data risk mystification. Many of the sources of data are already structured. The assumptions of these structures, the material impacts of underlying technologies and particular software and the pervasive presence of tropes and metaphors need continual unraveling.

Cognitive science has a key role to play in developing visualization aesthetics that privilege pattern recognition. Viewing complex 3D images and navigating through these requires eyehand coordination

and focused perception. Designing to facilitate, or at times disrupt, cognition requires that artists or designers draw from this body of knowledge. At the same time, cognitive science needs to recognize that visual expression carries with it the aesthetics and aesthetic traditions of its source technologies and the subjectivity of visual images at the most fundamental level.

Data visualization approaches deriving from the art world are of value in their own right, producing compelling works of art, and valuable as a means to raise new questions and approaches to data. Art's deconstructive tendencies are helpful in unfolding assumptions that are built into data collection and structure. Experimental, abstract, multidimensional, highly interactive works can be immersive and provocative; perhaps more so than simplified visualizations that are illustrative of prefigured assumptions. Aesthetics that can evoke and provoke other disciplines, yet draw from the formal and critical values of art, bear great promise. This is a field where art and design practices can be engaged in multiple layers of discovery of new forms of expression and of new realizations in the fields that are aligned with the source data be these genomics, physics, economics, or information theory prompting insights and reflection uncommon to contemporary practices of data visualization.

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METAMEDIUM (THE EXPANDED ALAN KAY)

Helder Dias

Considering the informational lines that cross the Human and the machinic, it becomes imperious to re-design the theory of new media around these facts. It´s not enough to analyse the 'remediation' or to consider cinema as privileged precursor. The theoretical work shall be placed to a more general level and implies that the notion of mediation is understood in all its meanings.

Introduction

In the domain of biology and more specifically in the theory of evolution, we can define the extended field of conception as the totality of viable virtual paths that a certain evolutive stage can follow. As a classic example, all the books that can be written using the total possible combinations of the alphabet that produce words and sentences which make sense [1]. One of the actualizations of this extended field of conception is, for example, the tale where the author describes this process.

This brief introduction allows us to place this problem. Over the last decades, deep scientific explanations presented the biological and the psychological as the result of algorithmic systems. As an example, we can refer the evolution as a blind Darwinian algorithm [2], its cultural *'memetic'* extension [3, 4], the computational theory of the mind or the investigations around AI.

An extremely interesting fact, and not always explored in this context, is that also computers are algorithmic machines by excellence. The general knowledge of the outside world as a manifestation of an algorithmic system, associated to powerful computational iterative manipulators, allow us to delineate a space of research whose crossings generates new Human definitions of the 'so-called Human' [5].

The theoretical work shall be placed to a more general level and implies that the notion of mediation is understood in all its meanings. The nature, body and mind, are today seen as spaces of mediation so, a theory of new media, is forcibly a theory of the *meta-processes* that allow, feed and confer dynamic to the manifestations of design out of chaos. With or without the help of the mind. With or without the help of the computer.

Advances in science have resulted in the expansion of reality. For example, microscopes allowed us to know that, at an atomic scale, beyond the limits of our vision, there is a core of activity that sustains, articulates and helps to explain the permutations of that same reality. It is an epistemological change of extreme importance the one that is implicit in this recognition that there are limits to our capacity of perception and apprehension of reality through the senses. The importance is not limited to this finding, but also to the verification that many phenomena that surround us are made from these scales to which we have no access except by means of technical devices increasingly more complex.

Ultimately, this lack of access to these scales is a kind of standing invitation to an increasing reductionism even if, as experience has taught us, not always a full understanding of the phenomena is easier when they are reduced to its most essential components.

The past decades have highlighted further this divide between what we see and what we think it exists. To the molecules, atoms and elementary particles it was added a central element - the *bit*. The world around us is increasingly presented to us as a discrete, informational, storable and computable one. All this requires an even wider set of prosthesis to help us navigate and negotiate the meaning of that same reality, now composed of a multiplicity of information flows. We do not only refer to the prosthesis widening of the senses, but to the massive and distributed presence of computing devices, that help us cognitively by guiding us, filtering all consumed information, warning us.

Of course this view also has as a counterpoint, the open possibilities in terms of monitoring, quantification of the subject, control of unpredictability and calming of desires. Once again the analysis of technological development is organized between utopia and dystopia.

In short, it is indisputable that there is an increasing complexity in our relationship with reality, where the amount of information and stimuli produced involves the use of devices that render in some way, and supplement the limitations of our cognition. It is no longer just the sensitive flows that extend beyond the limits of our senses, it is all an informational machine that far exceeds us and apparently begins to dispense our actions. Where the first devices opened windows to the World because they broadened the reality, the seconds, computational, reconstruct and simulate that same World at the same time offering themselves as a model to explain it.

Metamedium

 "Although digital computers were originally designed to do arithmetic computation, the ability to simulate the details of any descriptive model means that the computer, viewed as a medium itself, can be all other media if the embedding and viewing methods are sufficiently well provided. [6]"

Since the dawn of computing that seems to exist a dispute between the will to create a computer system directed to the universality and the difficulties inherent to the areas that do not manifest themselves as computable. This dispute had its push with the pioneering work of Alan Turing and his proposal of creating a computational machine, itself universal.

With hindsight, we can observe and highlight these two trends. The first one, already mentioned, the general attempt to host the real within the computer, and a second, related to the need to introduce increasing levels of abstraction that enable us to generate lines of communication needed to implement such a project in expansion.

Decades later when Alan Kay defines the term 'metamedium' the author presents the computer as an active simulator of all existing media and others to be established. Through the prefix *meta*, Alan Kay also ends up recognizing the need to increase the level of abstraction to find a common substrate where the various media may relate.

The *digitalization* of information and logical formalization of algorithms capable of replicating in the digital, operations hitherto circumscribed to the Human sphere, paved the way for a set of experiences that would redefine the problem of mediation.

In the interplay between algorithms and computing resided the possibilities of logic formalization and mechanic simulation of various fields such as biology, where blind algorithms mixed with evolutionary systems generate a design endowed with growing complexity.

It is for this reason that for the last three decades, the duality code-computation has become increasingly central in the analysis of diverse issues around the notion of humanity and in the appreciation of the dynamics that animate our interaction with the reality that surrounds us. The way the computer makes the code operable, sets up oppositions about their role in the general construction of the World.

We are among the authors who question computation not only as a metaphor, but as the effective way the World works in general, and works where computing emerges as active mediation, such as simulation and as a metaphor, but where it is recognized a irreducibility and a logical impossibility of formalizing the entire physical universe, culture and functioning of the mind.

Following these two pathways, it raises notions of extreme interest like the opposition between continuous and discrete, the problem of *digitalization*, the rationality and logic against the limits of computing or the increasing quantification of the subjectification processes associated to an economic system of attention [7].

In short, the expansion of the original formulation of the notion of metamedium is done in two directions, both underpinned by the duality code-computer: The first is *ontologica*l and the second *phenomenological*. In both cases we overcome the problems of simulation of the various media, to start looking at all of reality as mediation or its construction as the update of a complex set of algorithms.

It is essential to discuss the code and the computation because then you can draw conclusions about the current state of mediation and review concepts such as central interface, representation, simulation, emergency or unpredictability. Whether our focus directs more to the phenomenological problem of mediation, whether our interest focus more on the ontological question of production, we should question the recent theoretical proposals centred on the code, on software and computation, starting by reviewing some concepts that are interlinked:

- **Information.** Today we produce and consume massive amounts of information. The world continues to be presented to us increasingly as information: DNA, memes, information theory, and computational theory of the mind. On the other hand, the digital information is based on a process that involves making discrete sensitive flows, apparently continuous. The expressive richness of these various flows must be described by zeros and ones, which means the entry into action of a segmentation process.
- **Algorithm.** The information may be subject to change, processed, according to an algorithm. Science cut out reality and was able to extract clear rules on its functioning. Overall this is a system of growing abstraction that allows us to logically formulate procedures for the settlement of a given problem.
- Both information and the algorithm can be converted into **code**. These codes may have different objectives: to communicate, clarify or hide [8]. The same algorithm can be implemented using different programming languages.
- Finally, **computation**. The information available and the changes that can be produce through the formalization of algorithms imply that they should be counted in some way. We must not forget that the notion of computing is not limited to modern digital computers and can be scattered and be implemented in different ways.

In short, non continuous reality converted into information on which we can formalize algorithmic modes of operation, lends itself to be integrated in various computing devices that go by the name of computer (mobile phones, iPads, laptops, etc). All this because we have more and more computing power available in more places and scattered by surrounding objects. The process requires an input (a world of flows that can be converted into discrete elements), an algorithm (which structured in the form of code will guide the processing form) and an output (a significant return to reality).

The functioning of today's computers is based on a layered system, where the level of abstraction varies linearly. Level change, from top to bottom, is equivalent to moving away from natural language towards the digital world of zeros and ones, translated into electrical variations. In the reality that surrounds us, and in which the computational mechanisms are increasingly operating, there is also a similar stratification where the juxtaposed layers line with continuity the discreet components of the matter. Understanding this apparent structural proximity allows us to articulate the two fundamental observations regarding the functioning of the code and the computation.

The first analysis results from the fact that the discreet formation of both entities (reality and computing device) feeds, via the code, transversal computing cross-links and agencies. The consequence of this possibility of integration goes through a further and radical technical rigging of the sensitivity and for the construction of a reality on demand. As mentioned, a phenomenological problem added to the strangeness, the risk and unpredictability. An active and strong mediation.

The second approach runs deeper. It is not enough to articulate and highlight the presence of computation in mediation and the phenomenological appearance of what surrounds us, but to recognize it as a major element. Powered by the scientific view, the reductionism and the simulations, the computational views of the world seem increasingly strengthened. It is important to analyze this version that uses the computer system as a model of operation and see if there is something new in this association or whether it comes in the wake of other historical moments in which certain technical devices, such as the clock, also served as an explanatory model for the functioning of social and mental systems.

The notion of metamedium, starting from the base formulation which was given by Alan Kay, lends itself to serve as a tool to analyze how the overall computing has evolved Lev Manovich [9] draws attention to the fact that the generation of Alan Kay was responsible for the union between simulation (Turing's initial concern was the creation of a computing machine that was capable of simulating a wide range of other machines) and the media. A union that would receive an added impetus with the advent of graphical interfaces in the 80's. The consequences of this approach are extremely important because they mark a divide between the computational aspects and its expression. Over the past 30 years, the stratification of computing gradually hid the construction of the simulation through the code and changed our relationship with a computer in a more focused experience in the media. This transformation has been so significant that Douglas Rushkoff [10] uses the following expression: *Program or be programmed* to draw attention to the fact that, despite having more computing power available in ever more devices, we haven´t built skills that allow us to manipulate the codes already established and that come to us in the form of software.

Conclusion

In short, today's review of the notion of metamedium can be very fruitful. On the one hand, because we can see more clearly how the computing rhetoric has installed itself in contemporary culture and how it

has produced clear reflections on the social organization and processes of construction of knowledge. On the other hand, beyond this more hidden presence computation continues to strengthen a mindset that sees the world as a metamedium, where algorithmic expressivity serves as an explanation for a wide range of complex phenomena ranging from the social to the mental functioning.

For everything that was said earlier, a theory of new media cannot focus only on the way the evolution of computing produces different *'remediations'* [11] and new media landscapes. A theory of new media, present and active, requires the inclusion of the problem of simulation and computing as essential aspects of this field of research.

As we have said earlier, the nature, body and mind, are today seen as spaces of mediation, so a theory of new media is forcibly a theory of the meta-processes that allow, feed and confer dynamic to the manifestations of design out of chaos. With or without the help of the mind. With or without the help of the computer.

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DIGITAL PERFORMANCE IN NETWORKED PUBLIC SPACES: SITUATING THE POSTHUMAN SUBJECT

Marcos Dias

This paper analyses how digital performances in networked public spaces situate the posthuman subject through a complex interplay of human and non-human elements, highlighting the importance of embodiment rather than privileging information over matter. Through empirical research on Blast Theory's digital performance *A Machine To See With*, I attempt to analyse this process closer through a performative account of posthumanism.

INTRODUCTION

Since the late nineteenth and early twentieth centuries, the city has become associated with a machinic organism through the rationalisation of urban space and living patterns and consolidated through major infrastructure networks. The advent of cybernetics through advances in computational processes has extended the machinic metaphor to human life in the form of the posthuman subject, where information is assumed to flow freely between computational devices and the body, and where embodiment is downplayed or erased altogether.

This paper argues that the experience of the posthuman subject in digital performances in (networked) public spaces is defined through assemblages where agency is distributed between human and nonhuman agents, reenacting embodiment rather than privileging information over matter. It also suggests that the embodied posthuman practices enabled by these performances are better understood through a performative (rather than a representationalist) account that overcomes the inadequacies of a static or advantage point of observation and of assigning agency to individual and self-operating agents.

Through research recently conducted on Blast Theory's digital performance *A Machine To See With*, I analyse the (posthuman) subject's experience of digital performances in networked public spaces through the embodied practices generated by the complex interplay between (but not limited to) participants, digital devices, networked public space, the performance's narrative and bystanders.

THE MACHINIC CITY AND THE POSTHUMAN SUBJECT

Since the late nineteenth century, the all-encompassing infrastructure networks of modern urban planning enabled what Steven Graham and Simon Marvin defined as the "[binding of] the metropolis into a functioning 'machine' or 'organism'". This process is famously illustrated by Haussman's nineteenth century 'modernisation' of Paris, described by Chaoy as an attempt to "regularise the disordered city [and] disentangle it from its dross, the sediment of past and present failures" [1].

In *The Metropolis and Mental Life*, George Simmel exposed the objectification of life through the rationalisation of living conditions in the emerging metropolitan areas of the early twentieth century, arguing that "modern mind has become more and more calculating" and the world becomes an "arithmetic problem". Simmel argued that the "calculative exactness of practical life" is the outcome of the desire to "fix every part of the world by mathematical formulas". For Simmel, this desire was intrinsically related

to the practices of the metropolitan life, with its "punctual integration of all activities and mutual relations into a stable and impersonal time schedule" [2].

In Simmel's account we can identify the emergence of a posthuman subject, merging the machinic processes of the city and the 'calculating mind' of the subject. This link was highlighted by the Futurist movement in Italy, which emerged a few years after Simmel wrote *The Metropolis and Mental Life*. In *The Manifesto of Futurist Mechanical Art*(from 1922), the Futurists proclaimed that: "we too are machines, we too are mechanized by the atmosphere that we breathe...This is the new necessity and the basis of the new aesthetic" [3].

According to Steve Dixon, the aesthetics of Italian Futurist performance theory and practice between 1909 have been highly influential in contemporary digital performance philosophies and aesthetic practices [4]. However, he sees a significant difference in approach between both. Dixon argues that the Futurist's glorification of the machine and their focus on embodied interactive practices and audience collaboration allowed "human excitement [to be] projected outward". In the 1915 *Futurist Scenography* manifesto, Enrico Prampolini argues that: "[Futurist Theatre] is alone in seeking the audience's collaboration. It doesn't remain static like a stupid *voyeur*, but joins noisily in the action [...] communicating with the actors". In contrast, Dixon argues that contemporary digital performance directs human excitement and creativity inward and into small screens, in what he defines as the "introversion of the computer paradigm" [5].

We must examine Dixon's argument against what Malcolm McCullough describes as a "paradigm shift from cyberspace to pervasive computing", where digital technology "pours out beyond the screen, into our messy places, under our laws of physics" [6]. This process brings computers into the messy, noisy and unpredictable 'real' world. The rising trend of internet-enabled mobile phones (also known as 'smart' phones) is perhaps the most visible reminder of this shift, which is also supported by: gesture-controlled videogames consoles, computer tablet devices and RFID (radio-frequency identification) tags, which attach readable digital information to objects.

Therefore, rather than taking Dixon's account of the 'introversion of the computer paradigm' at face value, we must test it empirically against the innovative practices that digital performance enables through embodied practices. These involve a constant dialogue between participants, digital mobile devices and the surrounding environment, mixing virtual and physical environments and screens and the outside world. In contrast to the Futurist's extrovert approach of provoking their audiences through physical reactions, contemporary digital performances such as Blast Theory's *A Machine To See With* provoke and challenge the audience through much subtler techniques, such as automated phone messages directed to their mobile phones. While in this case the techniques and actions might be internalised, the participant's are by no means less challenged than in the Futurist's plays: they must deal with these messages while navigating the 'messiness' of urban public space, eventually generating unusual or uncanny situations that must be dealt with in a public arena. Therefore, the performative experience of the participant is neither lost nor diminished, and is perhaps more challenged than in the Futurist's collaborative theatre plays.

TOWARDS AN EMBODIED AND PERFORMATIVE POSTHUMANISM

An embodied and performative posthumanism challenges the desire to control and/or predict the body's responses through normative and synchronised processes. Performing is always already a transformative, iterative and unpredictable process and highly context dependent. While modern urban planning attempted to control the body by standardising and synchronising the flows of infrastructure networks and the circulation of people through the city (as in Haussman's 'disentangling of the city'), the cybernetic movement emerging after the Second World War envisioned the control of the body through the control of flows of information.

As Katherine Hayles reminds us, the construction of the cyborg as a (posthuman) "*technological artifact and cultural icon*" was supported by the "conception of information as a (disembodied) entity" where "protein and silicon operate as a single system" and information flows are free from physical constraints. Yet Hayles points out that information is "*always* instantiated in a medium". She argues that in cybernetic posthuman accounts, the body is no longer identified with the self; it becomes a universal object "for control and mastery rather than [...] an intrinsic part of the self" [7].

Defining the body as a universal object entails that it is "primarily, if not entirely, a linguistic and discursive construction" rather than a performative body. Therefore we must distinguish body from embodiment to understand how the linguistic domain has attempted to control the body. According to Hayles while body is constructed through normative assumptions that define a stable and normative set of criteria, "[...] embodiment is contextual, enmeshed within the specifics of place, time, physiology, and culture, which together compose enactment" [8]. Therefore, embodiment denies the possibility of reducing the subject to linguistic interpretations. In her defense of a posthumanist performativity, Karen Barad argues that "language has been granted too much power" and that "the only thing that doesn't seem to matter anymore is matter" [9].

Barad proposes a posthumanist notion of performativity that incorporates both "material and discursive, social and scientific, human and nonhuman, and natural and cultural factors" [10]. However, she argues that this is only possible if "agency is not aligned with human intentionality or subjectivity" [11]. Therefore, posthumanist performativity recognises that it is unfeasible (and possibly undesirable) to resist the impact of machines in our environment and our own bodies, while at the same time acknowledging the importance of embodiment (or body in context) against the linguistic and normative construction of the body. This is enabled by a posthuman subject that, in Hayles' words, constitutes "a dynamic partnership between humans and intelligent machines [that] replaces the liberal humanist subject's manifest destiny to dominate and control nature" [12].

DEFINING DIGITAL PERFORMANCE IN NETWORKED PUBLIC SPACES

Digital performances in networked public spaces foreground the embodied posthuman subject envisioned by Hayles. The term *digital performance* encompasses works where both embodiment and electronic flows converge. It also avoids the limitations of using categories such as locative media, or digital interactive installations, which suggest a focus on a specific (and stable) technology or infrastructure.

I employ the term *networked public spaces* to describe the convergence of (private and public) urban and electronic flows. Public space cannot be reduced to a fixed arena where the 'public sphere' is enacted in an orderly manner or— as many contemporary social studies suggest—portrayed as 'dead

space' [13]. Public space has always already been networked, however the advent of digital technologies has foregrounded and accelerated this process.

Mobile phones in particular have enabled embodied posthuman practices that support performativity in public spaces through its multiple capabilities: phone calls, SMS (short message service), mobile Internet and locative media applications. These have generatedhigh hopes of a renaissance of the 'public sphere' and of public space, however these arguments remain speculative and largely untested.

The rise of locative media as "the next big thing" was accompanied, as Tuters and Varnelis point out, by practitioner's claims that "it can reconfigure our everyday life [...] by renewing our sense of place in the world". Yet at the same time, locative media has been criticised by many theorists for its apolitical nature and dependence on technology: while Andreas Broeckman accused it of being the "avant-garde of the 'society of control'", Coco Fusco argued that artists have substituted an "abstract connectedness for any real engagement with people in other places or even in their own locale" [14].

TOWARDS A PERFORMATIVE ACCOUNT OF THE POSTHUMAN SUBJECT

Such contradictory accounts highlight the importance of understanding embodied practices to situate the posthuman subject's experience in digital performances in networked public spaces. We must take into account: the subject's prior experiences of (networked) and everyday media practices through their own social and cultural contexts; the technologies involved, which are subject to failures and misunderstandings; and the unpredictability of the networked public space with its complex assemblages of bystanders,weather and mobility patterns, urban furniture, traffic flows and other participants.

A performative account of the posthuman subject in digital performance enables a non-linear narrative that "[articulates] the posthuman as a technical-cultural concept" and refutes metanarratives about "the transformation of the human into a disembodied posthuman" [15]. As Barad points out, performativity "[shifts] the focus from linguistic representations to discursive practices" [16]. This is evident in digital performances such as *A Machine To See With*: while it is based on a linear narrative with a clear chain of pre-scripted events, it is reshaped by the 'performance' of unpredictable assemblages of embodied practices.

The audience of such performances presents another complicating factor. While in traditional theatre plays (including the avant-garde performances of the Futurists), the audience was allocated a fixed area—and expected to react to the play through predictable patterns of engagement—in performances such as *A Machine To See With,* the audience is not only fully mobile, but performing the roles of both the actors and spectators. Therefore, despite the narrative being pre-scripted, it is impossible to predict participants' reactions. This challenges the understanding of these events and highlights the need for new methods of observation and analysis.

Barad suggests a shift in focus from representationalist understandings of events towards an active approach that reinforces the inseparable link between "observed object" and "agencies of observation", denying the possibility of a static or advantage point of observation. As the posthuman subject performs, the observer of such events must also 'perform'. In her view, discursive practices must *produce*—rather than simply *describe*—"the 'subjects' and 'objects' of knowledge practices" [17]. While Barad's framework proposes a posthumanist account that must be 'performed', it also questions the

human/nonhuman dichotomy and the privileging of human agency as the main trigger of events. A performative framework is particularly suited for understanding the embodied practices of the posthuman subject enabled by digital performances in networked public spaces.

In the following section, I discuss my attempt at performing observation during my field research on Blast Theory's digital performance *A Machine To See With* in Brighton during September 2011 towards an understanding of the posthuman subject's experience in digital performance in networked public spaces.

CASE STUDY: BLAST THEORY'S *A MACHINE TO SEE WITH*

"We needed to know whether you are a person who could step through a door and become someone completely different, and now we know. Your eyes are machines to see with and I am a machine to see with. This film is now yours. Is this the ending you want?" [18].

Participants are confronted with the quote above at the end of *A Machine To See With*, a digital performance by Blast Theory that reflects on our posthuman nature and the influence of machinic processes on our everyday lives. Blast Theory is an artist collaborative led my Matt Adams, Ju Row Farr and Nick Tandavanitj based in Brighton that has been creating innovative and challenging performances for the last twenty years. They describe their work as "explor[ing] interactivity and the social and political aspects of technology" and using "performance, installation, video, mobile and online technologies to ask questions about the ideologies present in the information that surrounds us" [19].

A Machine To See With invites participants to take part in a simulated bank heist that involves walking through public space while following pre-scripted instructions relayed by an automated phone system to their own mobile phones. Six participants start together following different routes that include a stopover in a public toilet (to answer questions given by the system while waiting inside a cubicle) and eventually converge onto the roof of a private (and usually busy) car park where they are told to enter a car. At this stage, one of the other participants is invited to join them in planning an attempted bank heist, which involves, among other things, betrayal, an aborted countdown, an escape route and a pledge to give money to a complete stranger.

While conducting field research on the event during its premiere in Brighton during September 2011 I attempted to employ a performative account of the posthuman subject participant by remaining close to the "observed object"—as Barad puts it—and using multiple and mobile points and methods of observation [20]. This approach involved: observing participants taking part in the event while making audio notes; taking pictures and videos of key moments; interviewing participants; taking part in the event myself; taking part in preliminary tests conducted by the artists; and attending project development meetings.

My performative observation of *A Machine To See With* highlighted the importance of embodied practices in reshaping the posthuman subject's experience of the event. Despite the linear narrative script of the automated phone system, the participant's experience was always unique and dependent on several unpredictable factors, such as the mobility of participants, their prior knowledge of Brighton, their interpretation of the messages received, the interference of bystanders, the surrounding urban space and the engagement of other participants.

For example, in one occasion a participant ended up in the wrong car park after failing to understand an instruction given by the system and decided to ask a bystander for help. While that might have been a frustrating event, he identified that moment as a highlight of his experience: while he hid for twenty minutes behind a bin in the wrong car park (the phone system told him to be discrete) waiting for a car that never turned up (which was stationed in the correct car park), he observed in the distance how the incoming sea fog (a nonhuman agent) gently enveloped a nearby building. He described it as the highlight of his experience—an event that was triggered by a failure in the relay of information.

The reality of the everyday life of Brighton constantly infiltrated the linearity of the pre-scripted narrative, challenging the perception and experience of participants: unexpected clouds of fog suddenly enveloping the car park; desperate bystanders knocking furiously on the public toilets' cubicles where participants were present; curious teenagers provoking participants as they exited the car; close calls with the passing traffic. Participants reacted very differently to these different experiences of embodiment. For example, while resorting to the escape route after the aborted countdown during the bank heist, some participants ran promptly, while others calmly walked away.

While employing a performative account allowed me to gain several insights into the experience of the posthuman subject taking part in the performance, it also highlighted the challenges of this approach: the difficulty of making notes and following the observed subject while moving through the public space of the city; identifying ideal points of view along the way while trying to remain 'invisible' to participants; dealing with the suspicion of bystanders; and losing track of late, absent or stealth participants.

CONCLUSION

A performative account of digital performances in networked public spaces enables a better understanding of the experience of the posthuman subject participant through the embodied practices that are triggered by assemblages of human and nonhuman agents. Such events are better understood through a methodological approach where observed object and agencies of observation are interlinked, and where embodiment plays an important role in both the participant's and the observer's experience.

Although employing a performative account exposes the observer to similar difficulties encountered by participants—which have to be dealt with dynamically—it allows for a dynamic approach that avoids the pitfalls of narrow descriptive accounts based on static or advantage points of observation and of assigning agency exclusively to individual agents.

A Machine To See With highlights the importance of embodiment in the posthuman subject's experience of digital performances in networked public spaces against a linguistic and normative construction of the body where information is privileged over matter, enabling emerging forms of embodied interactive practices and audience collaboration.

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WHERE IS MEXICO

JUAN JOSÉ DIAZ INFANTE

Brief introduction to the Latin American Forum. The term Latin American is a vacant concept and needs to be explored in a new way.
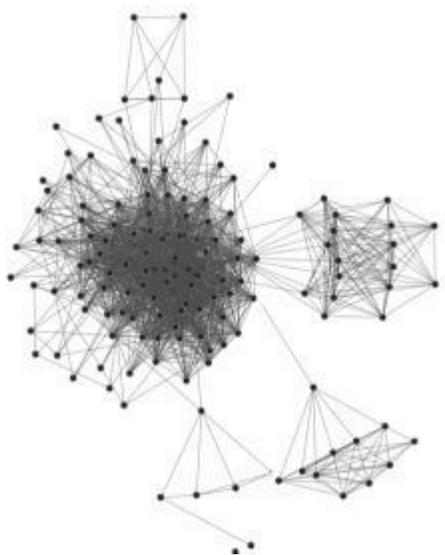
Sketch of a social network as a possible new configuration of a map.

What the United States does best is to understand itself. What it does worst is understand others.

_Carlos Fuentes, Mexican writer

Introduction to a Latin American Forum: why.

For thirty years, I have been working professionally as a troubleshooter, solving problems for companies and governments. Always very different type of problems ranging from conceptualizing federal elections to the introduction of new technologies. It is my experience that any problem most of the time is simpler than it seems. All you have to do is having the right diagnostic in your hand, it has to do with the possibility to "see". In many ocassions professionals choose the most complicated process in order to justify the hiring of a big team to ensure a probable solution based on quantity and no quality. I am very sorry to say that most of the people have a solution before they know what the problem is about.

The issue that I try to explain today as a metaphor has to do with a name. It does not matter how much power or money you have, if you are a teacher or the president of a country, when you are calling someone by the wrong name, that person is never going to show up, you are never going to meet him or her, never going to get to know him or her. It is quite a problem that in the year 2011, we are still struggling with basic principles.

It is my experience that when you apply the equation of technology to a misunderstanding or the wrong message it only multiplies the confusion.

That is what I would like to speak today in the Latin American Forum ISEA2011. Going back to the basics, to get you attention to the term "Latin America". It is important that as time changes so do concepts.

I want to focus on the understanding of the difficult reality that this region lives. It is a paradox, between the complexity of thought that you can find there and the struggle to solve every day reality. Nanotechnologists with international science awards, Nobel Prize candidates that instead of struggling with the mysteries of a micro universe, they struggle to be able to walk in into their classroom in San Luis Potosí, Mexico. In this particular case two brilliant scientists, Mauricio and Humberto Terrones were asked to leave their jobs because they were invited to too many international conferences and the administrator in retaliation would not give them budget to put together their microscope for several years. They spent more energy convinc ing a very bad administrator than doing their research.

On the other hand, the outside view, it was historic when George Bush spoke one time to the people of Texas warning them how the Nicaraguans could invade the United States by foot. It is not bad enough that Bush believed that. It is incredible that the audience actually believed such statement. It is incredible that they elected him president and by default a World "leader".

In my travels around the World, it is very common for people to ask me questions like "where is Mexico" or to state things like "you are not Mexican", in most cases I gave no importance to statements like that, since I always would take them as an isolated accident. Nonetheless, lately, upon reflection, in the added experience of thirty years traveling through the World, I have come to realize that if we do not define basic terms we can not define complex terms. If the first step in a plan made of many steps is not clear the second step is a disaster and so on. Dialogue and communication can not take place if the very beginning is a false premise. Basic logic.

The Forum we are today is meant to have a clear strategy and a clear message on my behalf. I am trying to redefine a vacant term called "Latinoamerica", which is a term that defines a series of countries, but strange enough in each of the chosen criteria they never land the same countries. When you define Latin America as per its Latino language, you include places like Montreal or Quebec, but you leave out all the indigenous population and the original tribes in all the countries. If you define it as per historical parallel, places like Haiti or Montreal are out of the conversation.

This type of confused definition generates a problem of identity, in which the people within the parameters of the term do not believe or want to be part of the "wrong" definition.

For me the visualization of the paradigm is a map made of layers, semitransparent not geographically precise: knowledge before the Spaniards and the Portuguese, knowledge after independence, other broken knowledge later on, situated within a series of civil wars, government overtakings and revolutions.

To try to put a history of ideas becomes a gigantic puzzle, an incredibly fragmented reality in which each new government has an explanation of their own culture:

Examples at hand could be how Chavez came up with a law that makes it illegal to any citizen of Venezuela to be called Mickey; in other countries, like Argentina, Mauricio Kagel did a lot of his work outside or someone like Fernando Flores that had to leave Chile and had to live in San Francisco. Great knowledge buried among layers and layers of complicated political turmoil.

There is the need of for these 21 countries to become a region and there is a need of the understanding of Latin America as its true entity. Unfortunately, governments of the american continent insist in signing trade agreements instead of political agreements. There is the intent of focusing only in the economy, as to say if the economy is OK everything will be OK. It is also unfortunate that they have missed that mark, and the economy is not OK. Latin America is missing a component of social tissue needed to support the possibility of the creation of a region.

Latin America is a multilayered place of many fragmented realities, that needs complete understanding about itself to actually being able to discover its potential and all its possible expressions. The wealth is astounding, to mention very few but fundamental examples, the scientific knowledge of the Mayans having discovered the number zero (revolutionary at its time), the work in cybernetics done in Mexico and in Chile, the invention of the color TV by Camarena which also became the TV system that was used in the Voyager.

My statement on the nature of Latin America works in both directions, a message sent towards the outside and towards the inside. When talking to the outside, is to generate a second look, or a more accurate and a different look, a look that needs more attention to detail because is not organized in the same manner as other regions and other countries. Towards the inside has to do with the adoption of the definition not as an identity but as this "supra - identity". When countries are in a path of development you need to generate the tools or resources to become as strong as possible. The concept of a region has to do with generating new strength.

It is a moment of attitude, It is for us the artists of the region to redesign the metaphor, with any tool at hand, the tool of communications, language, social networks, technology, understanding the problem, generating new thought. We need new maps. Maybe in an era of social networks the new map is not anymore in the form of a globe but it is in a form of a social network. We need models that work.

This is the beginning of a job that has to be approached in a group consensus, through the constructions of networks of thought and a common language and agreed definitions. As in the paradigm of "GI-GO", Garbage in, Garbage out, if you feed garbage to a perfect model you get garbage, if you feed perfect data to a garbage model you get garbage… Clear understanding of our identity can yield out clear thought.

NEW GENERATION OF ROBIN HOODS: CULTURAL AND TECHNOLOGIC PIRACY

Ali Halit Diker

Who does culture and its products belong to? We are in a path society becomes more open, cultural re-sources are shared and distributed freely. But free as in free speech, not as in free beer as it is stated in Free Software Foundation's website.

 "Property is theft!"
Pierre-Joseph Proudhon

COLLECTIVE CULTURAL PRODUCTION

Culture is produced and distributed by community itself without the need of any organization, corpora-tion and any political entity thrugh ceturies. As meral Özbek stated in her book "Popüler Kültür ve Orhan Gencebay Arabeski" this form of collective consciousness lies beneath what we call popular culture today. The best examples of this model of cultural production are minstrels and their master-apprentice relationships.   It can be observed, some of the main facts in this type of production are that they are emerged against the pressure of power; they are traveled on the grapevine and become legends by passing through generations. Through this process of re-telling and re-production the original work is modified and is re-shaped with the period it is re-created. Thus there might be diverse versions of the same product.

One of the stories which is told in Turkish folkloric culture is Köroğlu whose fight against Bolu Bey be-came a legend and who became a symbol of fight for freedom. Another story which is more global - thanks to popular culture- is Robin Hood who is claimed that he lived during the reign of King of Eng-land, Richard Lion-Heart in Sherwood Forest. The known roots of the Robin Hood legend takes us back to 15th century. The most common version is the one that Robin Hood stands aaginst the Nottingham sherrif who takes advantage the lack of power with the help of Hereford bishop while Richrd Lion-Heart was at war. Robin Hood is an outlaw who steals from the rich and gives to the poor, he is just and anti-clerical. He is commonly described that he comes from a social class called 'yeoman'. Yeoman class is more or less the same as today upper middle class. This class doesn't own a land but they're alsı not peasants. They are in the middle of both classes[1].

Robin Hood; he's a folk hero who fights for justice and freedom. The moral of the story is more or less about the equal and just distribution of resources. While doing this Robin Hood was marked as outlaw but it is only bacause of the paradigms defined by the holders of power. On the other hand, people needs this mythological hero. It seems normal that this story emerged during a period of oppression. There are two discourses in this anology. One is about how the story is created and spread and the other is the moral of the story itself. Culture is a resource which has to be distributed just and equal to the so-ciety.

PRODUCTION OF MASS CULTURE

Actually this collective consciousness is not totally rejected but especially during last 30-40 years are about exploiting this collective consciousness with copright laws and regulations[2]. Culture became an industry, a market and an area of commerce because of the capitalist system. Even though popular artists which are promoted as social heroes are puppets of big corporations. They become richer with intellectual property and copyright laws while they are also making the companies richer. The main problem is not that only companies benefit from these rights they are also becoming cultural monopolies. Intellectual property rights funtions just for the sake of capitalists who are controlling information, technologic and artistic production. Another side effect of these property rights is academic development is also monopolized by corporations and corporate entities. The most of the academic institution are sponsored by companies and their research are formed by the companies' interest. The board of trustees of academies consist of legal entities, CEOs and corporate managers who simply controls local or global economies. This is a reminiscence of the Church's position during Middle -or Dark- Ages. The most important sources of knowledge were holy texts and they were not open to public. The only privileged people to exploits these texts was a small group of elites. As a matter of fact almost all of the middle and low class wasn't even literate so today's capital and economic power were in the hands of clerics and noble class like feudal lords. Maybe after the invention of printing press the distribution o these vultural resources became more democratized. Today, new technologies offer much more powerful medium than printing press. There are much wider opportunuties for resistance and freedom with the internet. It is true that internet also became widely commercial but people are also discovering the alternate uses of this platform. In an era that culture is widely commercialized maybe it is best to use tactics such as Robin Hood's hit and run; small but effective.

COMMERCIALIZATION OF CULTURE / ACCULTURATION OF COMMERCIALISM

Today, multi-national corporations run most of the cultural entities such as museums and galleries and this is only a strategy to expand their customer profile[3]. And there is no such a thing as confidentiality nor cover. Maybe this is the transparency of evil Baudrillard mentions. Most of the investors of art or associates of galleries and museums specifies these investments are business strategies or backs up their other investments[4]. With these investments art market can survive through economic recessions[5].

Contemporary art works' conversion values are on stock markets. The most important art centers of the world are also capitals of finance such as New York, London, Dubai and İstanbul[6]. Capital's intervention and control of art does not include only art objects; like Stallabrass writes; it also includes the sales of images, sounds and words[7]. This creates a cycle of commercialization of cultre and acculturation of commercialism.

POPULAR CULTURE AND HIGH CULTURE

Especially Andy Warhol and Damien Hirst are among the most popular names who are aware of this cycle. Non of them denies that art is business.

DISTRIBUTION AND CONVERSION VALUE OF POPULAR CULTURE

Popular culture products have specific conventions, adress a very large audience, simple, quickly consumed and do not need to much investment. They are more or less like replicas or cheap productions.

Still they have a quite large market and can benefit from intellectual property and copyright. Lately agreements like ACTA which are supported by RIAA and MPAA intervenes the distribution and even alteration of these products. Sometimes these intervention goes as far as the violation of privacy. Some of the planned precautions of ACTA might include limiting the blank CD and DVD production and even the installation of spyware to the blank CDs and DVDs to control the customers actions of sharing and distributing art works[8].

DISTRIBUTION AND CONVERSION VALUE OF HIGH CULTURE

High art, on the other hand is an illusion outside this realm but it also has its own conventions such as obscurity, boredom and lack of sentimentality and these; so called virtues creates its own market[9]. Corporations that invest in popular culture or high culture seems to do this because they want to address two different types of consumer. For example Fender -especially American Fenders- is a brand that is used by qualified musicians and sold at high prices. On the other hand, there's Squier which addresses to customers which has average or a little more than average income.

Maybe the only difference of high culture and popular culture consumption shows itself on the area of collecting. Even new media art has its price which is simply against its nature because they are easily reproducable. But again, the sales do not only include objects; it includes images, sound and words. Also an art piece owner does not only have higher social status because of his or her money but because of his art collection and taste.

SPONSORSHIPS AND MUSEUMS

The collections of museums or personal investors are exhibited by sponsors according to local or global economic and political conjunture. Art seems that it is free but still it is oppressed by conventional apparatusses of power. Its controlled by visual and audial ideologies (It's another issue that if they even exist anymore).

INTELLECTUAL PROPERTY AND APPROPIATION

Copyright was first established to protect the rights of creators of some books, paintings and maps, then its use expands quickly [10]. The exact point of its emergence is to protect the author but in time it includes alteration and publication and this enables companies and corporations to exploit artists and even its own employers with such contracts that gives them the right to any use and publication of the work or invention. So companies gain much more profit than the creator. One of the turning points of copyright history is AT&T's block to source cıdes of its software[11]. This causes trouble among computer scientist. Escpecially among academic researchers. Then Richard Stallman found Free Sofware Foundation because he did not have access the source code to improve his artificial intelligence project ,so he took the first step through Open Source movement and Creative Commons and Copyleft licenses[12].

Slowly but surely commercialized culture is blanced with these models. Cultural production and products seem to circulate more freely. In a society that culture is produced autonomous, it is produced not for the masses but by the masses, everybody is both the author and the hero of this Robin Hood legend.

THE WORK OF ART IN THE AGE OF DIGITAL REPRODUCTION

As photography emerged movements which are more expressive in painting, digital reproduction provided masses to explore new ways of production to express themselves. New mediums and new platforms -such as internet- provided alternative ways of sharing and distribution of products. According to Vaidhyanathan this model of production and distribution got human creativity closer to how it has always worked[13].

INTERNET AND CULTURE SHARING

Internet is one of the platforms that human sociability occurs the most. An avarage internet user might not be considered very cınscious of this but it can be said that especially social networks triggers an intense sharing culture. This burst of sharing might be an unconscious or subconscious reaction to an enforced and controlled culture. Especially modified, remade or altered versions of some copyrighted products are essential among these shared reproductions.

RE-PRODUCTION AND DISTRIBUTION OF ARTWORK IN INTERNET ART

Actually the methods used in internet art works are substantially common in postmodern art.

One of the best examples that can be given for appropiation is Michael Mandiberg's aftersherrielevine.com. With downloadable high resolution pictures, their framing instructions and authenticity certificate everybody can have an image which has cultural value with has no or negligible financial value. The downloadable images are the one that Sherrie Levine photographed from Walker Evans' exhibition catalogue.

Anthoer example is MTAA's On Kawara Update. The works imitates On Kawaras black on white oil painting which only have the date it was painted on internet browser. When you click on the date some Google Ads appear on the screen. The work both questions artist labor and it's connection with art market. What happens if a code does all the work? Another feature of the work is that its source code is licensed GNU General Public License and downloadable. So anyone who visits the site has the right to create its own version of this artwork.

Even though it might not be considered as internet art The Droplift Project is another interactive experience which attacks intellectual property rights in a Robin Hoodesque way. Müyap in Turkey and RIAA in the US are monopolies on copyrighted music. The Droplift Project's website there are more than 20 songs which are composed with the re-use of some copyrighted material like TV show and radio jingles, popular songs etc. They are downloadable and there's also a sticker for album, a front and a back cover with a barcode. You prepare your CD just like the ones sold in big music stores. You go put it in shelf and then wait it to be sold. It's not illegal according to the First Amendment and the Fair Use of the Copyright Act but still the artists can be sued by the copyright owners.

ALTERNATIVE LICENSING

Among this type of re-production, sharing and guerilla activities there are also alternative licenses such as Creative Commons and Copyleft which are widely used in arts and design. Open Source and Open Culture is becoming a part of societies daily part routine. Some articles on Wikipedia can be used as academiz resources, Open Access Journalism provides transperant and objective news sources. These systems might create their own spaces of resistance against monopolies.

CULTURE PRODUCTION OF MASS

Slowly but surely commercialized culture is blanced with these models. Cultural production and products seem to circulate more freely. In a society that culture is produced autonomous, it is produced not for the masses but by the masses, everybody is both the author and the hero of this Robin Hood legend.

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SCIENCE, ART AND PHILOSOPHY: A REFLECTON ON A METHODOLOGICAL APPROACH TO INTERSEMIOTC ANALYSIS OF INTERACTIVE INSTALLATIONS

Luiz Antonio Garcia Diniz & Adilson A. J. de Oliveira

We intend to analyze the construction processes of the Installation "*Um Novo Tempo – A New Time*", created by the Research Group LABI, from the perspective of Yuri Lotman's reflections on semiotics. Our approach is guided by reflexive relations that lie at the intersection of the concepts of Biosphere and Semiosphere.

Introduction

The vast field of reflection that the analysis of the semiotics of culture proposes allows us to think about cultural objects, in terms of both its immanence and transcendence. This means thinking about the relational forms that such objects have with the culture in general and, particularly, with the aspects of our construction or objective discoursivity. In other words, we must discuss the relationship suggested by objects linked to cultural elements which constitute the external semiosphere (Lotman, 1999) and engendered by it, in particular with an eye toward its discoursivity to understand the perspective of the Other singularized by the observer subject. Such subject will be defined here as a result of the relationship between the virtual and the actual, erasing boundaries that, as well define Peter Anders, places us in a cybrid environment. Cybridism, a socio-anthropomorphic phenomenon, is quite a clarification of the society in which we live.

Therefore, we have on one hand, the discoursivity of the object itself conditioned by its internal laws; while on the other hand, we have the same object inserted into the cultural material of the semiosphere. And finally there is the observer, himself subject to contingencies that gave him the status of singular subject. It should be noted that the schema described above is part of another factor that we believe is important to remember: the link established between these three movements or moments, divergent of suggest stability or permanence of an instance to another, in fact, is made by continuous movement. What we found in and observer/reader interrelationship with the object seen, read and updated by him is a continuous maze of back-and-forth of elements distributed transversally, vertically and especially non-horizontally or linearly.

We will list, then, the elements proposed by the installation of the point of view of its physical structure to look more attentively at their construction procedures in terms of the meanings produced.

A NEW TIME: CONSTRUCTIVE ELEMENTS OF THE INSTALLATION

1-Tablet:

Component of the set below, the tablet, whose purpose is to record a message that is sent to the plans listed above.

2-Joystick device: spatial projection of deferred time

Past, present and future: the same phenomenon in three different perspectives. The interactor being filmed in three image planes: black and white, and red. The device consists of a webcam and a Joystick with five preset keys. Description of keys: access the recent past, access the longer past, access the present, accesses a possible future, change the angle of vision of the planes; Lever: Controls the time units in the second and third cases.

3-Touch Screen: whose choice of six videos shows a phenomenon in its temporality accelerated or extremely slow: the description of the physical phenomenon that occurs in the time interval of the phenomenon (mechanical, hydrostatic, biology). Videos shown: punch, drums, drumsticks, bladder filled with water, flower opening, etc.…

4. Clock: aims to show the irreversibility of time. Advancing the clock clockwise, the interacting agent advances the time and, working it counter-clockwise, time is reversed (hair, egg, building falling and glass breaking).

5. Time Machine: temporality browsing media or historical times: Proposal for historicizing time, more specifically, the time in the media related to historical events.

SEMIOTIC SPACES

If we consider semiotic space as a place where semiosis occurs and, if we take as the object of analysis the interactive 'A New Time' installation built at the intersection and articulation of various languages as intersemiotic construction, or even grounded by the fact that these various media that carry distinct meanings produce various significations in their interrelations, and they are managed by the perspective of an interacting organizer, we could deduce that in an interactive installation such as the one proposed for our analysis there is an ensemble of several elements or sets of semiotic elements. However, in our view, it appears to be methodologically important to separate them for analytical purposes and then turn to the production of meaning that the relationships outlined above produce.

The semiotic space, which we will deal specifically with here, is the installation of 'A New Time'. It is necessary, however, to define that space taken up in its particularity in relation to semiosphere as Lotman defines it in his work 'The Semiosphere' (1999). The semiosphere finds conceptually a parallel in the biosphere, space in which all components are networked, making it impossible thus to isolate a single element without breaking the previous balance. It should be noted also the importance of the conceptual proposal to situate it synchronically and not diachronically.

We believe that all concepts involved in the installation go through two discoursive instances: the thematic isotopy (abstract) and the figuratized. The thematic precedes the figuration in its conception because it works with deeper levels of discourse. It's important to also note that without the passage to the figurative isotopy, we can't think of art, since it operates with consecutive passages of one to another. There were also switches necessary so that the discourse and its meanings are grasped by the enunciatory which, particularly in the object of our study is also the enunciator. The most globally enunciated built by the articulation of thematic and figuratively thematic isotopies only becomes intelligible when the sum of the meanings or interferences/actions added by the interactor participation becomes a constituent of the enunciation.

Exemplifying the way described above, in the installation 'A New Time', the isotopy theme — the plan of content, is made up of different approaches that suggest the concept of time, reversibility, irreversibility, literary time, and media time. The figurative isotopy is the result of the passage of thematic isotopy to the plan of expression; in other words, of constructs figuratized by the installation, for example, the videos about different times and the time machine as a metaphor for the temporality of historical time broadcast by the media.

We consider it important to note that on Lotman's trail of thought on a conceptual side of the semiosphere, it would not be possible to isolate cultural systems, since it comprises the whole of cultural production and the fact that its boundaries are constantly invaded, whether it deals with epistemological, linguistic or theoretical frontiers.

FROM THE SENSIBLE TO THE INTELLIGIBLE: OR HOW TO MAKE THE SIMULACRA – THE FIGURATIZATION OF A MEANS OF CONVEYING A SENSIBLE AND INTELLIGIBLE EXPERIENCE

Can we also consider the installations as simulators of voices that carry meaning? How do we reconcile the aesthesis experience by the induction method of scientific discourse? Or to the so-called scientific knowledge that such facilities are striving to achieve through their own methodology? These are questions to be designed to establish criteria ranging from the strategy of constructing indicative simulations of voices inherent to speech to scientific knowledge itself, narratively established in order to be disclosed to an audience that is not knowledgeable. Easing the transition proposal, that is, one that goes from the sensible to the intelligible is a function of strategy, or a set of strategies that the discursivity of the work proposes.

The installation 'A New Time' suggests the creation of a problem at the representative level interweave in the concept of time. Thus, it proposes a reflection on concepts such as the irreversibility of time, linear time and deferred time. It offers different looks at time or temporalities; thus we can infer from his narrative that the time from the point of view of physics it is different from, but not exclusive to, that which we learn in the more immediate term: we manage to grasp the idea of clock time, manage to place it in daily life but not in that of an action that happened a century ago, for example (unless through history and memory). Bergson (1974, pp. 268) considers that "the science of matter distinguishes a number as large as we would like for the range of moments in time that it considers. As small as intervals that are contained may be, [it] allows us to divide them further if we happened to need to do so." Since natural science always considers virtual time, stopped time is never real time, i.e., the time distinguished (envisagé) or as a flow. We would add still some aspects that define the present time in installation, such as literature, the arts and media.

We believe that a short digression fits here to clarify the point of view of the relationship between the three axis of our work located at the interface created by the relationship and links between art, science and philosophy. Therefore, we feel called upon to explain how we approach these forms of knowledge from the perspective of philosophy. To this end, the reflections of Deleuze and Guattari's work 'Qu'est-ce que la philosophie?' (1991) Seem extremely important. The dimensions of knowledge, according to the authors, can be seen through the ways in which art, science and philosophy of the approach. The three means or dimensions of knowledge are specific, some as direct as others, and are distinguished by the nature of the plane and what occupies it. To think is therefore to think by concepts, by functions, or by feelings, and none of these thoughts can be considered better or worse than another, or as the au-

thor makes clear, none of them can be supposes to synthesize or express a thought more or less adequately than another. Another factor to consider is that every form of knowledge originates chaos, understood as a virtual space of possibilities. Chaos is not Nothing or absolute disorder, but rather a virtual in that it contains every possibility. Consequently, in the same way that chaos can give rise to forms and concepts, it dissolves them.

Thus, we consider that a see that non-order is processed into a form of knowledge. This form, or systematization of knowledge, provokes your insertion in one of the planes or dimensions mentioned above. Deleuze considers the event as the virtual reality, virtual updated. It is in this sense that the chaos or the virtual event and this allow for updating in the form of an organization of thought. Such an organization will determine the level of knowledge and the binding of the three dimensions that unfold. Basically, the question that pervades the thinking, the 'degree zero' of its birth, is the event [évènement], a phenomenon that gives it form and is processed in the space defined as chaos: virtual space in which the human agent seeks definitions an understanding of the events surrounding it in everyday life.

Therefore, in order to think of time not in linear terms but in its relationship with what was, what is and what will be, the installation proposes, through its enunciates a means of amplifying the concept of time in their simultaneity, i.e. present, past and future in terms of their interrelationships. Such statements seek to address many different readings, such as those quoted above.

DISCOURSE AND DE-COURSE

In accordance with Greimas and Landowski (1984), our approach is based on three forms of speech as typified in the social sciences and, in our case, we a hybrid discursive field, because its structure posits two distinct understandings, the first related to the creation, specifically for the electronic arts, and the second related to the scientific knowledge as stated in more general enunciation: speeches in search of scientific certainty; questions about the very meaning of research and interpretation of speech.

In the case of our subject, the second module seems more appropriate since the goal is closer to the discourse on the relationship between art, science and general statement, discourse of the unfolding of the installation itself: scientific dissemination through interactive installations. In other words, it would deal with interrogation of scientific and epistemological junction, located here as a discursive element of enunciates subjacent to the enunciation.

Defined in this way, the playing field of discourse as a question about the search itself, namely, a methodological reflection that brings together aesthetic and science, we aim to define in the same way the field of semiotics that would fit within an analysis of this type of discourse: the interactive installation driven by the 'mean to say', your 'to make', [vouloir-dire, faire] the intention of disseminating scientific knowledge. Thus, every object as constructed by cultural signs (paradigms) in relation to a context by discursivity as defined by the enunciation, the underlying enunciates are so articulated (syntagmatic relation) that they define, so to speak, the emphasis employed in this relationship as explained below.

PARADIGM, SYNTAGMA AND SYMBOL

Resorting to the idea that the concept of time found in our installation can be articulated and addressed in accordance with certain relationships around the concepts of paradigm, syntagma and symbol. Consider, broadly, that paradigm is the set of signs that we hold to prepare a syntagmatic relation or an utterance: an established relationship within the paradigmatic set of signs. As an example of this process, proffer as a possible schematization of the sign 'time' as part of a set of singular and different times. The result of that provision in a speech, taken here in the broadest sense, is what will determine our choice among the possible forms of syntagmatic relation. This process can be extended to any set of signs, such as pictorial, sonic, filmic, or in the relationships established between them, such as in the case of films, performances in which there are a relationship between sound and image, among others.

Thus, if we consider the settings of the discourse in the form of modules, namely, the symbolic, the paradigmatic and syntagmatic, we see that the latter focuses on semiotics, i.e. the relationship between signs and their semiosis. This does not, of course, exclude the constituent elements or the base to be used for the construction of the sentence, or, a little more explicitly, the isolated signs, taken alone under their paradigmatic form. That said; between the paradigmatic element used for the installation and its unfolding narrative, we can observe the paradigm 'time' distributed in at least four contextual relationships: the temporality media, the literary, cinematic, and that primary concept of the work, the temporality from the point of view of physics. Such enunciates within the enunciation define the meaning [vouloir-dire] of the work and lead the interactor to interlace his own narrative that will be added to the initial proposal and the enunciatory can to produce their own speech.

METHODOLOGICAL STRATEGIES IN THE INSTALLATION A NEW TIME

One way to divide semiotic groups themselves to the installation which we analyzed, was to separate them by blocks and start our analysis by clipping of the proposals suggested by the installation and defined by the five devices already listed. With respect to the plane of the utterance, there is an important variable which we have to mention: Although the object we analyze seeks through sensorial perception an analysis of scientific concepts, their proposed goal is an artistic product, and thus on the one hand, travels the field of the domains (scientific, artistic or philosophical) for the field of reflection on art, and on the other hand, the reflection is proposed specifically about electronic art, and further a field delimited, one which comes to electronic art designed as an interactive installation, i.e., a scenario that is requested from the enunciate a physical and cultural participation that the existence and work may have meaning.

Another reflexive field is that of scientific concepts proposed by the course of the installation. The poetry of images, sound setting, the language of the texts of writers, poets and scientists, serves as an anchor and metaphor and thus these productions collaborate in driving the manipulation of the enunciatory. Not being able to predict a pattern like the enunciatory advertising campaigns (target models, such as youth, children, classes), a way was conceived to fill the void of knowledge (potential space) intended to be attained (update) in the form of monitors (discursive simulacra of scientific knowledge) that amplify the voice of poetic speech and scientific understanding that are proposed aimed at the installation.

As a result, the concepts of irreversibility, reversibility, relativity and simultaneity are treated by the specificity of their constructs and by the means that the interacting might handle.

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PARTICIPATORY ART AS INNER CITY WORKSHOP: THE URBANREMIX SOUND PROJECT

<u>Carl DiSalvo</u>, Jason Freeman & Michael Nitsche

UrbanRemix is a collaborative and locative sound project designed to engage inner city communities with their neighborhoods through participation in a public art event. The project consists of mobile and web applications that allow participants to explore the acoustic identity of their communities as they record and remix sounds from their surroundings. This paper presents the concept and realization of the project in three different cities.

Urban Remix, 2010-11 Times Square project, map interface for sound mixing (left); Art on the Beltline project, Travis Thatcher live performance on location (right).

The UrbanRemix project builds on the idea of participatory art as a form of citizen involvement that engages people with their neighborhoods by encouraging citizens to re-discover their surroundings in a new way.

Participation has been discussed as a key quality of a range of contemporary artistic practices. As part of what Kester termed "dialogical art" it engages the audience, making their involvement an integral part of the artwork itself. "[A] dialogical aesthetic requires that we strive to acknowledge the specific identity of our interlocutors and conceive of them not simply as subjects on whose behalf we might act but as co-participants in the transformation of both self and society" (Kester 2004). Bourriaud differs in his approach to this kind of process-based art but comparable to Kester he stresses the "realm of human interaction and its social context, rather than the assertion of an independent and private symbolic space" (Bourriaud 1998). He identifies global urbanism as a driving motor as well as the stage on which the "growing urbanisation of the artistic experiment" (Bourriaud 1998) unfolds. UrbanRemix relates to this kind of participation and engages citizens in a new form of acoustic dialogue with their neighborhoods

and each other. It not only connects to the urban space thematically but also uses it as a source and stage for the artistic process itself. Sound recordings are gathered by local communities, shared via an open web site, and remixed online as well as in live performances staged in the neighborhoods where the sounds were recorded.

UrbanRemix is a platform that provides for participatory locative sound recording, mixing, and sharing. It consists of three key elements:

- a mobile application for capturing geo-tagged sounds
- an interactive online map for exploring and remixing sounds
- a range of outreach workshops and live performance events.

The UrbanRemix mobile application for Android and iOS allows participants to record sounds, take photos, tag them, review them, delete them, and upload them to a central server. Every sound recording is stored with its GPS coordinates, a timestamp, the ID of the recording person, and other customizable tags. Sound recordings are limited to 60 seconds and are uploaded as uncompressed audio files. Before they can use the application, participants first have to sign up on the UrbanRemix web site, where they agree to release their field recordings under a Creative Commons license. The application itself is available free of charge on the Android Market and the iTunes app store.

The web site (http://urbanremix.gatech.edu/) provides access to the uploaded media and allows participants to further tag the files, search them, and download them. The main interface to access the recordings, though, is an interactive map, built using the Google Web Toolkit. Recorded sounds are represented as markers on maps according to their GPS location. Users can filter the content of these maps for IDs, recording dates, or tags. Most importantly, they can click on the map itself to draw virtual paths through these locative recordings. Any path is then rendered as an audio soundscape mixing together the sounds closest to the path and changing their amplitude, panning, and filtering over time to reflect movement along the virtual path.

Participants are free to add more paths and can gradually build up an increasingly complex soundscape based on a multi-layered virtual traversal of the city. UrbanRemix allows further, more detailed sound manipulation as participants can loop and change rendering and mixing parameters in each path's settings. The result is an online mix based on the sounds recorded in the city and assembled with the help of spatial tracks crossing the city's map. Each mix can be saved, downloaded, and shared with other users. Finally, users can batch-download sounds to their DJ software and remix them locally on their computer.

The third element of UrbanRemix is a series of workshops and live performances. In practice, UrbanRemix comes to life in individual projects that center around communities and events at a certain place and time. Each project typically starts with workshops to inform groups in the neighborhood about UrbanRemix and encourage them to begin the collection of sounds and images. Discovering and selecting specific sounds for their own collection encourages participants to explore their neighborhood. It literally asks them to listen to their surroundings anew. Once the collection is complete, two forms of remixes are possible: online, using the web site; or offline, in the form of live performances. To prepare a public live performance, DJs download the collected sounds and perform live remixes using only the contributed content. All sound mixes, from DJs and other participants, can be shared and are found on the UrbanRemix site as well as other sound sharing sites.

A number of locative sound projects have addressed the use of locative media in urban neighborhoods. (see also (Freeman et al. TBP)). These include projects like Urban Tapestries (Proboscis 2004), [murmur], the Tactical Sound Garden Toolkit (Shepard 2007), Sonic City (Gaye, Maze, and Holmquist 2003), and the Silence of the Lands (Giaccardi, Eden, and Fischer 2006). UrbanRemix stands in the tradition of these projects and shares many comparable technologies and concepts such as maps, GPS, and locative

sounds. A key difference is, that UrbanRemix focuses throughout on a community aspect in the creation, mixing, and sharing of the evolving soundscapes. Sounds are gathered by local communities in their neighborhoods, shared and remixed online, but also presented back to participants in live performances delivered by professional DJs on location. The city becomes both a place for production as well as performance. UrbanRemix does not constitute an immediate intervention in the form of direct action but offers the chance to rediscover and reinterpret the spaces surrounding us.

Since summer 2010, we have conducted a number of projects with UrbanRemix that involved different audiences, cities, and neighborhoods. These include a project in the Tenderloin District in San Francisco, a project for the Atlanta Beltline project, and one at New York's Times Square. Various audiences have used the system, from High School students, to church community members, musicians, teachers, and media educators. Over time, UrbanRemix has proved to be flexible and portable and it has attracted some interest from artists and communities as an experimental platform for their own projects. In addition, UrbanRemix has been used as an educational tool in music classes during summer camps offered by the Atlanta Public Schools. The following paragraphs will focus on three projects in three different cities to discuss the project in more detail.

The Art on the Beltline project was part of a larger art program that addresses the multi-billion dollar redevelopment of the inner city of Atlanta. The art initiative is part of a 5-year plan developed by various communities and implemented in July 2006. As the development changes the city artists are invited to contribute projects that deal with the changing spaces and relate to what is marketed as "Atlanta's New Public Space." 270 artists contributed in 2010 and presented visual work, installations, and walks, as well as dining on the Beltline and musical performances on location.

As part of this program, UrbanRemix invited citizens to record sounds on the undeveloped locations before they will be reshaped by the upcoming development. The result is a form of acoustic virtual heritage that allows an audio-exploration of places whose character is bound to change rapidly in the near future. The final performance by DJ Travis Thatcher was held at a temporary stage on location at the Beltline on the border between the Old Fourth Ward neighborhood and Inman Park. The Old Fourth Ward is one of the oldest districts in Atlanta and has seen many changes in population and development. Today it houses the Martin Luther King Memorial site and is an example for gradual gentrification of inner city neighborhoods. Inman Park was Atlanta's first planned suburb and evolved into an expensive and largely historic neighborhood.

The biggest challenge during this project was to involve participants. Even though about 180 sounds were recorded, there were not many individual participants – possibly due to the way we announced the project as a "free for all" event instead of emphasizing more direct community involvement. The resulting sound collections might reflect a kind of virtual heritage or conservation of the location before the upcoming development, but they barely related to the socio-cultural conditions of the surrounding neighborhoods. This challenge of recruiting participants for the Beltline project informed our future work, making it clear that proactive solicitation of participation would be required. Still, even with limited participation, the outcome of this project is a collection of sounds that serves as a documentation of the acoustic identity of the space at one moment in the history of Atlanta.

A much closer collaboration with local communities was at the heart of the UrbanRemix project in San Francisco. The event was part of the City Centered Festival and hosted by the Glide Memorial Church. Originally founded in the 30s, the Glide Memorial Church developed into a thriving open community that actively supports often disenfranchised citizens of San Francisco. Since the 60s its program reaches out to a range of minorities in the city and offers housing, medical assistance, and educational programs. The surrounding Tenderloin district is a historic downtown area of San Francisco and a highly diverse neighborhood where inner city challenges such as crime and homelessness are found as well as historic buildings and thriving art communities.

Participants in the workshop included teen youth from the Glide arts program, instructors from that program, as well as interns and volunteers working at Glide for the summer. Over 170 sounds were recorded during the one-day workshop ranging from different voices in the neighborhood to detailed sounds, such as security keypads or traffic noise. During the project, a noticeable focus on recordings of voices emerged – as if the different citizens of the neighborhood were meant to find their way into the soundscape through their speech. Ken Ueno performed the public remix performance at a small gallery in the neighborhood. Because the project was part of a relatively short conference event, it faced a condensed schedule, which complicated the work of Ueno. He had only one day to familiarize himself with the recorded sounds for his live sound mix. While we managed to base the project better in the local community, the challenge remained to connect the process of remixing better to the chosen location. In large part this was due to the structure of the workshop, which emphasized sound collection over sound remixing. The lack of sound remixing after the project showed that we needed ongoing solicitation, even post workshops events.

The UrbanRemix project at Times Square, New York was a collaboration with the Times Square Arts Alliance and combined the approaches tested before. Times Square is a renowned tourist attraction in New York, an extremely busy central hub that sees high traffic from both tourists and locals. The Times Square Arts Alliance regularly invites public art projects to Times Square. The goal is to let visitors encounter contemporary art and raise the profile of Times Square as a location. The invited projects include installations, projections, as well as live performances and are largely temporary pieces. UrbanRemix ran in April and May 2011, leaving the sound collection open for one month. The event was promoted online and through the Times Square Art Alliance on location to engage the audience. It also offered some prizes for the best online sound mix and the best sound recording to motivate participation. In addition, two workshops were held with students from the Jacqueline Onassis High School in immediate proximity to Times Square. A third workshop, co-organized by the New York media art collective Eyebeam, included local educators and media experts from museums, schools, and other institutions. Over 600 sounds were recorded and mixed by Thatcher and Damon Holzborn during a dual performance at the end of the project. They performed on a public outdoor stage in Times Square and in a second performance inside the visitor center nearby. The prize for the best online remix was won by a Brazilian artist, Osnildo Gesser Muller Junior, who had discovered the project online and had mixed his soundscape from his home in Brazil based on the recordings of the local participants. The price for the best sound recording went to a local high school student. Thus, the project's outcome mirrors the double nature of Times Square as a lived neighborhood for its citizens, as well as a space of tourism and transit for a larger global audience.

No technical evaluation of user involvement has been conducted yet, but the informal feedback received in all three projects was largely positive. Participants often report new "finds" on their scavenger hunt for interesting sounds. This can be a discovery of something new in the all-too-familiar, like students discovering a fountain by "finding" the sound of water near Times Square in close proximity to their school, or it can be the documentation of a changing environment, as seen in the Art on the Beltline project.

Accordingly, participants showed clear signs of ownership of their contributed sounds throughout the projects. When they reviewed the sounds recorded for a specific project online, they often started with their own recordings, filtering out all other contributions on the web interface. At the same time, the live DJs were curious about the sound recording participants. Ueno stated after his performance in San Francisco that, "What I most wished to happen was to meet the people who collected the sounds and talk to them after my performance, which, unfortunately, didn't happen. I would have liked to have heard their impressions of what I did, and if they could recognize their contributions." Different participants clearly engaged in the intended artistic musical dialogue "on" the location. This sense of shared ownership and personal connections was also visible in other UrbanRemix projects. In 2010 and 2011

UrbanRemix was used in music courses in summer camps with the Atlanta Public Schools. These camps allowed for a longer and more focused involvement. Students worked for approximately a week, recording and remixing sounds. Some students, however, not only created their own sound remixes but surprised us with their own dance routines based on their remix soundtrack. Reactions like these indicate that the engagement with their surroundings had clearly led to a new artistic dialogue.

Kester asked "How do we form collective or communal identities without scapegoating those who are excluded from them? Is it possible to develop a cross-cultural dialogue without sacrificing the unique identities of individual speakers?" (Kester 2005) Admittedly, not all boundaries for such a dialogue are eliminated in the case of UrbanRemix. Participation still depends on availability of relatively expensive smart phones, for example. Although we provide devices during the workshops, many other citizens remain excluded.

UrbanRemix succeeds in retaining the identity of individual participants within the sound collection and the evolving remixes. Participants not only pay special attention to their own sounds, but they also react whenever they identify "their" sound in somebody else's remix. In that way, UrbanRemix provides an engaging platform for personal involvement with neighborhoods in a new sound-based dialogue.

Technically and conceptually UrbanRemix delivers a platform consisting of software, workshops, and on-line media. We constantly improve these core elements of the system, but to participants they appear as a "given" in any local project. Such a rigidity barely fits into the Dialogical Aesthetics outlined by Kester. It allows for a creative exploration of the surroundings, but only within the technical frame set by the underlying platform. On the one hand, this frees the participants to a playful involvement, on the other, it limits them to existent mechanics and restricts any alteration. For example, we do not teach how to change the code or hack the mobile application. In this regard, UrbanRemix constitutes a tool for artistic involvement that has an own rhetoric: what data is saved, who has access to the technology, what is the role of the administrator, how and where are projects publicized and conducted?

At the same time, each project is shaped by practical conditions depending on the participants but also on the conditions of the event, which include the scheduling of projects, availability of WiFi networks or electricity at the location. Even though they all used by-and-large the same underlying technical set up, each UrbanRemix project was unique. The system seems to encourage a ludic engagement that fosters a specific playful exploration of one's neighborhood. This engagement should be seen as step toward Kester's "cross-cultural dialogue" wherein performative and situated actions are integral part of the art piece.

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BIG GAMES AND HIPSTERS: COOL CAPITAL IN PERVASIVE GAMING FESTIVALS

DAN DIXON

Pervasive and street gamers are compared and contrasted with the infamous subculture known as 'hipsters,' showing that although they are quite different social groups their aesthetics operate in similar ways. Specific attention is given to the emergent, socially relative nature of these aesthetics and the operation of 'cool' cultural capital. These findings are based on ethnographic field-work carried out in 2010 at the *Come Out and Play* festival.

Pervasive games are new forms of playful experience that have emerged from the intersection between ubiquitous computing technologies and computer gaming. They are played in the physical world, away from desktop computers and gaming consoles; expanding game space into lived reality. However, as an unstable, emergent or avant-garde field the labels are still in flux. Street gaming is a term that tends to be applied to an evolutionary subset of pervasive games that chart a trajectory away from obvious technology, but still sit in a milieu of childhood video gaming, smart phones, internet access and the ubiquity of the web. These games have followed a design evolution that has removed unnecessary technology and focused on appropriative, energetic and playful uses of the city.

This paper is intended to show that there is a close relationship between the cultural capital of those involved in street games and the aesthetic appreciation of the experience of these games. Using hipsters as a curiously interlinked subculture, I point out that there are similarities between the way the two groups manipulate culture and meaning.

One reason for this approach is that formalist, or functional, interpretation of the rules, models and patterns of street games does not set them apart as they are often similar to traditional, large-scale, playground or wide games. However there are subtle layers of meaning that do create clear distinctions for those with the necessary cultural capital and make these street games mean much more to the players than just their mechanics.

In the July of 2010, I carried out an ethnographic study of the street gaming festival*Come Out and Play* in Brooklyn, New York. This was part of a longer investigation into pervasive gaming festivals that also occur in London, Berlin and Bristol. Established in 2006, *Come Out and Play* is the longest running festival of its type in the world; an annual, weekend event, with game designers and players coming from across the world.

During *Come Out and Play,* I closely followed *Gentrification: The Game*, which would eventually win the prize for "best use of technology" at the festival, and filmed a team of players for the full two hours of the game. *Gentrification* was designed and run by Atmosphere Industries – a group from Toronto – and is loosely based around *Monopoly*. In the game, multiple teams of players, playing as besuited developers or local residents, are pitted against each other to fight for or against the forces of gentrification. Physically racing up and down streets to photograph themselves in front of properties – the mechanic to purchase locations – they would then go on to strategically build things such coffee shops or community

centers. There is an obvious irony in the game as the name suggests, especially as the designers specifically play the game in neighborhoods that are undergoing, or have undergone gentrification.

As these games are played in busy streets, in amongst everyday life and the players are performing unexpected actions, for example handing out flowers, singing, marching, making speeches, they are constantly asked what it is they are doing. For any street game, this appears to be a difficult question. After a number of attempts at describing to various local residents, one *Gentrification* player, whilst interacting with a man outside a US veterans centre hastily shortened his description to, "It's a hipster game."

Another, quite atypical, player was a local resident with a thick Brooklyn accent who had lived in the area all her life. She had brought her teenage son to play, as he liked acting and games, and ended up joining in this game herself. When I asked how playing this game made her feel, she described how all the other players were much younger and very different from herself; and finally, "It makes me feel like Williamsburg on a Saturday night." Williamsburg being recognized as the international locus of hipsterdom. [1] She said it made her feel highly uncomfortable.

Finally, as even one of the designers says, in a newspaper interview about the game, "We're interested in hipsters. That's it in a nutshell." [2]

Although the designer's quote appears to be flippant, between the three of them they have hit on something deeper about the relationship between who the players are and their enjoyment of the game. There is a deep and relevant parallel between hipsters and the players of street games.

Hipster – One who possesses tastes, social attitudes, and opinions deemed cool by the cool. The Hipster walks among the masses in daily life but is not a part of them and shuns or reduces to kitsch anything held dear by the mainstream. [3]

Defining the contemporary hipster is no easy feat for a subculture that prides itself on individuality and Internet-accelerated trends. The term itself is highly contested and in fact, for hipsters, being called a 'hipster' is something of an insult. [4] The term 'Hipster' first appeared as a reference to first black subcultural figures in the 1940s and then white subcultural figures in the 1950s. [5] Current hipsters emerged between 1999 and 2003, coming out of a post-punk, post-grunge neo-bohemia that is driven by a late-capitalist milieu of the experience economy. Hipster seems to emerge out of a thwarted tradition of DIY, alternative youth subcultures that have been integrated, humiliated or destroyed; leading to hipsters being anti-political and consumerist, ultimately deploying mockery and irony to communicate apathy and disgust around local and global issues. Paralleling Mailer's 'white negro hipster,' which fetishized 1950s blackness, the 21st century hipster, "fetishizes the violence, instinctiveness and rebelliousness of lower-middle-class suburbia and low-class country whites." [6] Some keywords that define this set of looks and interests are: "Trucker hats; undershirts called wifebeaters worn as outwear; the aesthetic of basement rec-room pornography; flash-lit Polaroids; fake wood paneling; Pabst Blue Ribbon; porno or pedophile moustaches; aviator glasses; Americana T-shirts for church socials, et cetera; tube socks; the late albums of Johnny Cash; and tattoos." [7] A final approach to definition is that the hipster culture appreciates and uses an aesthetic based on tensions, ironies and radical alterations between knowingness and naïveté, adulthood and childhood, pretentious complexity and foolishness.

Although both the book and event that are *What Was The Hipster* [8] devolve into denigration and hipster-hate it is one of the few serious attempts to analyze hipsters. Although the book is not especially

academic in itself, as it is made up of reportage and press articles, Bourdieu emerges as the only serious academic reference that any of the authors resorts to. Repeatedly in the book's various chapters and cuttings hipster tastes and style are denigrated, and as Bourdieu points out, tastes and style are not purely aesthetic, but socially and politically determined. [9] Hipster-hate is a classic example of what he calls 'symbolic violence,' the unconscious modes of domination within everyday social habits. This relation between aesthetics, class, education and cultural capital is seen to be crucial in analyzing hipsters and is also crucial in understanding the emergence of street and urban games.

Combined with cultural capital, Bourdieu's concept of 'habitus' is important in understanding both hipsters, and it is important in understanding why digital hipsters play pervasive games. There are parallels in their worlds that emerge in their different practices across different fields. Habitus is an unconscious set of predispositions, tendencies and inclinations, not so much rule bound, but playing within regularities. [10] This is down to similarities in the structures of their habitus and the way they both mobilize the logics of their cultural capital.

In her ethnography of Williamsburg hipsters Ingrid Tolstad describes how this subculture creates and manages the intangible quality of 'cool,' [11] and equates it to Bourdieu's concept of cultural capital. The ability to amass 'cool' capital results from the hipster's middle class habitus, level of education – usually university level – and high level of disposable income – from jobs in the media and creative industries. As Tolstad says, 'cool' has value, but it is very contextually dependent and is constantly redefined by the members of the subculture. Thus making it difficult for people outside the subculture to appear 'cool' or understand what makes someone or something 'cool.'

Although, as Greif pointed out, there are some common markers of hipsterdom, [12] from within the community the logic of 'cool' and the signs of membership are highly nuanced. This concept of 'cool' is aesthetically presented through retro-referencing and intertextuality in fashion and design. Raiding the late 20th century, the ideal hipster will select a clothing style from one period, tattoos from another and follow obscure bands, resurrecting music from the past: constructing a personal text to be interpreted by other hipsters, becoming both authentic and different at the same time. [13] The ability to both construct this individualized personal image and read the personal images of others is highly dependent on the individual's habitus and the level of cultural capital obtained through university level education. The hipster is a highly mobile and highly influential group of people, whose trajectory might well follow similar paths to the ones Bourdieu mapped for fashion houses in France. [14]

Our native Brooklyn player considered herself out of place; she felt surrounded by different people and equated that sense of alienation with the same feeling as visiting the hipster areas of New York. None of the players or designers of these games truly think of themselves as hipsters, or belong to that subculture. In fact raising the idea with some designers has provoked the same kind of hipster-hate as that which appears in *What Was the Hipster*. [15] However there are parallels between these two groups that go beyond these comments. These groups share many structural and aesthetic similarities that make pervasive, street and urban gamers a form of digital, or gamer, hipster. They are certainly not typical hipsters, but many phenomena are typically hipster.

The classic hipster employment is in specialist retail and service jobs, or in the advertising, media and content industries. [16] [17] Through my ethnography, I have found that players in street gaming festivals tend to work in digital media, web design, game design and generally the more creative end of the ICT industry. There are however subtle, regional differences in the make up of the main street and pervasive gaming festivals. These reflect the social networks of the organizers and designers as well as the

industry focus of the cities where they happen. For example, *Come Out and Play* in New York had a higher concentration of game designers and developers due to the large 'indie game' design community in and around the city which the organizers are heavily involved in. *Hide and Seek* in London is skewed towards the digital media industry, which would also appear to match up with the background of the organizers and the high concentration of digital media in London. *You Are Go* in Berlin seems to have drawn in many artists, again due to the organizers and the large population of art, especially media art in that city.

Players and designers of pervasive games share similar upbringings to hipsters. They are almost universally from middle class backgrounds and have achieved at least an undergraduate education. There is a surprisingly high level of post-graduate education amongst players of street games, and also a high level of academic involvement.

So there are similarities in upbringing and education across these two groups, but obvious differences in the types of common employment. These groups are obviously not the same and there is certainly a split between hipsters and street game players. However, even though there is local variation across the many different cities and countries there is a commonality of players of street games. Broadly speaking they all tend to be involved in what might be called the experience economy, the set of business that orchestrate memorable events for their customers; more specifically, those that are based on the creative application of digital technologies. Although there are exceptions to this rule, there is a high degree of commonality.

There is also one key aspect of street game players' upbringing that is very important. Again, almost universally, they all grew up playing video games and to a lesser extent tabletop, board and role-playing games. There is an embodied capital in their access to the stories, symbolism, gameplay and shared experience of video games, especially what are now known as retro-games. Most of the players at these festivals range from the mid 20s to the late 30s, and the games they would have grown up with are from the early 80s to the early 90s. These eras of childhood gaming seem to hold a particular fondness for the players that goes beyond memories of childhood.

It is not just that they grew up gaming, as many from these generations did. Although not as distinct a concept as 'cool' for hipsters, street gamers also tend to attempt the same kind of authenticity, honesty and depth in their relationship to some other forms of gaming. Most of the players I encountered have a strong engagement with some form of non-mainstream gaming, for example the *Civilisation* series, retro-gaming,*Minecraft*, or German board games. This creates high levels of very specific forms of embodied cultural capital: a form of capital that functionally fills a similar space to that which the 'cool' capital does for hispters.

The games at *Come Out and Play* ran the gamut from playful punning, such as *CounterSquirt* – a water pistol game with victory mechanics from the computer game *CounterStrike* – to loving attempts at live-action recreations of classic arcade games, such as a game of *Asteroids*, with 16 neon-tube wearing individuals acting as chaotic, bouncing, break-apart asteroids. These games are packed full of both visual symbolism, but also functional symbolism through their borrowed rules, interactions and back-stories. These digital hipsters 'get' street, urban and pervasive games through their gaming histories, and in the same way that Bourdieu describes habitus, they have a feel for the game. This differentiates them from those who casually encounter these games.

Just as hipsters have a set of tastes that comes from interpreting the aesthetics that emerge from manipulating 'cool' capital, and retro-referentiality, so do street game players. They create, and are the only ones that can truly appreciate, street games that are based on a deep level of referencing and reverence of games in general, and especially those from their collective childhood. In the same way hipsters mix the themes of child and adult, naïveté and knowingness, street and pervasive games tend to also mix childhood with adulthood. Games from their collective childhood are referenced, reused and remixed. As one interviewee put it, they are "children's games with something extra," referring to them being suitably challenging, complex and involving for adults

Returning to the game of *Gentrification* there are multiple layers of symbolism and ironies at work that extend beyond the game itself. There are oppositions and inversions between the child and the adult. It can be seen as a simplified, scaled up, child's game of monopoly to explore the very adult concerns of gentrification. It is simple enough to be played by those in the know but complex enough to alienate the locals. There are levels of irony, in that these digital hipsters are playing at symbolic gentrification in gentrified neighborhoods, but instead only follows the resident and developers who are caught up in the eddies from previous waves of colonizing artists and hipsters, both regular and digital. This is a hipster game on many levels.

Street games can be games that work within these inversions and contradictions because the community of players understand them. Not all games work with this and can be simplistic, but the best of them play off these properties and their tight network of reference to bring out experiences that are more than just the mechanics of the games. As both Lefebvre [18] and Debord [19] point out, these types of playful activity can engage in powerful dialectics with space and society.

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FACING PERCEPTUAL SHIFTS

MARGARET DOLINSKY

"Figuratively Speaking," a VR world, introduces Cubist figures from Dolinsky's paintings to a newfound dimensionality in virtuality where they establish both their personalities and the landscape. VR sets up a subversive confrontation by using a range of perceptual stimuli (visual, auditory, kinesthetic…) to exploit the artistic experience. Painting extends VR and the perceptual shift momentarily usurps reality.

Fig 1. Figuratively Speaking, © 2011 Margaret Dolinsky, VR World, Photo: Edward J. Dambik

Fig 2. Figuratively Speaking, © 2011 Margaret Dolinsky, VR World, Photo: Edward J. Dambik

Fig 3. Figuratively Speaking,© 2011 Margaret Dolinsky, gouache painting and 3D modeling are the inspiration for VR worlds

Introduction

The complexity of creating artwork for virtual reality theaters such as the CAVE Automatic Environment offers artists a multifarious palette that only begins with hardware and software. The aesthetics of an experience requires creating a plastic environment that ignites the imagination in order to inveigle the visitor and simultaneously engages the visitor. Virtual worlds immerse visitors with a range of perceptual stimuli (visual, auditory, kinesthetic…) that can be finessed through the artistic process. By setting up subversive confrontation between the visitors and the worlds in terms of such techniques as perspective, illusion and projections, a perceptual shift can occur that momentarily usurps ordinary reality. "Figuratively Speaking," a VR environment for the CAVE, is based on original watercolors of abstract figures whose faces, for the most part, are their bodies and concurrently compose the landscape. This deliberately confounds the environment to engage the visitor in a face-to-face dialogue with particularity and personality.

Facing perceptual shifts

There has been a historical tradition in art towards altering perception. My work in virtual environments employs dynamic imagery to heighten awareness, promoting what I call a "perceptual shift" for the visitor. A perceptual shift is the type of cognitive event of having experienced something extra-marginal, on the boundaries of normal awareness, outside of conditioned attenuation. [i] Perceptual shifts are often provoked by artwork such as *trompe l'oeil,* Cubism, Cornell boxes, labyrinth gardens, and Brecht's political theater. These devices for wonderment have a magical quality that requires a specific interaction unique to the particular device and its functions. Once the participant realizes his or her role within that interaction relationship, possibilities open for perceptual shifts and cognitive events. In my own work, I am not attempting to shape emotion in particular, but I do hope to shape perceptual possibilities within immersive environments.

Image making

I keep a sketchbook next to me at all times. It is especially critical in the morning. I reach for it before I am fully awake. I do not use an alarm clock, radio or other device. I avoid sounds and thoughts that define the day. I simply tell myself before I fall asleep what time I need to wake up. I sketch before I can articulate words, as if still captured in a dream state. It is during these hypnagogic moments that images form. Moreover, from the images, I recognize a sense of being. Rather than verbiage, motion becomes evocative, creating patterns of lines and shadows. The sketches come charging from the movements of my forearm that is channeling notations of memories and dreams that assemble themselves onto a surface. They are harbingers of narratives that temper and toughen consciousness and build gateways towards analogies. The sketchbooks are diaries, daily blogs in visual form.

Sketching impels me and inspires my paintings that inspire my virtual reality. At times, a sketch leaps forward, demanding further enhancement and calling to be fortified with color. I rarely understand the images before I paint them. I seem to know, without any calculated thought, which one needs attention. The process of applying color is seemingly ignited by an enticing song, as if sung by sirens. I execute the process of painting with mesmerizing fascination. I guide the brush to conspire with the surface. I counsel color onto a path where ultimately it is suspended from further voyage. The colors adhere to the plane, mixing with light, creating a surface, maintaining shape and decorum. As the culminations of my forces whip the brush's lashings into shape, the colors and shapes acquire integrity as entity. Color adds a dimensionality to the dreamt up image, provides a new parallel of existence, and extends my visual understanding of my process. Color establishes the robustness of the characters. It makes them whimsical, light-hearted yet at times, frightening.

The resultant image, a frozen structural moment finalized in time, becomes a world of contemplation that reorganizes itself as often as I look at it. The images begin to define a virtual environment and extend towards three dimensions. I create them anew in 3D computer modeling software. As the characters cultivate their relationships with one another, their prevailing forces energize to the real world and inculcate me with further ideas.

3D Virtual Worlds

The complexity of creating artwork for interactive stereoscopic cinema or virtual environments offers me a multifarious palette that only begins with hardware and software decisions. I consider my art images in terms of the connections they offer the visitor. The screens open to an infinite space that must be planned out as if it were real estate that is not necessarily grounded. The space offers multi-dimensional, gravity defying exploration with sensors triggering events. Illusion is presence. The 3D presence, completely illusory, is complex. It is visible through the light from the projectors coded in data. Each shape object model geographically maps the xyz Cartesian coordinate system and articulates a corresponding texture that maps the UVW components. They are co-located in the environment set with sensors for interaction. The hardware and software limitation mandates each facet of the artistic development with its own parameters and criterions. I must be vigilant. I am here for the experience dictated by my sketches.

Aesthetics of experience

The aesthetics of a real time animation experience ignites my imagination. I inveigle the visitor first through brightly colored and odd shapes depicted from my paintings. These shapes simultaneously engage the visitor, as they comprise the unusual characters to meet. Stepping into my real time interactive animation, the world is filled with the sights and sounds from my imagination. The environment navigates between my externalized imagery and my internalized thoughts. Small areas of the environment are confined to intensive interaction. The free navigation is halted by specific objects that manipulate sound. The juxtaposition of these events allows for free roaming thoughts with intermittent deliberations and activity.

Visual Perception

Virtual worlds are privileged by visual imagery. In "Figuratively Speaking," the original paintings dictate the aesthetic that guides the visitors through the experience. The paintings establish a 2D visual aesthetic that is extended to become a 3D space. The responsiveness of the visitors is encouraged through a range of perceptual stimuli including visual components, auditory design, and attention to kinesthetic movement. Rudolf Arnheim explains, "Visual perception is visual thinking… No thought processes seem to exist that cannot be found to operate, at least in principle, in perception."[ii] The unique visual milieu energizes the experience. In order to navigate, one must identify the seemingly unusual imagery and make connections with it. In order to make sense of it and to make decisions, one suspends disbelief and interacts with art.

I design characters that look like heads. 3D allows them to move awkwardly, stare gracelessly and speak gawkily. They are simultaneously amusing and frightening. It allows me to establish an interactive relationship with a world I would otherwise only know in 2D (on paper and computer screens). I know the characters multi-dimensionally as a manifestation in 3D graphics or in rapid prototyping. I feel privileged to be able to extend the characters' conversation with me to others. I carefully place them to facilitate way- finding by creating visual choices or preferences for the visitor. The characters peak the visitors' interest and determine their next movements. I ignite attention through shape, size, color and brightness of the spatial configuration with the other objects that comprise the environment. This active selection and visual thinking creates a formula to design visual drama in the environment. Instead of drop down menus or folders with names on them, the objects are the way to navigating understanding.

The abstract imagery is reminiscent of the likes of Chagall, Klee and Picasso's cubism. The bright abstract shapes direct the visitor to explore particular paths. The fundamental elements of the imagery such as size, color, shape, and brightness can attract or detract the visitor to and from a route. These elements influence how the visitors' body moves along the path as well. At one point, all movement has to stop while at another it is slow in order to see what is unfolding nearby and in another, one cannot move fast enough to catch up with the moving objects, such as the boats in the water. My environmental design causes visitors to move to the side, lurch, and crouch and bend in order to anticipate a movement, face a situation or provoke events.

The visitors are also enveloped through the use of sound. The world is enhanced by sound that lifts visitors and carries them through the experience. The background audio is an ambient sound composition by Michael Drews and performed by the band, Big Robot.[iii] The foreground sounds, heard when the events are triggered are composed by sound artist Rachel Weaver.[iv] As visitors are listening, sound indicates where attention should be focused. Sound peaks thoughts and manipulates emotions. Sound provides context through acoustics and psychoacoustics. The malleability of the environment relies on the influence audio creates. Begault describes 3D sound systems as having four acoustic simulations: representation, replication, transmutation and creation.[v] Creation is a completely unknown auditory

experience. This fourth simulation, creation, is what I find effective for my abstract environments to enliven the mood and engage the visitor in a theatrical art performance.

The design of audio, imagery and kinesthetics work in tandem to create a higher degree of temporal resolution and enhance the channel of communication between the visitors and the art.

Perceptual shifts

I construct pointers to perceptual shifts as the formal structure in my virtual worlds. I aim to capture those perceptual moments that are often lost because they are extra-marginal, outside the bounds of ordinary awareness. These moments are significant when they are initially recognized and lead the way towards integration of one with the surround. The environment must affect the visitor. Each visual element, auditory cue and kinesthetic activity represents a moment of recognition. These elements may act as a doorway, stairwell or tunnel that requires investigation. I establish the possibility for narrative by transforming the structure and architecture of the space into a series of visual and metaphorical guides for the participant. The environment is the navigational structure that ignites perceptual shifts and indicates the possibilities for interaction and, in turn, guides the overall experience.

The perceptual shift is established in terms of cognition, emotion and kinesthetics. The figures build a dynamic visual vocabulary. Combined with the awareness of time, the worlds are moving paintings. The visitors stand in the perceptual foundation of paintings that manifest experiential space. What is significant about creating virtual worlds is that it is the first redefinition of perspective since the Renaissance.[vi] I extend this mathematical perspective with a perceptual shift in dynamics that allows visitors to face an unknown and synthesize to their present sense of knowing.

Figuratively Speaking

"Figuratively Speaking" is a virtual environment that establishes a ritualistic interaction of recognition, listening and attending. It is inspired from a series of hynagogic paintings. The paintings feature portraits that are simultaneously faces and figurative characters. The composition of the painting is in a six-panel grid formation. The painting allows the eyes to navigate the images in a sequential fashion, much like abstract comics. The virtual environment allows the body to navigate in a nonlinear fashion, similar to a stream of consciousness movement. The portraits provides affordances for the VR environment to establish methods for way finding.[vii] The faces are portraits, figures and landscape elements.

Some of the perceptual context of this work looks at the research of Reber et al who suggest that aesthetic experience is a function the perceiver's processing dynamics. "The more fluently the perceiver can process an object, the more positive is his or her aesthetic response… Finally, the impact of fluency is moderated by expectation and attribution."[viii] The experience of searching is governed by the aesthetics and the emotional tones of the faces/figures. Together, context and conceptualism, evokes exploration, recognition and discovery. The face is a metaphor for identity. The face represents a kind of knowing the self, determining where one is in relation to the other. The face also represents a kind of knowing of the other, determining where one is in relation to place and path. The face is also body and parts of the body makes up the landscape. Therefore, the face is also the grounding force. The visitor is immersed in a subversive confrontation with face and identification. This deliberately confounds the environment to engage the visitor in a face-to-face dialogue with particularity and personality. While navigating, the visitor constructs a narrative and the visual conversation moves between the artist, the visitor, and the artwork.[ix]

Conclusion

My virtual environments seek to create perceptual shifts by setting up subversive confrontations between the visitors and the world. Visual design techniques for virtual environments such as perspective, illusion and projections are only the beginning of creating experience. My worlds are inspired by abstract drawings that are painted and reconfigured in 3D. In "Figuratively Speaking" the adventure is established through the use of abstract portraiture. The visitor must reckon the moment by coming face to face with her reality.

The forces from the paintings will inseminate a virtual world where the objective is that over time and by navigating through space, visitors produce their own momentary narratives, similar to my recognitions of my own perceptual shifts. The visitor navigates, explores and contemplates the environment, as if they too can recognize an extra-marginal moment in time.

"Figuratively Speaking" is an artwork that realizes 2D painting as the foundation for a virtual environment aesthetic. The vibrant colors and unique forms energy the environment and illustrate the dynamic playfulness of relationships between faces and characters, real and virtual. The change in scale and repetition of forms encourage exploration of the figures as both characters and as landscape. Beyond mere viewing of a frozen image, visitors can move and explore towards an aesthetic experience.

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ART AND LIFE: BIOCYBRID SYSTEMS AND THE REENGINEERING OF REALITY

Diana Domingues, Adson Ferreira da Rocha & Cristiano Jacques Miosso

Ontological levels of creative reality and the reengineering of life provided by the BWAS– biocybrid wearable affective systems – configure the expanded sensorium and the health measures against the infirmity of landscapes, in biodiversity. Art and Technoscience combine developments in biomedical engineering in physiology and synaesthesya into the drama of life and the embodiments in Brazilian cultural rituals, urban space, domotics and ecology.
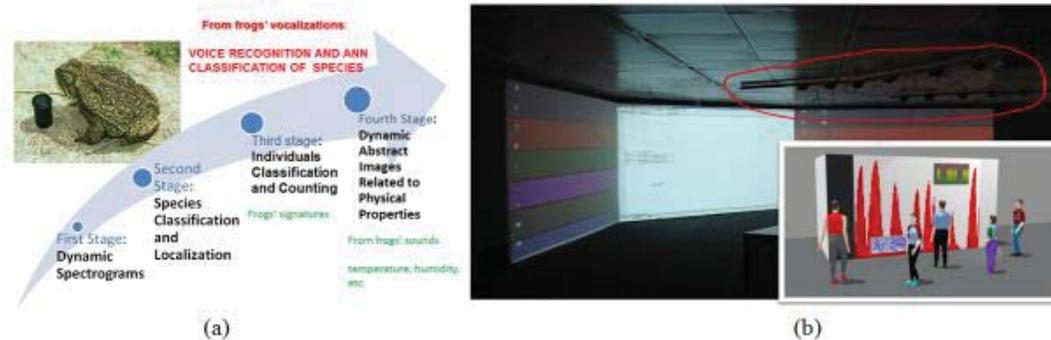
Figure 1. (a) The four stages in the development of the system for the classification of frogs' vocalizations. (b) A large screen for the manipulation of visual and sonic information.
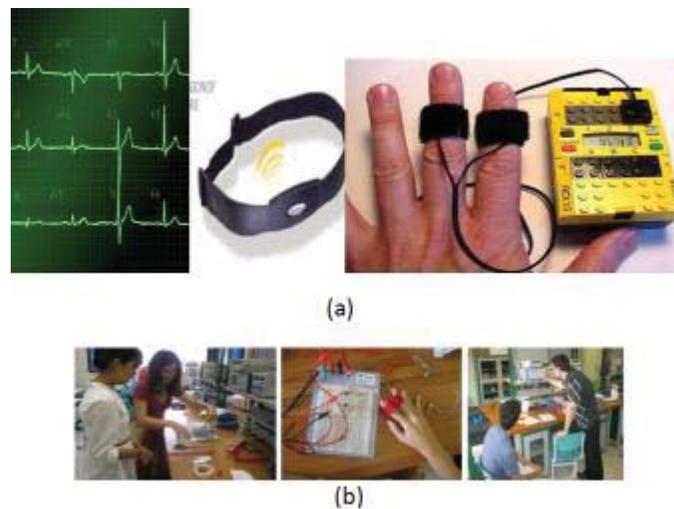
Figure 2. (a) Circuit sensors for the biocybrid condition. (b) Laboratory of instrumentation, where we develop the biosensor circuits. BWAS mobile wireless using non-invasive sensors for the body capture electrophysiological signals - galvanic skin resistance, breathing rates and heartbeats, which are treated and transmitted.

Figure 3. Traditional figures of Baianas (the old mother), in a Carnival dance, performed at Rio de Janeiro streets. Image provided by Maria Aparecida Donato, a post-doc researcher at LART.

1. Introduction - Biocybrid systems and the drama of life

Challenges of the world, increasingly technologically dependent, are faced by our biocybrid circuits of sensors, blurring the limits of the natural worlds and the engineered reality. Creative technological levels regarding body, landscape and the urban life of our biocybrid systems are provoking the end of the "nature itself" and the emergence and "the future engineered reality". The Group of researchers at UnB Gama in the Biomedical Engineering Graduate Program and in the Laboratory of Research in Art and TechnoSciences – LART develops biocybrid systems for human existence in the continuum and symbiotic zone between body and flesh - cyberspace and data - and the hybrid properties of physical world. That continuum generates a biocybrid zone (Bio+cyber+hybrid). [1] We add biofeedback circuits of sensors, therefore, bio signals to the cybrid condition, pointed out by Anders in 1998, [2] and we investigate complex enactive systems of creative technologies which reinforce the *natural* history of artifacts, with cyber technologies and transparent interfaces ubiquitously mixed to phenomena of ecocosmos life.

Biocybrid condition is the co-existence in the physical and cyber worlds connected by enactive interfaces allowing biosignals communication and affordances in the "narratives of life". Anthropologically, we propose the affective wearable condition, resembling Picard's investigation on affective computing. [3] We reinforce the liveness condition and the reengineering of our sense to be alive in every act through our biological signals. This approach is not new; we only gain creative levels for the understanding of our relationship human/environment in the remote theory of enactment, as in Aristotle's *Poetics*. [5] Enactive interfaces embodiments reinvent the drama of life by Aristotle and life is a complex act of being enacted to the environment by biosensors.

1.1. THE AFFECTIVE AESTHETICS

The body as part of an interactive system evokes the expansion of the aesthetic dimension in conceptual and body art with responses generated in symbiotic zones with programs within "hermeneutic operations," dealing with biophysical laws, when code and facts are experienced in the intensity of the senses and the ability of data laws built into the system. In the field of *endophysics*, [4] Rossler's interfaciology points out what the Performative Science is.

Reaffirming the origins of the discipline *Aesthetica,* postulated by the German philosopher *Baungartner* in 1750, we propose embedded systems for synaesthetic experiences of biosynthetic bodies and the ability to perceive the world with the five bodily senses. Physiology and synaesthesia are the main topics for our microcircuits.

Biosynthetic interfaces integrating biocybrid systems are no longer machines, but complex systems, surpassing the human condition and limits of the mechanistic paradigm. We must delete this old classification and consider human/animals/environment as a complex, living organism. In 1997, we had already discussed, in the *Flesh Factor* list of Arts Electronica Memesis Symposia, [5] some theoretical aspects related to this development.

In the 1990s we started to postulate the interest of sciences on the human factor of technologies, increasingly growing to the spiritualism of their theoretical approach. We now propose the biosynthetic interfaces expanded to *biocybrid* systems and ecstasy. But in the earlier form, we had already started postulating the trance*.* Our projects described in Section 3 analyze rituals in the passage from trance to ecstasy. We consider the "sentences" of the body movements, called *parakinemas*, which come to existence due to stimuli, whose basic components appear also in the Brazilian culture's rituals and myths.

In a general way, the point is to consider the myths and old ontologies close to the biocybrid systems, the reengineering of sensorium and the reengineering of nature.

2. Reengineering Nature – Biodiversity, Infirmity and Affectivity

Assuming the role pointed out by Louis Bec, we are engaged extremophiles, [7] working in the direction of a cultural and anthropological paradigm, and concerned with the planet's health. In the same way of ontological levels of creative reality and mutual influences with environment information related to the James Gibson's ecological perception theory (1986), [6] we investigate the ecosystem in its dynamical relations between human, animal, plants and landscapes.

The urgent attention to life in our country's huge territory calls for the extromophile creative attitude, facing the effects of an endemic infection of tropical climates as well as the challenges of the biomes in the Amazon Forest. We consider the infirmity of the territory and the human invasion and destruction of the ecosystem self-organizing defense.

We will describe two of the types of research we conduct: *Sapio – biodiversity, infirmity and affective geography* (Dengue infirmity and health care) and *Frogs' signatures: Pantanal Bioma in Amazonia Forest* (preservation of ecosystem and biological community).

2.1. SAPIO: BIODIVERSITY, INFIRMITY AND AFFECTIVE ECOSYSTEM

The System for the Acquisition and Processing of *Ovitrampas* Images (SAPIO) develops an automated tool for monitoring, fighting, and preventing *dengue* in creative extremophile actions regarding a human/environment/net, natural/artificial, remote/local and rural/urban structure in mutual contamination. Dengue ecological information analogous to the principle of the ouroborus mythic serpent, and self-regenerating emergent narratives about health care and dengue. Interfaces localize the ovitrampas,

special traps that collect the mosquito's eggs and reveal infestation tendencies allowing the prompt definition of control actions. The SAPIO project is aimed at obtaining and analyzing ovitrampas images, in order to automatically count the deposited eggs and to disseminate the collected information through the World Wide Web.

2.2. AFFECTIVE GEOGRAPHIES: INFIRMITY OF THE LANDSCAPES AND NEW ABSTRACTIONISM

Our Biocybrid cultural platform mixes people's life and behaviors to the natural physical environment, by using data collected mainly data from geography (GPS, Google Maps) and SIG regarding the infirmity of the landscapes. The processes are fundamentally different from photography and television used in Brazil, using tools such as data visualization, scientific methods of signal processing, web semantic and visualization of social nets, augmented reality and mobile devices using APIs for Google maps, Google earth, SMS, Blogs and Wiki Maps. Learning and teaching about the epidemic mixes experiences in the physical world and in the digital environment, with collaborations and reciprocity. The co-location in the virtual and physical environments makes virtual worlds reengineering physical world. They share the responsibility and affection to the landscape, meanwhile the Art History, in the domain of the new abstractionism is enhanced by signals processing, data visualization, satellites eyes, computer vision, and other synthetic systems. The CyberAdams and health care reengineer reality.

2.3. FROGS' SIGNATURES IN THE PANTANAL BIOME

In another line of research, we investigate the frogs' populations in the *Brazilian Pantanal* area, and explore the richness of information in the frogs' vocalizations. This sonic landscapes theme is the research focus of the PhD student André de Oliveira, enhanced by our investigations on data visualization and signal processing.The data visualization and sonification system in voice recognition and intelligent methods to analyzethe properties extracted from the frogs in Pantanal Bioma are summarized in Figure 1 (a). The automatic system will provide to the biologists the classification of species and the number of frogs living in that remote bioma which will replace the old and analogic ones.

In developing the biocybrid system and the simulation of the human proximity using wearable art and biosensors to act and actualize, by immersive synthetic biofeedback interfaces the data landscape – large data screen or cave, exemplified in Figure 1 (b) –and the manipulation of visual and sonic information, in dialogues with the distant *Pantanal* Biome. Metaphorically, we propose the frogs' signatures and the human behavior dealing with laws and phenomena of the cosmos, by influencing life of nature inside theworld as a living organism exchanging electrical potentials, heats, sounds and vibrations and the sense of presence being advanced by the technological apparatus and affective biofeedback for the responsibility of humans and a healthier territory.

3. Reengineering Senses – Biocybrid Systems and Expanded Sensorium

We develop microcircuits with sensors for the creative levels of performance and*coinaesthesia* – all the sense, to reaffirm the potential of affective aesthetics. Manufactured synthetic senses for enactions and synaesthesia [9] as filters for translating the intertwining of the body with the technological environment configure that perception as a laboratory phenomenon, as Krueger described in his "Redefining

Human". Microcircuits of wearable biosensors referenced in Maturana and Varela consider the interactions with the environment as sources of percepts, rather than mere representations and the body is involved in a neuropsysicophysiological way, with mutual interactions with the whole environment. [8] Physiology and synaesthesia are the two topics for biofeedback

3.1. SYNTHETIC SENSORS AND THE OUROBORUS PERCEPTION: THE SEAMLESS AND END-LESS AFFECTIVITY

The endless ouroboric principle of life, by Domingues, [2] with the mythic serpent eating its own tail and self-regenerating life, is expanded in wearable affective biocybrid systems. We invest in technological innovation regarding the miniaturization of hardware systems that have enabled the development of network sensor nodes, for interconnected wireless networks and assistive medical applications. According to Rocha, [11] thosesensors have the ability to detect or measure some phenomenon of nature, processing and transmitting data or information to other sensors. In our artwork the circuit is built in an intelligent network inserted in a set of accessories, which coupled to bodies configure the Biocybrid Wearable Art System (BWAS), exemplified in Figure 2(a).

3.2. THE PERIPHERAL PERCEPTION: EXTRUSION OF EYES AND COUPLED VISION

 What is vision now?

The recent anthropological biocybrid mobile condition amplifies the phenomenology of "being here" (Barthes), altered by the use of mob cameras of cell phones, and the locative and geographic interfaces. We perceive with three eyes, and no more only coupled to the mechanical eye of the photographic camera. In January 2011, we discussed, in the SPIE conference, *virtual reality reengineering reality* session [1] and the inclusion of synthetic objects in physic concrete spaces by mixed and augmented reality and computer vision. The system reaffirms the post biological extrusion of human vision, by the act of seeing shared with the satellite eye in the sky and the handled eye of the mobile device, expanding the human perception. Tags in AR placed in a GPS (Global Positioning System) and the possibility of geodesic coordinates create a co-located event for human body. The neuropsychophysyological perception expanded by data signals processing, geotags and computer vision alows interventions in urban life, using mobile augmented reality (MAR). The ecological geolocated art event *Borges Fantastic Creatures in Buenos Aires' streets* insert Synthetic creatures in the city.).The earlier *14 Bis* biocybrid system, celebrated Brasilia's 50th birthday, in a public event where the plane, invented by the pioneer Santos Dumont invaded the sky. In the Domotics field, we use the BWAS in connection to a specific environment (home, office, hospital or other), and the relations between the inhabitants and the space, as well inhabitants, patients and doctors etc.. Regarding biomedical applications, the relationship of distance between individuals is a relevant factor in the recovery of some diseases. The certain distance from other people or objects, and the invisible bubble of space which is the "territory" is one of the major dimensions of modern society are the approaches to LART PhD student Tiago Franklin Lucena in his Project *Cidadepathia.*

3.3. TRANSPHYSIOLOGY OF PASSIONS: EXTREMITIES OF THE BIOCYBRID CONDITION AND RITUALS: FROM TRANCE TO ECSTASY

In the same attitude of creative extremophiles, we focus on the expanded sensorium in data visualization and biosignals, reconnecting the body and its physiology to the rituals.The concept and operational

principles: 1) the body's schemas based on Rudolf Laban's corporeal graphics or Labanotations; and (2) kinestesia, always perceiving and processing data of human physiology and affective levels in scientific analyses of electric potentials and biofeedback using the BWAS. The kinesthetic Labanotation schema enhanced by the data visualization methods, in sensorial properties of synaesthetic biofeedback provide us the kinetography mixing the Kinemas, as a language of movement in a transphysiological dimension. Aspects of motion, electricity, graphic design, in data visualization and data sonification: body movements, translating graphics, gestures, postures, fragmentation, reinstatements, dynamics, internal-external connections and motor schemes, dealing with gestures, rhythms, not only at each stage of the movement, but also in consideration of what affects you, the environment and the coupled interior and affection in the flows of life with affective wearable sensors. The resulting concept fundaments the transphysiology of the Ecstasy is rooted in the concept of the Transphysiology of Passions and Trance, proposed by the supervisor of this research, Diana Domingues and discussed in the post doctoral research by Donato Cida / CNPq. The body's electrical potentials rising from ecstasy in Brazilian rituals such as the carnival and Afro-Brazilin religions as Candomblé and the shamanic trance differs of the ecstasy states. In the ceremonies that involve embodiments in deep levels of unconsciousness, the ecstasy and their sensations, emotions and thoughts, attempt the condition of transcendence, embedded in mediunic state. The internal excitations of the nerves and sensorial apparatus caused by the impression of the senses are translated in its transphysiology, where the sensorial and affective presence is measured. Laban's paradigm postulate that human movements are always composed of the same elements, whether in art, at work, rituals than in everyday life. Consequently, we search for a method with emphasis on the psychological and physiological aspects that lead human beings and electrical biopotential of a body, which in their combination produce states, qualities, actions and parallel motion feature psychic actions present in our actions – recognition in the form of rhythms and structures – the *poiesis* of a bio-cybrid body.

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ART AND THE EMERGENT IMAGINATION IN AVATAR-MEDIATED ONLINE SPACE

DENISE DOYLE

This paper presents a framework for what is termed 'the emergent imagination' (developed through a recent PhD thesis) that arises out of the transitional spaces created in avatar-mediated online space; and argues that the conditions for 'the emergent imagination' are best generated where the experience of space is heterogeneous and where the plasticity of time-space relationships is articulated.

Figure 1. Wanderingfictions Story as part of the Meta-Dreamer project at the Golden Thread Gallery, Belfast (2009) Digital Object. © Denise Doyle
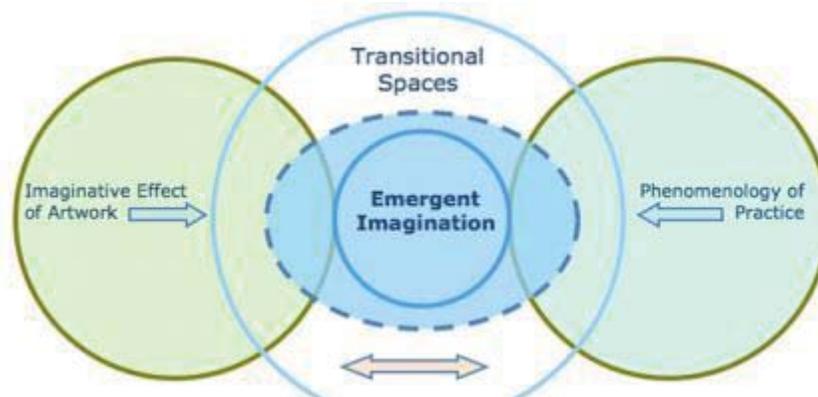
Figure 2. A framework for the Emergent Imagination (2010) © Denise Doyle

Far from the immensities of sea and land […] isn't imagination alone able to enlarge indefinitely the images of immensity? [1]

Introduction

This paper presents a framework for what is termed 'the emergent imagination' (developed through a recent PhD thesis) that arises out of the transitional spaces created in avatar-mediated online space, and it examines how contemporary notions of the virtual have changed our framing of the imaginary. According to Edward Casey, "imagination (in Western thought) is not securely situated in regard to such decidedly different acts as sensory perception and conceptual thinking." [2] Perhaps this is because, "imagining is easy enough to enact as experience, but it is extremely difficult to capture in midair for the purposes of scrutiny and examination." [3] This paper considers the importance of investigating imaginative experience in relation to the process of artistic creativity and practice and discusses the ways in which the 'virtuality' of avatar-mediated online space impacts on the 'reading' of the artworks created in the space itself. Referring to the heterogeneities of space explored in virtual worlds, the paper argues that whilst the virtual remains connected to time, the imagination becomes connected to space, and through this a new set of time-space relationships in virtual space can be articulated.

Avatar-Mediated Online Space

Since its inception eight years ago artists have been exploring the virtual space of *Second Life* where the act of creating is already mediated through technology. The *Kritical Works in SL* exhibitions were presented during 2008 and 2009 on Kriti Island, which acted as a laboratory space for ongoing artistic and imaginative practice research in *Second Life*. Central to the development of the space was the community of experimental artist practitioners who relied on a particular form of collaborative co-operation. The research began with a grass roots development from connections made within the space itself. As an artist-researcher, the main strategy was to create a presence on the platform and invite others to participate. Kriti was also a space for the presentation of the process of thinking in relationship to the key themes of the exhibitions, that of the imaginative potential of the space and the subsequent exploration of the relationship between physical and the virtual spaces. Following the realization of the exhibitions, interviews were conducted with six of the participating artists and analyzed for the artist's insight in the context of creating immersive and interactive experiences in the *Second Life* space. The accepted format of the artist's interview traditionally explores the tacit knowledge base of the artist's experience and draws out any impact on the artistic process. However, a further method was used for the analysis that exposed a previously unacknowledged layer of experience for evaluation, that of the phenomenological method of Imaginative Variation. In this approach, the interviews were analyzed to uncover the essence and meaning of an experience, in this case 'the artist's experience of being a creative practitioner in virtual space.'

What criteria can be used to examine and make sense of the array of artworks produced in *Second Life,* and how can the practice undertaken there in the lifetime of the platform be reviewed in the context of contemporary art or New Media practice? What modalities of art are being explored within the space? The concerns appear varied and multi-layered. There is the continuation of the contemporary arts discourse in the *Second Life* space, there is the anarchy of social engagement and participation, and there is the recreation of painted virtual spaces where the issue is either their ability to come to life, or the ability to do the unimaginable, to walk around and be immersed in pictorial space. This play of the

imagination incorporates the re-enactment of art and performance events. All of these movements and actions have come about on the *Second Life* platform during the last eight years.

Analyzing the Kritical Artworks

In his 2009 article, 'The Translation of Art in Virtual Worlds,' Patrick Lichty outlines a number of interesting questions with respect to artists working between the virtual, and what he terms the 'tangible.' He presents four modalities of art in which the modality "refers to the location and vector direction of the work's relation between worlds." [4] He suggests there are four modalites of art currently being produced in virtual worlds: the Transmediated, the Evergent, the Cybrid and the Client/Browser work. He explains:

This epistemological 'movement' within and between worlds has four basic structures; work that is essentially traditional physical art translated to the virtual, 'evergent' work that is physically realized from virtual origins, the virtual itself, designed entirely for the client/browser experience, and 'cybrids' that exist concurrently between various modalities. [5]

The transmediator, according to Lichty, "tries to align the tangible and the virtual," [6] and this movement is illustrated by the vector direction of the transmediated work from the physical world to the virtual world. According to Lichty, an example of work that is within this category is Marina Abramovic's *Seven Easy Pieces* (2005). A second modality of art are those built for the client/browser experience. The semiotics of these two modalities, the transmediated and the client/browser, are, as suggested by Lichty, "a straightforward affair." [7] The Cybrids, according to Lichty, "are less concerned with continuity, but are interested in the differences and distinctions between worlds and scales." [8] Both the Cybrid and the Evergent works demonstrate a "movement from virtual to tangible, which includes consideration of works existing in simultaneous physical and virtual components, [and] present more complex models." [9] This complex play within and between worlds, in particular "the enigmatic liminal works that live between worlds," [10] those spaces that are potent for the imagination, already demonstrate an array of creative potential in the *Second Life* space. My own project entitled the *Meta-Dreamer* (2009) could be considered to be an evergent work based on Lichty's proposition. Working with digital materialization expert Turlif Vilbrandt, [11] data was extracted from *Second Life* to create a digitally materialized object of my avatar, *Wanderingfictions Story*. By experimenting with digital processes and the type of material used, attempts were made to represent jade and clouded glass, amongst other textures. The end result can be seen in Fig. 1: the qualities of the figure are cloud-like and ethereal as though she (the meta-dreamer) is 'almost there.' [12]

The Emergence of Transitional Spaces

The vectors of movement of the four modalities of art described by Lichty can be considered to denote the directions and creations of meaning between the physical or tangible world, and the virtual world, and movements within and between virtual spaces themselves. These vectors of meaning are, in the Transmediated artwork, from the physical world to the virtual; and the vector movement of the Evergent artwork, is from the virtual to the physical or the tangible. A third vector can be placed within the virtual world space and denotes a circular and self-referential movement within virtual and imagined worlds themselves. A fourth series of vectors move between the spaces denoted as Cybrid spaces where connections and augmentations of artworks are multiplied and duplicated. However, these vector movements could also be considered to be that of the 'movements of the imagination' itself. If the

modalities of art and creation of imaginative effects are compared it appears that spaces in transition provide the movement where meaning is created. Through the research it was found that the imaginative effects created in the artworks and presented in the virtual world of *Second Life* arise out of four categories of transitional space: the surreal, the fictional/poetic, the emergent, and the spatio-temporal.

An outcome of the research was the development of a new framework for the imagination (presented in diagrammatic form in Fig. 2). 'The emergent imagination' can be seen to emerge from both the heterogeneities of space created in the imaginative effects of the artworks and in the artist's act of creating through a phenomenology of practice. The transitional spaces are at the centre of the framework itself and out of which 'the emergent imagination' comes into view. The conditions for the appearance of 'the emergent imagination' are seen both in the act of creation and in the outcome of the creative act itself. In the analysis of the imaginative effects of the artworks it was noted how the transitional spaces created suggest the presentation of space as a field of becoming. The heterogeneity of space created has at its base the multi-faceted experience of space and its changing relationship to time. Additionally, the phenomenological account of the artist's experience of creative practice in the *Second Life* space suggests a varied experience of embodiment and imaginative experience. [13] The wide-ranging accounts of the artists indicated the extent to which time, space, and time-space relationships were central to this experience. In the creation of the framework for 'the emergent imagination,' the experience of embodiment and the associated imagination of the senses may explain the visceral and material responses to the phenomenological experience in virtual space.

Time-Spaces of the Emergent Imagination

It is pertinent to consider Casey's description of imaginal space, imaginal time and the imaginal margin (following his first-person phenomenological study of the imagination) with respect to the framework for 'the emergent imagination.' In describing his experience of imaginal time, Casey writes that in the felt presence, "not only was there no single temporal matrix extending throughout [...] in each instance there was present a vague positioning of given items of content within a time span." [14] In describing imaginal space Casey writes, "in spite of their diverse and often truncated character, these varieties of spatial expanse were nonetheless intrinsic elements of the imagined content [...] for all such items of specific content are invariably presented as localized, if not strictly located, within imaginal space." [15] Finally, with respect to Casey's imaginal margin, it is described as, "the fading fringe found at the outer limit of specific imagined content [...] being almost entirely featureless, it cannot be given any definite location." [16] Echoes of the imaginal margin are found in the explanation artist Taey Iohe provides of her experience of allowing her mind to drift in the *Second Life* space, not knowing if she sees a half wolf or a half dog at the edges of the world as though she is describing the space of a dream or reverie. [17] With respect to Casey's study, there is no real sense of the positioning of an imaginative experience in time and this is also the same for space. There is no real geography of the imagination in a physical, locatable, Cartesian sense and this is reflected in the heterogeneities of space experienced in avatar-mediated online spaces. A field (rather than a geography) of the imagination may be a more suitable account of the experience.

Doreen Massey, in an essay responding to the work of artist Olafur Eliasson, attempts to illustrate a set of relationships between time and space by using a narrative account of a journey between Manchester and Liverpool. In the process of traveling she suggests, "if movement is reality itself then what we think

of as space is a cut through all those trajectories; a simultaneity of unfinished stories." [18] Further-more:

Space has its times. To open up space to this kind of imagination means thinking about time and space together. You can't hold places and things still. What you *can* do is meet up with them […] 'Here,' in that sense is not a place on a map. It is that intersection of trajectories. [original emphasis] [19]

If each space has a particular time, as Massey implies, then the transitional spaces that have been identified in avatar-mediated online spaces may also have a particular time attached to them. Not only, then, are there heterogeneities of space but also different sets of time-spaces that can also be located in the *Second Life* experience. The time-spaces of 'the emergent imagination' may also share their qualities with mythic time. Of mythic stories, Jay Griffiths writes:

[They] talk time out of mind, charm time and trick time, clogging it or stretching it: fables make time fabulously paradoxical, a stubborn blot on the face of clock-time but true to the time of the psyche, where past present and future are kaleidoscoped. [20]

Even Gaston Bachelard writes in the *Dialectics of Duration* of different levels of temporal experience:

As soon as we had acquired through mediation some skill in emptying lived time of all its excess and ordering the different levels of temporal phenomena into a series [we] saw that between this passing of things and the abstract passing of time there is no synchronism. [21]

All of these expressions suggest a plasticity to time as a lived experience, but also to the specificities of time-space relationships.

Conclusion

Sean Cubitt suggests that in online arts it is in the combination of a "spatialisation of time" and "the re-making of actual-virtual relations' that the peculiar ephemerality of online arts makes new sense." [22] The very notion that Cubitt expresses here is the very set of relationships discovered to be at the centre of a framework for 'the emergent imagination.' The analysis of the imaginative effects of the artworks presented in the two virtual (and physical) gallery exhibitions of the *Kritical Works in SL* project demonstrates a mode of artistic exploitation of the particular combination of user-generated and avatar-mediated spaces. These virtual, sometimes liminal and always transitional, spaces that emerge from the artworks are complex and multi-layered. A further analysis of a phenomenology of the practices of artists in avatar-mediated online spaces reveals that the imagination is experienced as embodied. A materiality to space is identified through an imagination of the senses that responds to the presence of the (imagined) body of the avatar. Here, the conditions for 'the emergent imagination' are best generated in avatar-mediated online spaces, where the experience of space is heterogeneous and where the plasticity of time-space relationships can be articulated.

This paper explored some of the philosophical implications of virtual worlds, through an examination of the concept of the imagination as that concept is seen in light of the pervasiveness of the virtual in our everyday lives. The thesis presented here posits that it is precisely in the generation of 'the emergent imagination' in avatar-mediated online spaces that we can best enrich our 'real world' lives, by applying

some of the emergent experience of the plasticity of time-space relationships and the heterogeneity of space itself to our lives in the world around us.

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NOSTALGIA TI FREGA

Carla Drago

Nostalgia Ti Frega is a photographic exploration of memory, identity and place that focuses on the emigrant community of a Sicilian village destroyed by an earthquake 40 years ago. This paper outlines the key influences across disciplines that have shaped the creative framework of the project.

Nostalgia Ti Frega, 2011, Carla Drago, photographic media, Copyright Carla Drago.

THE PROJECT

Nostalgia Ti Frega is a photographic project being completed as part of a Doctorate of Creative Arts at the University of Technology, Sydney. An exploration of memory, identity and place, the project focuses on the emigrant community of my father's Sicilian village of Salaparuta, destroyed by an earthquake 40 years ago. Aiming to capture a sense of the virtual space the village now inhabits, the project will consist of both digital and analog photographic objects: a limited edition set of photographs, printed on fine art paper, and presented in handcrafted wooden boxes will interact with a photo-book deployed on a tablet touch-screen device. Each printed photograph will be specially coded and, when detected by the digital photo-book, will unlock further, hidden content within it. As a digital object, the photo-book includes features that allow users in distant locations to comment on photographs and to curate and share their own chapters. Their engagement with the application will become part of the unfolding history of the village and its people.

The creative development of *Nostalgia Ti Frega* has drawn influence from several disciplines. Ideas around cultural change, including the effects of industrialization and globalization, the role of memory

and nostalgia in shaping identity; and the use of the imaginary within a shifting cultural context, are explored. The notion of the global village, including what it might consist of in a post-digital age, is a focus. Writing on haptic technologies and touch, and why these areas are increasingly important, has contributed to the creative framework, as has work in the area of material culture, particularly in relation to how objects relate to place and identity. Another important factor has been the use of user-centered design principles from the User Experience field of digital media. Developing out of the Human-Computer Interaction (HCI) discipline of Computer Science, UX principles are concerned with the effect (or emotional impact) on users when using digital products. Finally, the project also explores new approaches to storytelling, building on previous research that proposed a rhizomatic, nodal, non-linear storytelling framework specifically for interactive digital platforms.

THE VILLAGE

Salaparuta was a village of about 3000 people situated in the hills of Sicily's Belice valley, a few kilometres north of Santa Margherita di Belice and several kilometers west of Corleone. Like Santa Magherita, it had a castle and nobility, though after the reunification of Italy in the late 1800s and subsequent redistribution of land, the nobility left. Unlike Corleone, it was not a 'mafia' village.

The earthquake of 1968 was emphatic in its destruction. Several villages and towns were destroyed, 380 lives were lost, 1000 people injured, and 70,000 left homeless. With little local options available most of the population emigrated to Australia, Canada, the United States, and cities in the north of Italy. The rest camped in makeshift barracks and waited for new housing to be built nearby. Today the old village of Salaparuta is nothing more than over grown rubble; it is hard to distinguish where many buildings once stood.

As earthquakes go, the one that struck that winter was not a particularly strong one and, despite the tragic human causalities and destruction of property, did not come close to the catastrophic earthquakes Sicily's urban centers had experienced through history. However, unlike cities, which by their very nature are always in transformation and where destruction and redevelopment are customary elements and expectations of urban culture anyway, villages – usually understood as small hubs of human life in largely unpopulated landscapes – are very different entities. The entire physical presence of a village – its squares and meeting points, churches and cafes, thoroughfares and back-alleys – is intrinsic to how inhabitants socialize and interact, shelter from the environment and from strangers, and generally differentiate between the familiar and the unknown. In short, the physical space of the village is vital to an understanding of who, as a community, its inhabitants are and what their place, as a collective, in the world is.

While it can be argued that all spaces of habitation shape the identity of inhabitants, a village and its association with community, intimacy and belonging is understood to shape identity in a particular way. The notion of 'village' has in fact been used to understand and negotiate ideas around community and connection in many different contexts, from the destruction and redevelopment of urban landscapes, to the ability of mass communication to create a so-called 'global village.'

Traditional Sicilian culture is no different in this regard. The physical endurance of a village is a cultural reference point to the community that calls it home. It maintains continuity, is a reassuring anchor, and persists. So, when a village is destroyed and laid desolate, and, as in the case of Salaparuta, its people are scattered across the globe, what takes its place?

Even though not everyone from Salaparuta is directly related by blood, to be a *Salitano* means to be part of an extended family of *paesani* (villagers) and to be treated as such. This extends to descendants as well, so that a child or grandchild (or great-grand-niece-twice-removed) is considered a member of the village, even if they have never been there. Clearly, many years after its destruction, a sense of Salaparuta persists. The village is no longer the same physical place it once was (at least not an inhabitable one) but it is certainly something somewhere in the hearts and minds of its people. It is this 'something' and 'somewhere' that *Nostalgia Ti Frega* seeks to explore.

NOSTALGIA AND IDENTITY

In his 1983 essay on postmodernism and consumer society, Fredric Jameson argued that the formal features of the post-modern world expressed the deeper logic of its social system; namely that it had "begun to lose its capacity to retain its own past, [had] begun to live in a perpetual present and in a perpetual change that obliterated traditions of the kind which all earlier social formations have had in one way or another to preserve." [1] Jameson's view was that people simultaneously lived in age that was radically disconnected from its past, but paradoxically, because of a pervasive nostalgia toward this lost past, were unable to articulate or describe the present or the very nature of their own environment.

He was essentially describing an identity crisis – the collapse of an established order and the resulting cultural void from which anything was yet to emerge. This is not unlike the migrant experience of the villagers of Salaparuta. The loss of old identity, precipitated through a physical disconnection to the homeland; a disconnection, creating a pervasive nostalgia towards the past; and this nostalgia, in turn preventing the emergence of new identities, are all hallmarks of what many migrants experience when adopting a new country as their home.

Jameson does not offer any way out of the bind he identifies. Dubious of our ability to experience what he saw in the 1980s as impossible dimensions, he calls for our bodies to "grow new organs, to expand our sensorium" and waits to see what the "new architecture" will bring. [2]

Over two decades later, it is clear that identity has certainly moved beyond Jameson's postmodern stasis and is understood in ways suggesting we have indeed developed new dimensions. [3] Nostalgia too, rather than a stultifying, empty void, has grown new limbs, becoming something with the potential to enable hybrid, conflicting, previously impossible identities and histories.

In her 2001 book, *The Future of Nostalgia,* Svetlana Boym – an artist and migrant to the USA from the Soviet Union – dissects nostalgia into two prevalent types: "restorative," which seeks the return to an original state and the recovery of an absolute truth (and which she aligns with nostalgic quests for restoration prevalent at the end of the 20th century) and "reflective," which is a meditation on history and on the passage of time and perpetually defers a homecoming by cherishing shattered fragments of memory. "Reflective nostalgia does not pretend to rebuild the mythical place called home; it is enamored of distance, not of the referent itself. This type of nostalgia is ironic, inconclusive, and fragmentary." [4]

Reflective nostalgia sits neatly in Boym's artistic, Off-Modern art practice, "a detour into the unexplored potentials of the modern project." [5] While *Nostalgia Ti Frega*, is not a radical experiment in terms of artistic expression, as Boym characterizes her art, it does embrace the notion of reflective nostalgia as a

tool through which to understand the paradoxical, hybrid, complex identities of its subjects, the *Salitane,* and their homeland today. As Boym states, "For many displaced people from all over the world, creative rethinking of nostalgia [is] not merely an artistic device but a strategy of survival, a way of making sense of the impossibility of homecoming." [6]

MATERIAL CULTURE AND CONTAINMENT

Another focus of the project has been to consider the ways in which virtual ideas and emotions can be made manifest and expressed through material objects.

Part of this interest stems from the fact that photographs themselves, especially family photographs, are already objects that function in this manner. Historically, photographs and photographic objects have played important roles as repositories for both collective and individual memories, binding people to a sense of self and to each other. [7] Within Sicilian culture, photographs remain highly cherished objects with enormous emotional power. In the wake of the earthquake, when it was deemed safe to return to the village and recover what could be salvaged, photographs were considered highly valuable. They contained so many memories and emotions of lives now destroyed it is not surprising this was the case.

Photographs are also a potent example of how we use objects to understand ourselves and our relationships to others. In *The Comfort of Things* Daniel Miller demonstrates the manner in which people express themselves through their possessions, using them to both mediate interpersonal relationships and formulate a sense of self. [8] Greg Noble develops this approach in his work on the 'cumulative self' by considering the containers used to house our cherished objects. Specifically in relation to a shoebox containing photographs Noble writes:

The open-ness of the shoebox – [its] ability to function as [a form] of self-reflection and to undergo alteration – suggests that [it] be understood not in terms of containment as enclosure but as a form of containerisation, a holding together of objects for their safe transport. [It secures] the development of a stable but cumulative self because [it provides] both the mobilities and moorings necessary for ongoing existence in a complex world. [9]

Ideas around containment have clear synergies with reflective nostalgia – the ability for histories to be fragmentary and transformed by rearrangement, to offer more than one pathway, to move not in a single, straight, direction but inhabit many places at once. Given the evolving and emergent nature of the community at the centre of *Nostalgia Ti Frega*, incorporating technologies of containment into the project is a way to cradle the ever-shifting community identity, and also participate in its formation. Moreover, it enables the analog/physical aspects of the project (the wooden shoe-box) the ability to provide an emergent story experience, one the digital photo-book application will similarly provide.

POST-DIGITAL, POST-ARTIFACT

Rapid developments over the last two decades in telecommunications, digital technology, and interactive media, mean that people and communities can now connect in new ways. Identity and belonging are increasingly mediated through connections that take place in 'virtual' space and photographs are playing an important role in these connections. [10] *Nostalgia Ti Frega* takes its place within this digital

world by being presented, in part, on a tablet touchscreen digital device. Like the box for physical photographs, the tablet serves as a 'container' for the digital application. The size and mobility of tablet devices make them especially suited for this.

Importantly, tablet devices are heralding an interface paradigm shift away from the mouse towards touch – as the mouse transformed the possibilities of user interfaces, so too will touch and gestural interaction. Tablet-touch devices are relatively new, and innovative examples of narrative photographic applications for them still relatively rare.*Nostalgia Ti Frega* will explore the potential these devices offer, both from a user interaction point-of-view, and in relation to dynamic non-linear story experiences, ones that users themselves are able to contribute to. Incorporating ideas from reflective nostalgia into the user experience design, the application will be a platform where content can be transformed and re-arranged, story progression will not be singular or linear, and multiple-versions of the same story are possible.

This intent also neatly extends previous research completed as part of Masters studies in interactive multimedia. There, drawing correlations between 'experience,' as understood by information architects, and 'story,' as understood by film and television practitioners, I highlighted the importance of storytelling in the design of interactive forms of media, especially in contexts where traditional forms of storytelling were no longer as compelling. Using the concept of Rhizomatics, as described by Deleuze and Guittari (and taken up by others) as a basis, I suggested that an active and participatory experience design in digital interactive contexts be informed by non-linear methodologies of narrative. [11] *Nostalgia Ti Frega's* conceptual framework, informed so heavily by ideas from reflective nostalgia and containment, is an opportunity to experiment with this approach.

However, while digital technology has changed the types of social connections and stories we can now experience, we, and our world, are still physical entities. We exist in and in relation to a material world, and, as significant as our virtual connections may have become, our material context is still present and, crucially, still significant. Carol Wilder has speculated that our resistance to digital technology is because the experience of what we perceive to be more 'real' is more valuable to us than the experience of the high-tech. [12] Sherry Turkle goes even further in her 2011 publication, *Alone Together*, surmising that technology's increasing domination of our lives threatens to make us less human: "Under the illusion of allowing us to communicate better, it is actually isolating us from real human interactions in a cyber-reality that is a poor imitation of the real world." [13]

Creating a photographic work that embraces the potential of digital interactivity, while also keeping a firm anchor in the realm of the material, is a timely project. As such, the project – both digital and analog aspects of it – sits firmly within the paradigm of what Craig Mod has termed 'post-artifact': "ethereal and networked, emerging publicly in fits and starts. An 'artifact' complete for only the briefest of moments. Shifting deliberately. Layered with our shared marginalia. And demanding engagement with the promise of community implicit in its form." [14]

Ferdinando Sciannia, one of Sicily's most preeminent photographers, began his career by documenting the changing culture of his own hometown. In the 2002 retrospective publication of this work, *Quelli Di Bagheria*, he stated: "I believe that the ultimate ambition for a photograph is that it end up in a family album." [15] In many ways, *Nostalgia Ti Frega* can be thought of as a new kind of family album, one specific to a post-digital, post-artifact age.

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ARTISTS AS THE NEW PRODUCERS OF THE COMMON (?)

ATHANASIA DAPHNE DRAGONA

This paper examines a new form of creativity, based on the commons. Using two projects organized in 2010 by the National Museum of Contemporary Art in Athens as case studies, it aims to define the features of this emerging creativity and to locate the challenges and changes formed for the creators involved in this process.

Paolo Virno writes that post-fordism is the era of the "communism of the capital." [1] The notion, which may be heard as a political (pseudo) paradox of our times describing a capital based on communality, is not a new form of utopia, however, it rather implies a new kind of accumulation and creation of value based on the expropriation of the common. Knowledge, information, affects, codes, social relations, the new 'artificial' common wealth, which is not inherited but is produced and shared by the 'posse' – the potentiality – of the contemporary multitude, is what is at stake and what is being capitalized today according to the Italian school of thought. Produced in the contemporary metropolsis and the networked spaces we have come to inhabit, the common is the multitude's strength and its Achilles's heel at the same time. Continuously becoming and constantly expropriated, being abundant, dynamic and diffused, it can only be understood as a derivative of a life in excess and a life open to appropriation and control. Therefore, the 'communism of the capital' is an oxymoron expressing the controversies and questionings of the post-fordist condition. How can the multitude's capacities to think, to produce and exchange information and knowledge escape capitalization? How can they be reclaimed and by whom? If there is no longer an outside, as it is often being said, is there maybe a possibility for a change, which would derive from within?

This paper looks into the role of art in the years of the new common wealth. Taking into consideration the great number of projects which have been developed in the last decade and the references made to creativity in the context of the new discussion on the commons, a double-sided observation is attempted; not only on how forms of art encourage a swift of mentality towards the commons, but also on how the art world itself changes through this process.

The starting point for this positioning will be two projects initiated and curated by myself and organized by the National Museum of Contemporary Art, Athens, in 2010, the year when Greece started losing its financial independence. Seeking alternatives in the impasse of late capitalism, *Esse, Nosse, Posse: Common Wealth for Common People* and *Mapping the Commons, Athens* aimed to examine and locate the commons in their two main reservoirs, the Internet and the city.

Esse, Nosse, Posse: Common Wealth for Common People

Esse, Nosse, Posse: Common Wealth for Common People is an online platform launched in April 2010, as an open comment to the growing common wealth of the connected society. [2] The title is a reference to the Latin triad "I am, I know, I can," that having constituted the core of renaissance humanism, today interestingly reappears in order to describe the features of the contemporary multitude. [3] What is important is not only the knowledge itself but also our potential for its production and the formation of our subjectivities through it at the same time. Taking this into consideration, the online platform aimed

to refer –through a rich variety of artistic creation – to the motivations and capacities that form the new common wealth and to respectively discuss the controversies and risks lying behind it. To achieve this, *Esse, Nosse, Posse: Common Wealth for Common People* hosted: a) projects critically commenting on the new forms of networked wealth and b) initiatives and open platforms based on free and open software, encouraging exchange and collaboration. Selected texts were also uploaded as resources to provide a context for further discussion.

The issues tackled by the projects that were presented were the following: the passage from the fordist to the post-fordist society and the transformation of labor (*First of May* by Marcelo Exposito), the immeasurability of the immaterial work conducted in the networks (*User Labor* by Burak Arikan and Engin Erdogan), the new forms of online labor based on virtual sweatshops (*Invisible Threads* by Jeff Crouse and Stephanie Rothenberg; *Gold Farmers* by Ge Jin aka Jingle) or on crowdsourcing (*Bicycle Built for 2,000* by Aaron Koblin and Daniel Massey; *re_potemkin* by .-_-.), the call for a free exchange of knowledge beyond copyrights (*Free Culture Game* by Molleindustria; *Perpetual Wall* by Dimitris Papadatos), the interweaved character of the networked economy (*All Over* by Samuel Bianchini), the imbalance of the information society (*Internet Art for Poor People* by Carlos Katastrofsky; *MAICgregator* by Nicholas Knouf), and the value of attention economy in territories of info-noise (*Falling Times* by Michael Bielicky and Kamila B. Richter).

While the above works were discussing the capitalist character of the networked condition, the platforms, that were also introduced, invited users to join efforts of collaboration, co-production and knowledge sharing. Initiatives by collectives with significant work in the field were listed, such as: Furtherfield, who encourage people to recycle their old laptops by offering them to the homeless (*The Zero Dollar Laptop);* Platoniq, who propose a platform of exchanging services (*The Bank of Common Knowledge*); or Mediashed who propose that people communicate their low cost products through their database (*Gearbox*). Escaping capitalization, control and appropriation, these efforts propose to users a different mode of engagement and production in the networks. At the same time, projects with a more specific character were also included. Such as the platform of Anders Weberg (*P2P Art*) who invites people to participate in the creation of an ephemeral common artwork based on peer-to-peer logic, or Brett Gaylor's *Open Source Cinema*, which invites users to upload and remix the videos online. The Artzilla team has also been included for its web browser modifications and subversions that support freedom and openness, along with the Shiftspace group who, in a similar approach, propose the placement of open source layers above any website. In addition, the network Kate Rich created for the fair trade of products is presented (*Feral Trade*), as is Dmitri Kleiner's *Telecommunisten* network, which offers tools and services that are owned by the workers themselves.

A new utopia or a breakthrough in the networked world? This entity of projects is only part of an emerging creativity on the Web which is based on the idea of the commons. However, can we realize our potential and re-orientate our disposal for socialization and knowledge towards the new liberated environments the artists propose? We might be in the beginning of a shift in mentality, yet it should be noted that the initiatives and actions discussed in the context of this paper are not being valued on the basis of their popularity or 'efficiency.' They are considered noteworthy for the stance that their creators take. What lies behind them is a call, an urge for a new system of values that can empower the growing common wealth. These values are to be found not solely within the Web, but also within life itself and especially in its most lively terrain, which is the contemporary metropolis.

Mapping the Commons, Athens

Mapping the Commons, Athens was a cartography project that followed *Esse, Nosse, Posse* reflecting a need to trace the commons in the urban environment and to examine their role in times of crisis. The project took the form of a cartography workshop conceptualized by the Spanish collective Hackitectura, which was commissioned by and hosted in the premises of the National Museum of Contemporary Art, Athens in December 2010 . [4] The aim was clear: to map the city of Athens, restless and vulnerable as it was, according to its commons. The work was undertaken by an interdisciplinary group of artists and researchers from the universities of Athens, guided and supervised by Hackitectura; with contributions from artists, sociologists, scientists and theorists working on the field.

Seeing beyond the 'public' and the 'private,' the team sought for, examined and documented the different types of commons that were located in the urban environment. The elements of sociability, openness, sharing and accessibility were of primary importance during this exploration; special attention was given to peer-to-peer practices, community networks and forms of exchange economy. The entries enriching the cartography were decided and organized according to certain parameters related to the 'wealth' being produced, the community supporting it and the risks of its enclosure and exploitation.

The team successfully produced two maps: a research map, where all commons were described, categorized and located; and a video map where certain commons were developed into video case studies by the participants. Furthermore, a blog documenting the progress of the workshop was also created. However, the most important outcome of the project was the 'common' produced during the workshop itself; the knowledge that the community of creators, students, artists and theorists formed together while also building a common experience and imaginary.

Locating the features of common-based art

Taking the above works as examples, one can interestingly locate similarities that assist in recognizing the features of a new form of creativity which emerges on the basis of the common. The rich variety of works discussed – which may be categorized as net art, game art, software art; or as documentaries, interventions, databases and maps – all share a kind of openness and collectiveness which opposes previous ways of perception and evaluation in the contemporary art or new media art scene.

In an attempt to locate and summarize some of the main features of this creativity, the following points could be used as a start:

- The works, in their wide variety, do not constitute art objects or art installations; they present no certain aura and claim no art market value.
- They accordingly do not aim for the awe of the spectator; they do not impress by their aesthetics, technics or complexity.
- They claim no authorship and no uniqueness; their power is in their distribution and diffusion.
- They are not cryptic or ironic; on the contrary, they aim to be direct, understandable and reachable.
- They address the citizens and users of the cities and the networks and not specifically the art audience, the art institutions or the art collectors.

The aim of this growing entity of works seems to be no other than to socialize knowledge. They are works that, as Matteo Pasquinelli expressed it, belong to the age of "social reproducibility," [5] which

followed Benjamin's age of 'mechanical reproduction.' We have gone beyond the unlimited reproduction of artistic objects and the loss of the aura of the prototype. The challenge for the works of art is a new one; it is the challenge for a "unicity without aura" as Virno put it, for a "non-original unicity which originates in the anonymous and impersonal character of the technical reproduction." Art's new aim, he argues, is to find the relation between the highest possible degree of communality or generality and the highest possible degree of singularity, the balance between the most general and the most particular . [6] Are the works previously mentioned not a first step towards this direction as they refer to the common wealth produced by the general intellect on one hand and to the importance of the contribution of each singularity on the other? Is the presence of the artist's identity not lessened as works seek for a new balance between individuality and collectivity? Or rather between "multiplicity of individual expression and the unity of a collective will," between "singularity and solidarity, cooperation and freedom?" [7]

This realization, however, leads to the need for the second definition: who are the creators that seek this new balance expressed as a "unicity without aura" for their works and why?

Describing the creators of commons based art/the new commoners

Discussing works based on collectivity, openness and lack of authorship, it easily becomes clear that we mostly refer to creators who are leaving the role of the 'artist' and moving towards the one of the initiator, the collaborator, the affective worker, the networked creator, the hacktivist. Often, the creators might not even be artists. In their shoes there are programmers, architects, lawyers, social scientists, or generally people from different fields who see creativity as an invaluable tool of expression, communication and resistance. This is a new generation of creators who wishes to merge with the 'audience,' blurring prior boundaries and hierarchies. What brings them together is the virtuosity, the social competences and the affective potentialities they all have and use in their virtual and urban interactions. For Virno, who assigns to virtuosity a central role for the post-fordist way of being, and sees creativity as diffused today, "each and every individual is, *at the same time*, the artist performing the action and the audience: he performs individually while he assists the other's performances." [8]

But what does such a realization mean? Do artists still have a role to play or they fade in the name of a new common and radical approach of creativity?

At this point, one needs to pause and reflect on some of the fundamental ideas of the common wealth on one hand and on the actions of the creators being discussed on the other. "There is no commons without commoning," wrote Peter Linebaugh, highlighting the fact that besides the common goods, the social practices of a community are also needed. There is no commons without the commoners; these are the individuals that not only produce and share the commons but also establish relationships of solidarity between them and fight to reclaim the commons that have been enclosed. While Linebaugh refers to the 'Magna Carta,' the commoners of the medieval England and the land enclosures, one could interestingly juxtapose this sequence to the inhabitants of today's cities and networks with the enclosure of the common wealth produced. What seems to be missing, however, is the cultural memory of a prior different mode of being and sharing that the commoners of land had, reminding them what there was to be reclaimed. [9] Missing this element, an urge for a common imaginary appears that – replacing common memory – will be based on the realization of the multitude's potentialities and will offer the ground to step on in order to reclaim the surplus of the knowledge and information which is being en-

closed today. A form of this common imaginary is what the creators are building through their initiatives, activating through it the shaping of new communities and new commons. Seeing artists as the new commoners therefore is the first point that can be made regarding their contribution.

A second point can become clear while looking into the formation of the new common spaces that the artists are particularly proposing which are beyond control and exploitation. The online collaborative platforms, the databases of exchange or the workshops organized can be seen as the new interconnected spaces that allow communities of commoners to be formed, offering to the worrying and restless multitude a new home and a new ground for social encounters.

Thirdly, the creators today may assist the contemporary digital multitude by encouraging the use of the tools that we all already have in our possession. What we need today is to learn how to work with language, codes, ideas and affects; and how to build relationships through them. [10] We need the knowledge and information infrastructure that artistic creation seems to be able to provide while avoiding at the same time the appropriation of these tools on the web and in the city environment by third parties.

Finally and hopefully, through such a process a new system and a new theory of value can emerge, one which would express the desire of the multitude for a liberated connectivity. As life is in excess today, as work and life have become one, a new balance can only be found through creativity that embraces the ideas of sharing and co-producing.

Reclaiming a new form of exodus

Open, participatory and rhizomatic, the new form of art emerging based on the commons seems to have some of the features that media art did not reach before. It is a form of art that tries to assist, to engage with the audience and to share knowledge. It informs and encourages transformation; it takes responsibility and helps the multitude to overcome its fears.

Although this new form of creation could be related to certain movements of art history such as Dada, for its recycling practices and its negation towards artist's authorship, to Situationism for its refusal to copyright, or to the movements of institutional critique; yet the creativity based on the commons presents an interesting differentiation. It is not necessarily anti-art or anti-institutional. It alternatively takes a stance or a point of view that looks beyond the art system and the art world. The artists do not negate art or the museums' structures and hierarchies. They often choose to address to them and propose new forms of collaboration that will need to be based on new grounds of openness and sharing. They often invite institutions to enter a game based on openness and diffusion of information and to surpass the constraints of ownership and authorship that might have impeded such an orientation. They ask museums to join their efforts towards the commons by providing the audiences a context for art practices related to sharing, by encouraging and presenting creators' alternatives to capitalism, by assisting in the formation of new common places and common values beyond institutional walls.

Facing the impasse of late capitalism, the creators of the works that were discussed in this context, seem to ultimately aim for a new form of exodus. This exodus however can only come from within, by staying where we are and by expressing a collective will for a change. The idea therefore is to "pursue a line of flight while staying right here, by transforming the relations of production and mode of social organization under which we live." [11] For this reason, the efforts of the creators to reach out and communicate ideas, to overcome themselves as names and overcome art as art, assist in the formation of a

multitude of commoners that can achieve direct experiences of co-operation beyond exploitation. This is a value that is worth noting and supporting for years to come.

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RE-CONQUERING THE GAMIFIED CITY: AN OLD BATTLE ON A NEW URBAN GROUND

ATHANASIA DAPHNE DRAGONA

What does the notion of gamification imply for the urban environment? In the last few years, images of new adventurous cities have appeared which offer excitement, fun and socializing to citizens who are full of energy and desire for challenges, rewards and status recognition. Is this an expanded gaming territory or an unfortunate ludic decadence? This paper addresses gamification by looking into an old battle, situated between 'game' and 'play.'

In the last few years, a new challenge appeared for the inhabitants of cities around the world. Gamification, the strategy of applying game dynamics and mechanics into non-game contexts, reached the contemporary metropolises and created a new ludic layer over them. Challenges, points and levels have been integrated into the urban environment inviting citizens to act as players and compete for achievements, awards and status recognition. Designed by location-based social networking sites, the new motivations for urban exploration are based on two fundamental human characteristics: our sociality and disposal for play. Being rewarded "for doing new things and for making a better effort to be social," the players engage successfully not only with different everyday activities, but also with life itself writes Jane McGonigal, arguing that the application of pleasurable game elements can actually assist in restructuring society in better ways. [1] While, according to this line of thought, a great game-based future might be opening ahead of us, one cannot help being reserved when confronted with such positivism. On which grounds does gamification really stand? This short paper will aim to discuss gamification by locating the contradictions and misrepresentations connected to it on one hand, and by situating the potentialities for its surpass on the other.

Gamification is a term describing a process applied not only to the urban environment but to a wider range of sectors, such as those of health, education, labor and the Internet, with a common aim: to affect and manipulate human behavior for the favor of the market. Although McGonigal chooses not refer to the market but to praise the process as a decisive solution for the impasse of today's reality, most of the gamification supporters directly discuss the possibilities game-like processes may offer to generate more customers, more advertisements, more revenue. For this reason, since its beginning, gamification has been met with hesitation by scholars from the field of game studies. Described as "exploitationware," [2] or as "a tactic employed by repressive, authoritarian regimes," [3] gamification has been doubted for its aims and values. The world might have always resembled a game, but never before did this resemblance manage to make profit per se.

Complementary to this first argument, a number of logical points can follow regarding the sense and impact of applying game dynamics and game mechanics to urban life. Do we really need extrinsic awards, for instance, in order to wander around in the city and decide where to stop? Do we need extrinsic motivation to meet our friends? Is having our movements and interactions tracked, controlled and used by third parties worth it, for the fun of the game? Gamification has therefore received a lot of critique not only for the profit that it generates but also for the devaluation of human activities that it encourages.

In addition to the above, scholars doubt the influence of the integration of points and awards into a non-game activity and the characterization of it as a game; these elements are actually the less important aspect of a game they argue. However, either the game resemblance is accurate enough or not: the features and techniques used are sufficient to trace the revival of an old battle between two fundamental notions, those of 'play' and 'game.' By setting rules and constraints, by enclosing certain locations in the map while ignoring others and by limiting the citizen's openness and freedom of choice, gamification's preference towards the 'game' becomes clear. Or, to remember Roger Caillois, 'paidia' seems to be defeated by 'ludus,' as the "arbitrary, imperative and purposely tedious conventions" of the latter take over the gamespace and push away the "frolic and impulsive exuberance"; the "anarchic and capricious nature" of the former. [4] The formation of the new controlled city, seems therefore to be in complete antithesis with what the Situationists once envisioned as the playful city, or more particularly with what Constant framed as the 'New Babylon.'

What a sad reversal and a disappointing cancellation of the revolutionary ludic thoughts of the past, one could note while reflecting on the 'New Babylon.' What a swap in the use of technology: from a means of liberation to a means of control, from the city planned for 'Homo Ludens' to a city planned for playful work. The 'New Babylon,' a city for play, leisure and adventure, a city where work would be automated and man would be free as in a utopian city. However, no one expected such a realistic misrepresentation of it where 'Homo Ludens' would become again 'Homo Faber,' seduced by game gimmicks and fouled by the impression that the game like interfaces of technology could empower him over the city. Although Constant wisely predicted the exciting ludic behavior the advance of technology and telecommunications would bring, little could he foresee the expropriation that would also follow. A city of movement, based on dynamic relationships between citizens and the urban environment was realized, but based on the inhabitants' disposal, sociality and potentiality.

In reality, the new gamified cities perfectly fit into the context of the post-fordist metropolises, of the new city factories where the multitude lives. The contemporary cities based on our knowledge, information, codes and social affects are being gamified; inviting us to produce more, while collaborating and/or competing with our friends. Gamification is in perfect alignment with the new modes of immaterial and affective production. We produce as we play. We work as we interact. The new realistic perception of ludic cities is based on our capacities and potentialities. However, for this same reason, no dead end has been reached yet: gamification can be opposed and this is possible only by again embracing play itself.

While a gamified image of the city is being created by interfaces, a different documentation of the contemporary metropolis manifests playfulness as an immanent element of today's multitude. The fragmented, anarchical, diverse and incoherent multitude in times of crisis and transition uses play to express and highlight its opposition and resistance. Masks, movements, actions appear spontaneously within gatherings and demonstrations. "The anger of the protesters coexists with their joy in the carnival," as Hardt and Negri note. "The protests are carnivalesque, not only in their atmosphere but also in their organization," which shows an enormous capacity for innovation; innovation to transform reality itself . [5] To see this image one needs to turn from the mobile interface to the image of the square, from the controlled gamespace of the market to the reclaimed public space of the city. The anarchical, impulsive elements of paidia are apparent; one only needs to set his eyes on the practices of the urban players around us. At stake today, therefore, are the potentialities of today's players/citizens, which can easily be used for the profit of the market through game like interfaces, or for the benefit of the common through tactics of playfulness. For the latter direction, players/citizens need to realize not only the set of possibilities offered in today's city gamespaces but also the ways value can be generated and exploited with their involvement.

In other words, we need to keep going back to understanding the rules and constraints of the 'game' and to being critical and playful at the same time. Else, the gamified corporate reality will slowly abolish common play. At that point, we might even be driven to a manifestation of a call to "Never Play" following the "Never Work" of the Situationists as a form of resistance, as McKenzie Wark writes in his latest book_. [6] Could we prevent the ultimate ludic downfall of our times?

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BIOSENSING AND NETWORKED PERFORMANCE WORKSHOP

Anna Dumitriu

The Biosensing and Networked Performance workshops led by Anna Dumitriu and Tom Keene enable participants to build and calibrate their own iPhone compatible Galvanic Skin Response Sensors (GSR), which enable recording of subtle changes in the user's emotional arousal. Participants then collaborate to develop a networked performance that engages with the ethical implications of disclosing such personal information within the public realm.
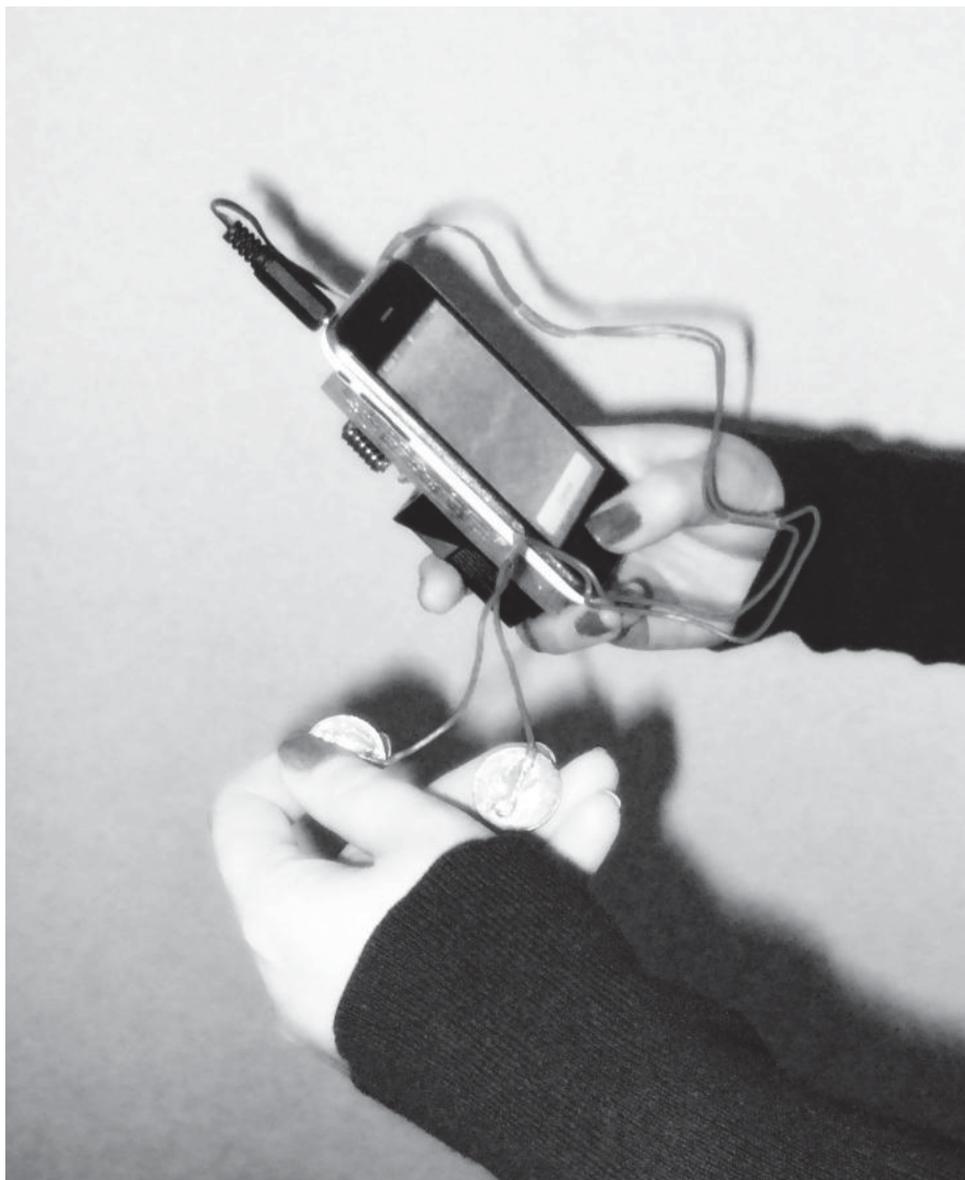
"Biosensing and Networked Performance" by Anna Dumitriu & Tom Keene, materials: electrical components, smartphone. Photograph copyright Anna Dumitriu.

Participants learn to solder and connect their own GSR sensors, connect them to their iPhones and share their sensor data online. The workshops create a framework for debate around the of the implications of new social networking and pervasive computing technologies and the increasing issues of privacy as, increasingly, our most personal details can be recorded and shared. Finally participants work with the workshop leaders to improvise, plan and rehearse an intervention performance work that is be performed at the end of the workshop. This performance may be very subtle and not immediately obvious to any (unwitting) audience members that may be around, playing with ideas of what we do and do not reveal to those around us both in the physical and digital sphere.

The project builds upon artistic research undertaken by Anna Dumitriu in her role as artist partner on an EPSRC funded project "Supporting Shy Users in Pervasive Computing" working with an interdisciplinary team of sociologists, computer scientists and human-computer interaction specialists at The University of Sussex. The project is investigating how pervasive computing is changing the ways social interactions occur, how we are becoming socially present in an increasing number of ways (sometimes without even realizing it), what our digital presences say about us through the data that is being recorded and how that data can be used.

Whilst in some ways technology may enable a reassuring sense of invisibility and anonymity (in terms of creating digital avatars and being able to use false names) it can also lead to obsession with self-image, fears about how one is perceived and confusion about how to present oneself or how to behave. This can lead to a feeling that there is a need to 'perform' and a sense of being laid bare, even provoking a form of 'stage fright' as described by sociologist Susie Scott an investigator on the project:

"…feelings of shyness arise when one perceives oneself as relatively incompetent at interaction, and fears being exposed as a poor team player. If we anticipate that we will say or do 'the wrong thing' and face embarrassment, surely it makes perfect sense to defend oneself emotionally by remaining quiet and avoiding the spotlight of a front-stage performance." (Scott, 2006)

Interactive digital art is a useful example of a piece of technology that is intended to promote high levels of engagement but can often evoke feelings of shyness in visitors, as the works presume that visitors are actively engaged and willing to 'find their own ways' through a work and explore how to playfully interact with it. Ironically sociologists' findings from this large-scale project show that the *majority* of visitors feel they lack the competence to actively engage with interactive art (and this includes artists and gallerists), especially in front of others that they perceive to be more confident performers. Intimidated, they tend to feel that there is a set of rules that others are aware of and that they do not have access to. So they prefer to fade in to the background rather than let the side down by failing to perform 'in the correct way'. Scott argues:

"Shyness is a normal, socially intelligible and communicatively rational (Crossley 2000) response to dramaturgically stressful situations. Shyness involves a feeling of relative social incompetence: of 'not knowing the rules' of social situations, as if there is a 'right' way to manage them. This is accompanied by a perception of 'Competent Others' around oneself who do appear to understand these rules and seem better equipped to perform appropriately. When faced with this risk of 'getting it wrong', being embarrassed, being scrutinized and judged by a critical audience, inhibition makes absolute sense as a dramaturgical response." (Scott, 2007)

In response to this research, the Biosensing and Networked Performance workshops seek to engage participants not only in the hands on building of the technology they are working with but, importantly, in the creation of a set of rules that will be used to generate new performance work of their own making.

The simple biosensor device used in the workshop is a Galvanic Skin Response sensor (made using easy to find components and a 'hardware hacker' approach) that measures the electrical conductance of the skin and can be attached to a wearer's finger to measure subtle changes in sweat levels. Sweat glands are controlled by the sympathetic nervous system so skin conductance is a useful indication of fluctuations in psychological or physiological arousal. The data produced by the device is then input into the iPhone via its headphone socket and uploaded to an online sensor data sharing facility using a method developed by Keene.

As arousal levels reach certain thresholds they can be used to trigger text messages and other outputs via a software interface written by Alex May (based on work done by Eskindir Asmare as part of the wider research project). These text messages are part of a predetermined script for a generative performance written by the workshop participants. Based on the GSR data from one member of the group, the others can enact various 'flash mob' style behaviours. For example members of the group may drop their knees in unison on receiving a certain text message cue, others around them having no idea what the trigger for this was. However actions may be far subtler such as participants yawning in unison or even just touching the corners of their eyes, almost imperceptibly. The rules, the behaviours and the text messages are invented as part of the workshops.

In many ways the idea of sharing your emotional states online is a difficult issue. Technically GSR is not an ideal method. The only genuinely effective method for scientifically describing emotions is functional magnetic resonance imaging (fMRI) and this is not in any way portable. But the most problematic issue is already with us: pressure from others to subscribe. It is already the case that some employers insist that employees register with location tracking systems such as Google Latitude. Not only that but parents also use the same software to track children and partners to track loved ones. It is difficult to extricate oneself from being tracked if it is not desirable. How do you tell a loved one 'I no longer wish you to know where I am"? It would be even harder to say 'I no longer wish you to know how I feel' even if at the start of a new relationship you enjoyed sharing every inner secret, this may not always be the case.

Reflection on key issues around developments in pervasive computing is central to the development of the work and the workshops consider what the future possibilities and implications of ubiquitous biosensor data sharing might be; they look at what ethical issues need to be considered; how technologies impact users on a personal level? (This includes the impact on "shy users") and what the technical difficulties of implementing the automated sharing of emotions via ubiquitous technologies are.

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COMMUNICATING BACTERIA

Anna Dumitriu

The *Communicating Bacteria* Project combines bioart, historical textile techniques and 3D mapped video projections to explore new research currently being undertaken in the field of bacterial communication, to engage a wide audience in the field and increase debate and understanding of this potentially new form of infection control. The project is funded by The Wellcome Trust.
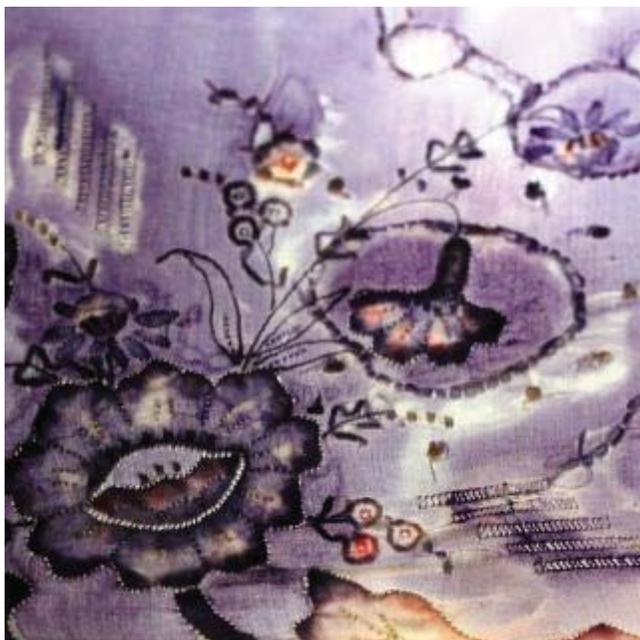
"Communicating Bacteria" by Anna Dumitriu, medium: antique embroidery, contemporary embroidery and bacterial pigments. Photograph copyright Anna Dumitriu.

Bacteria have intricate communication capabilities, for example: quorum sensing (voting on issues affecting the colony and signaling their presence to other bacteria); chemotactic signaling (detecting harmful or favorable substances in the environment); and plasmid exchange (e.g. for transfer of antibiotic resistance genes). This is now being investigated as a form of social intelligence as it is realized that these so called 'simplest' of life forms can work collectively, obtain information about their environment (and other cells) and use that information in a 'meaningful' way. Using signaling chemicals such as *Homoserine Lactone*, the bacteria pass on messages to nearby cells, which can be either part of their colony or other living cells (including eukaryotic and plant cells).

The project is led by artist Anna Dumitriu; in collaboration with microbiologists Dr Simon Park and Dr John Paul, and video artist Alex May. Dumitriu's long-term artistic practice is focused around microbiology and collaborative practice. *Communicating Bacteria* [1] builds strongly on her earlier work – including *Cybernetic Bacteria 2.0*, a digital media installation presented at ISEA 2010 – and current role as artist in residence on the on the UK Clinical Research Consortium *Modernising Medical Microbiol-*

ogy Project at The University of Oxford, Nuffield Centre for Clinical Medicine, which looks at the changing face of medical microbiology in light of the possibilities of (near) real-time genome mapping of bacteria and developments in bioinformatics.

The importance of the public understanding of microbiology cannot be understated. Many businesses play on public fears in order to add value to their products, while newspapers and TV shows fill our minds with images of bacteria as armies of tiny monsters ready to attack unless we buy some new hand wash or detergent.

The infection control potential of interfering with bacterial communication and quorum sensing mechanisms is at an early stage, however it is known that:

This 'census-taking' enables the group to express specific genes only at particular population densities. Quorum sensing is widespread; it occurs in numerous Gram-negative and Gram-positive bacteria. In general, processes controlled by quorum sensing are ones that are unproductive when undertaken by an individual bacterium but become effective when undertaken by the group. For example, quorum sensing controls bioluminescence, secretion of virulence factors, sporulation, and conjugation. Thus, quorum sensing is a mechanism that allows bacteria to function as multi-cellular organisms. [2]

Therefore, the ability to block the receptors that receive quorum sensing signals would lead to bacteria that are no longer able to turn on those processes. To be able to block the expression of virulence factors (such as bacterial toxins) would render highly pathogenic organisms far less dangerous. Further down the line an understanding of the exact signaling mechanisms might even lead to the possibility of directing the behavior of bacteria.

The *Communicating Bacteria* Project involves the development of a body of new work, including: textile designs stained with dyes made from bacteria that change colour depending on the behaviour and communication of bacteria, crochet patterns based on bacterial responses, interactive interventions that are modeled according to behavior and communication between bacteria, and a series of hacked antique whitework embroidered pieces created using genetically modified bacteria.

Textile art has a long history of communicating difficult and complex stories and ideas, from the Bayeux Tapestry to the AIDS Memorial Quilt. The soft qualities of the fabric and the skills of the makers help to reach out to a wide audience of all ages. Dr Simon Park had previously created a number of previous works involving the staining of cloth with bacterial pigments (and slime moulds) and his expertise and inspiration was integral in the development of this project.

The antique whitework (white on white) embroideries are worked in to by hand with delicately stitched images of bacteria and communications networks. Dumitriu's modern stitches are far heavier handed than those of the original makers, creating an interesting juxtaposition. Additional patterns are created using a genetically modified strain of*Chromobacterium violaceum* called CV026. *Chromobacterium violaceum* is white in its natural state but turns purple when it receives a communication; but, since bacteria grow in colonies and individual bacteria are continually sending and receiving signals it always appears purple. However, the CV026 strain is effectively mute. It can receive a chemical communication signal but cannot send one, so it only turns purple in the presence of a communication from another bacterium. When exposed to unmodified *Chromobacterium violaceum* it slowly turns purple as the chemical signal spreads.

Around the time of the enlightenment, the perversely difficult practice of whitework embroidery was considered to be one of the highest levels of achievement for a woman. They would sew in the evenings by candlelight, straining their eyes to see the tiny stitches, hunched over their embroidery hoops, their bodies twisted and constricted by tight corsetry, one pinprick of blood meaning the whole piece would be ruined. This coincided with the period in which many of their male counterparts started to become 'gentleman scientists' and to rigorously study the world around them 'scientifically.' This was the time when the scientific method was developed and disciplinary boundaries were drawn between art and science. By juxtaposing whitework with her scientific practice, Dumitriu considers these paradigmatic changes in the process of research and current moves towards transdisciplinarity, alongside a consideration of what 'feminine' approaches to science might mean.

Central to the installation is a stunning antique Edwardian whitework dress, with Dumitriu's additional stitching and a purple pattern created by the process of bacterial communication. The dress was laid out on a one meter square agar plate (a makeshift Petri dish from a DIY centre normally used for mixing concrete and sterilized with ethanol), inoculated with CV026 and left to grow, be absorbed into the fibers and travel along the fine stitches. After a day or so of incubation the white CV026 was exposed to the *Chromobacterium violaceum* and the communication signal traveled across the fabric as the white bacteria turned purple. This process was filmed using time-lapse photography and the resulting film was projected, using 3D video mapping technology (developed by Alex May) across the dress and related objects within the final installation. The dress having been dried, sterilized and made safe.

The project continues to be developed and work is now being undertaken to develop methods to exhibit the process taking place live and run participatory sessions working with the team. This entails the development of a modular Category Two bio-containment facility that can be constructed within art gallery settings, whilst fully conforming to health and safety requirements and enabling a much deeper level of engagement and understanding of these complex microbiological processes through a powerful and experiential artistic approach.

References and Notes:

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2. *Bonnie Bassler's official website at Princeton University,* http://www.molbio.princeton.edu/index.php?option=content&task=view&id=27 *(accessed June 28, 2011).*

THE EMERGENCE OF CONSCIOUSNESS

Anna Dumitriu

The Emergence of Consciousness project is an artistic investigation of the scientific study of consciousness and the possibilities of 'machine consciousness' through the use of performance art and digital media. Dumitriu worked with sensory and movement deprivation (e.g. blindfolds, physical restraints etc.) and augmentation, in an attempt to take on the role of a robotic agent herself and try to understand what it *feels* like to be a robot.

"The Emergence of Consciousness" by Anna Dumitriu, performance with Bondage tape, lidocaine, robot, earplugs and digital projections, photograph copyright Anna Dumitriu.

The issue is that we tend to think we know what a *conscious* experience is and our inner mental lives are filled with assumptions about the conscious experiences of others, we believe we know how they feel and we assume they have some insight into what how we feel. We have what's known as a "theory of mind" and are able to identify other "minded" subjects. But these abilities are set to be thrown into question as developments in artificial life (AL) technologies lead to the potential to build robots that give the impression of being "minded" in some way. Thomas Nagel's paper "What is it like to be a bat" suggests that it is not possible for us to imagine how it would feel to be a bat because bats use sonar to navigate their world, something we could not imagine as we have no understanding or experience of it. However technological advances may offer us limited access to "new" senses, even in the short term and we can learn to incorporate them, perhaps enabling new insights. An example of this is the "Enactive Torch" built by Tom Froese and Adam Spiers, which: "provides the user with one continuous channel of vibro-tactile feedback to the hand, where the strength of stimulation depends on the distance to the object which is currently pointed at. The distance is measured using an ultrasonic sensor."

Working closely with researchers from the Centre for Computational Neuroscience and Robotics at The University of Sussex during her artist's residency there Dumitriu investigated notions of what "conscious

experience" might mean for a robotic agent in contrast to a human (the artist herself). The project, which was created as part of the London 2012 Cultural Olympiad is inspired by perspectives of embodiment as characterized by Francisco Varela, Evan Thompson and Eleanor Rosch, and situatedness as applied to evolutionary robotics by Rodney Brooks. This research was used to develop a new work, which was performed at Lighthouse in Brighton in July 2010. For the piece Dumitriu attempted to take on the role of a robot agent by reducing (as much as humanly possible) her sensory input down to that of her collaborator a medium sized robot whose only interaction with the world is through its limited sensors and wheels). Working with an assistant (Luke Robert Mason) her ears were blocked with earplugs, her head and body were wrapped in thick black bondage tape to block out her vision and restrict her movement and her skin was coated with Lidocaine cream (local anaesthetic). She was given a walking cane to sense her world with (as suggested by Dr Inman Harvey as being a close analogue for the robot's sonar. In the performance the robot attempted to find the centre of the room using a control system evolved using a genetic algorithm and a single sonar sensor, Dumitriu attempted to find the centre of the room using her remaining sensory capacity and a counted the paces she took to get from one side to the other. The robot method is faster in this case and the Dumitriu's very human approach is a demonstration of the incommensurability between artificial and biological life but nevertheless the work demonstrates clearly just how different 'machine consciousness' might be. These ideas were also brought out in digital projections to accompany the performance created artist Alex May.

Taking on the role of a robot agent is not a trivial process. The idea that a robot phenomenology is something that we could access is a contentious and flawed idea, however, an attempt to mimic the phenomenological experience of a robot should be of interest. The possibility of impoverishing the artist's sensory experience to that of a robot is not achievable and neither is the idea of an artist replicating the functionality of a wheeled robot through her own physicality. However the ongoing performative experiments reveal to both the wider public and to invited scientists and philosophers many of the issues inherent in developing machine consciousness, potentially revealing new insights whilst acting as a form of public engagement in robotics research.

In her experiments Dumitriu has attempted to enact "robot experience" with particular focus on Francisco Varela's work on how a robot might be considered to "mindfully" interact with the environment in which it is embedded. It focuses only on the sensor data it can receive and react to and not concerned with the floods of thoughts and emotions that fill (and pollute?) our human minds.

The practical aspects of the project are important to Dumitriu's understanding and Dumitriu built the robot agent from scratch in collaboration with a robotics specialist. The wheeled robot has the capacity to take in a large number of sensory inputs but currently is just using sonar. It is important for the work that Dumitriu understands fully how the robot is constructed in order to deconstruct it psychologically for the audience.

The work done in the Emergence of Consciousness project is now being built on in Dumitriu's new collaboration with the University of Hertfordshire where she and fellow artist collaborator Alex May have been appointed as Visiting Research Fellows: Artists in Residence in The Adaptive Systems Group (since January 2011). They are now working closely with Professor Kerstin Dautenhahn and Dr Mick Walters to develop a series of speculative robot heads designed to provoke the audience to think about their feelings about the possibilities of living with robot companions. It asks the audience to consider the field of social robotics and what they actually want in robot companions; how they should look, move and whether they should appear to be humanlike or 'minded'. The first of these heads was exhibited at the Science Gallery in Dublin (April-June 2011) as part of their exhibition "HUMAN+ *The future of the*

species" and included a humanoid robot body built by the University of Hertfordshire with a head created using rear projection 3D video mapping and a hacked Microsoft Kinect that is able to take on the appearance of anyone looking at it (in group situations it creates a composite based on proximity). The idea is that users may prefer a familiar face but the work plays with the sense of the uncanny as users begin to recognise themselves (a disjuncture perhaps between the sensation that something is minded and the knowledge that it is not). The title of that head is "Familiar" and also references the idea of the 'witches familiar' (in mythology this is often a black cat), a creature which 'appears only at a time of need', 'can act on the witch's behalf' and 'can change shape'. Technology as witchcraft?

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UNNECESSARY RESEARCH, WHAT'S THE POINT?
Anna Dumitriu

This panel outlines "The Institute of Unnecessary Research"(IUR) and presents a new paradigm in the way artists are engaging with the world through transdisciplinary practices. It brings together art, science and philosophy by creating participatory audience experiences. Sometimes humorous and sometimes grotesque, our work pushes boundaries and critically questions the means of knowledge production in the 21st Century.

Artists are innovators, if a new piece of technology or a new medium, becomes available; artists want to try it, to experiment with it- from microbiology to robotics; from tissue culture to neuroscience. Some artists take on the role of a scientist in almost a performative way and some scientists become artists themselves. Philosophy and ethics is always at its core and the work unpacks the instrumentalization of science and art for commercial and political ends.

Forms of "connective aesthetics" (Gablik) are used to engage audiences in participatory experiences that extend and generate new outcomes through exhibitions and events going beyond simple interactivity, throwing authorship into question, as members of the audience are inspired to become Unnecessary Researchers in their own rights.

The IUR was founded in 2005 by Artist Anna Dumitriu following discussions at the "Rules of Engagement" Conference on the nature of Art and Science collaboration, held at York University, UK and organized by Arts Council England. The original 'blue sky' vision for the IUR was a major research facility where scientists were employed to work with artists, thereby avoiding the common situation of scientists' lack of availability/time when engaged in art/science collaborative projects. Scientists tend to view a collaborative art/science project as extra-curricular to their 'day jobs', whereas to an artist the collaboration is often key to their 'day jobs' in terms of being either a grant funded project, commissioned piece

or artists' residency. This inconsistency is one of the biggest hurdles for art/science collaboration to overcome, often far greater than issues, such as funding, audience engagement and linguistic incommensurability. Key to the notion of art/science collaboration are these reoccurring questions, "What is the purpose of it?" "What can an artist offer to science", "In terms of art, why engage with science at all?" "What levels of cross-fertilization should happen" and most importantly "what has art got to do with knowledge anyway?" The IUR attempts to work with these questions.

There are obvious financial issues with building a major research facility for artists to work with scientists (the IUR favours a underground facility carved out of a rocky island that can only be reached by boat or helicopter (for purely aesthetic reasons)) so it was decided that The IUR should initially be started as a hub for artists or scientists working a high levels of trans-disciplinary practice, strongly concerned with the philosophical implications of their methodolologies, interested in public engagement and practicing in ways that could be described as 'performative' in nature. A web site was set up in 2005 and a very low-key performance event took place in Dumitriu's studio above The Phoenix Gallery in Brighton, England. Since then the has project attracted wide interest and has grown form there, including further performances and interventions at Sussex University, The Whitechapel Gallery in London, ETH in Zurich and as part of many festivals.

The Institute of Unnecessary Research is now an international hub for researchers and artists working experimentally and deeply engaged with their specific research areas. We present our research through performative and experiential methods, engaging the public and new audiences in our ideas.

The IUR uses performance as a means of conveying research; often events have an interactive component, the audience taking part in experiments and research activities thus changing the direction, development and final outcomes of the artwork. Critical theorist Suzi Gablik discusses in her essay on "Connective Aesthetics" that the traditional relationship of the artist to the artwork has come to be superseded, and that this social role of art has become increasingly important, since there is:

".. a rejection of modernism's bogus ideology of neutrality. Many artists now refuse the notion of a completely narcissistic exhibition practice as the desirable goal for art". (Gablik)

Artists have now come to see the process as equal to, or even more important than the outcome, or the performance is more important than the documentation of it. So the means of production of the artwork as a dialogical and collaborative process is also the outcome of the artwork in this model, which is what makes it so relevant to Art/Science practice, it is an analogue of the typical, natural relationship of the artist to the scientist (and vice versa), the journey rather than the destination. Although not inherent in all Art/Science practice it would seem logical to include the audience in the collaboration, with their own vast tracts of knowledge and experience. Gablik states:

"..there is distinct shift in the locus of creativity from the autonomous, self contained individual to a new dialogical structure that frequently is not the product of a single individual but the result of a collaborative and interdependent process". (Gablik)

This influence of performative, dialogical aesthetics, which comes from the collaborative structure of Art/Science practice makes it a useful technique for reaching out to new audiences in a non-hierarchical way. But these forms of collaboration are not easy and require huge conviction, and effort from all partners involved.

The IUR mimics and subverts the Institutional model it is based on. There are various 'departments' each 'headed' by an unnecessary researcher. The 'department' names are created by the individual artists, scientists and philosophers and based on their personal research areas. When a researcher joins they come up with a 'department' name, if they leave (and the IUR is a dynamic group in this sense) it is likely that the 'department' is discontinued (at least for a while)

For instance the Head of Crockery resigned his role (from within the online cyber world Second Life in 2006), as part of a multimedia performance at Sussex University, the position of Head of Crockery currently remains unfilled.

There is no official selection procedure for department heads, unsolicited enquiries are responded to with a warning that selection procedures "are entirely nepotistic", in fact the IUR grows organically through increasing networks of international contacts. Current departments include: 'Projective Geometry' (Alex May), 'The Digital Simulacra' (Luke Robert Mason), 'Neuroplastic Arts' (Gordana Novakovic), 'Textile Abuse' (Bettina Shuelke) and 'Viral Contagion' (Tagny Duff). There are currently 25 departments across distributed locations and the project is directed and co-ordinated by Anna Dumitriu (whilst working on her own research interests which cross microbiology, artificial life, robotics and ethics).

The name "The Institute of Unnecessary Research" is, in many ways, confrontational. It raises the question what is necessary research? Unnecessary does not imply pointless, it often means going beyond the normal (in the Kuhnian sense of 'normal science') and crossing boundaries, asking where do we draw the line with what we study or with what can be studied? Unnecessary Research encourages eccentric, obsessive, creative working practices and is an antidote to the stranglehold placed on research by central government and the gatekeepers of academia.

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COLOURBLIND: MACHINE IMAGINATION, CLOSED EYE HALLUCINATION AND THE GANZFELD EFFECT

Alan Dunning & Paul Woodrow

The Einstein's Brain Project is a group of scientists and artists working together to develop installations and environments exploring ideas about consciousness and the new constructions of the body. Recent work has used strategies taken from paranormal science and psychology to explore how interpretation in shared machine-human environments contributes to the construction of our worlds.
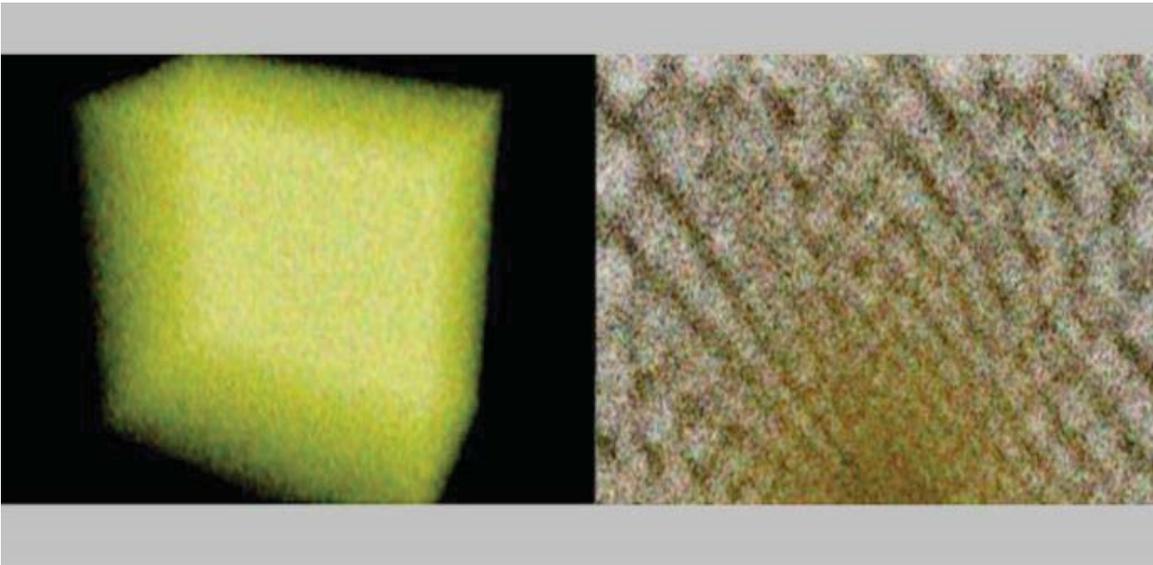
Fig 1. ColourBlind, 2010, installation View, © Alan Dunning
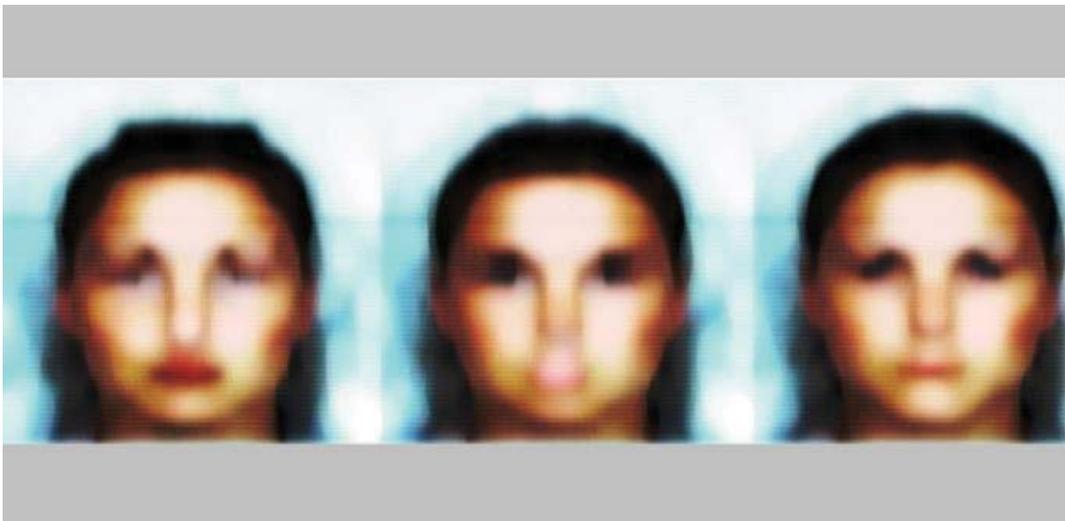
Fig 2. Doppelganger, 2011, installation view, © Alan Dunning
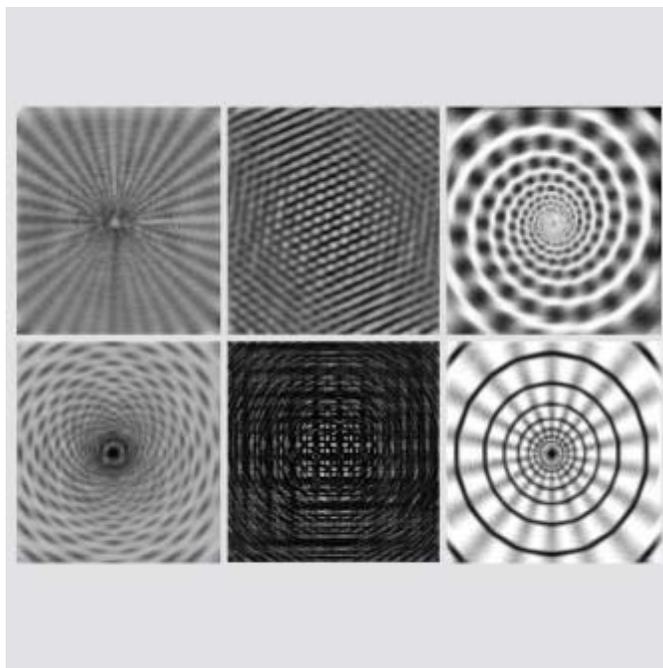
Fig 3.Typical patterns seen in CEH, © Alan Dunning

This paper introduces and contextualizes a series of new works – ColourBlind - that explores the internal workings of a machine through an implementation of the Ganzfield Effect and Closed Eye Visualisation insofar as they relates to ideas about hallucinations in human and machine hybrids. The work explores ideas about machine vision and how hybrid interpretation gives rise to unbidden and unexpected colours, images and patterns in streams of unstructured data, and how undifferentiated monochrome colour can affect interpretation imagination. Through an examination and analysis of visual system noise expressed as spatial temporal voxel volumes, the work explores these investigations as machinic hallucinations.

The Project's work is focused on how new representations of the body can conflate the virtual, symbolic and imaginary through the use of interactive performances, environments and installations that promote a high degree of disorientation and an awareness of the moment to moment construction of a self. Recent work has developed generative systems in order to reference ideas inherent in EVP (Electronic Voice Phenomenon) to examine ways in which we construct worlds, and bodies in worlds, through pareidolia - the psychological phenomenon involving a vague and random stimulus - often an image or sound - being perceived as significant, and apophenia - the seeing of connections where there are none.

This work has used, amongst other strategies, face tracking and feature recognition, to explore the felt presence of absent bodies, using intelligent symbiotic systems, comprising both machine and human vision and analysis, to reveal patterns – the shapes of faces, the sounds of voices - in apparently random visual and audio noise. These works explored the construction of a world delineated by presence and absence, and pattern and randomness, locating the body through a construction that is both machine and human.

In recent times the development and dissemination of computer generated imagery has made common-place constructed visual spaces that are fundamentally different from the mimetic and naturalistic representations of traditional media like painting, photography and film. But it is the increasing prevalence of machine and computer vision, and seeing machines, which has produced the most radical shift in the manner in which the world is perceived and constructed. This habitual employment of technological devices and programs has reconfigured both our conceptual and perceptual frameworks to the extent that what might be called natural vision is beginning to be superseded by machine vision. This suggests that vision is becoming disengaged from human needs and is now transferred to a technological plane.

The Project's exploration of hybrid perception and interpretation in shared machine-human environments concentrates on the idea that any visualization is a complex manifestation and indication of internalized machinic activity. In previous work we have been forced to acknowledge that our visualizations are constructs that are not uniquely related to the information that generates them. They are a complex hybrid of machine analysis, human interpretation, and scientific and artistic vision, which promotes a remapping of information beyond its immediate functional value. The drive to fill in the spaces opened up by those parts of an entity that resist their informational links, produces what we might only think of as false positives, but in doing so brings into focus acts of cognition that are inextricably linked to the building of meaning, the understanding of narrative, and, in turn, to the techno-subjective restructuring of the body.

The Ganzfeld (complete or open field) effect [1] is a phenomenon of visual perception caused by staring at an undifferentiated and uniform monochrome field of color. Usually this is accomplished by the subject wearing tight fitting goggles that block out all but one colour of the spectrum. In the 1930s psychologist Wolfgang Metzger, investigating gestalt theory, established that when subjects gazed into a featureless colour field they were unable to see anything after even a few seconds. In further experiments subjects that are immersed in the monochrome field for extended periods of time consistently hallucinated and recorded distinct EEG patterns of activity.

It is a well-known phenomenon with historical precedents in the followers of Pythagoras entering dark caves to gain wisdom through visions, [2] and in reports of trapped miners hallucinating and seeing ghosts. Similar experiences are often cited by Arctic and Antarctic explorers who report altered states of mind while traveling across large featureless landscapes. It is thought that the hallucinations in extended Ganzfeld experiments are the result of the brain amplifying neural noise in order to look for the missing visual signals, and it is this noise that is interpreted in the higher visual cortex, giving rise to hallucinations.

A ganzfeld experiment is a technique used in the field of parapsychology to test individuals for extrasensory perception. In the context of ColourBlind its similarity to scrying – an ancient system of revelation through prolonged observation of an object - should be noted. Martin Howse's experiments in scrying, in so far as they relate to our electronic environment and the revelation of a hidden city [3] have a particular resonance, as does Friedrich Kittler's exposition on the electro-mysticism of Thomas Pynchon's novels. [4]

In Closed Eye Hallucination an individual sees blobs, colours in motion and sometimes objects, even though the eyes are closed. Closely linked to the experiences of subjects in Ganzfeld experiments there are often patterns discovered within the blobs – most cited are webs, grids, honeycombs and other geometric and repeating structures. CEH experiences can take a number of forms: visual noise - seemingly

random noise of pointillistic light/dark regions with no apparent shape or order; light/dark flashes - regions of intense black or bright white that appear in the noise; patterns – highly organized motion and color forming complex geometric patterns and shapes; and finally objects and things.

In the ColourBlind works a camera is turned on, and covered with a single Ganzfeld goggle [5] and bathed in a pure yellow light. The only light passing to reach the camera's CCD is yellow light of 570 nm. The video stream is sent to a computer where the input is cropped and adjusted for fall-off at the edges of the camera so that the monochrome colour field is undifferentiated by tone or hue. The camera image is processed in Max/MSP to construct a voxel volume that is analysed for optical features within a specified region of interest. Tiny inconsistencies in the colour field, invisible to the human eye, false positives if you will, are tracked as they pass across 3 planes in the x, y and z dimensions of the volume. These inconsistencies are amplified and rendered as pixels on a video plane that becomes increasingly densely populated through additive blending. These pixels are streamed to a projection on the wall. Over time patterns gradually emerge as the video frames are accumulated and multiplied together. Two other screens show in turn the light that is seen by the camera and the voxel volume of data passing across the analyzing planes.

What starts as pure noise gradually resolves itself into patterns with structure and form. Sometimes these form rapidly, but usually these are the results of layers of noise blended together over long periods of time. The patterns that emerge bear a striking resemblance to patterns that are normally associated with those seen in closed eye hallucination and Ganzfeld effect experiments in which subjects stare at monochrome uniform fields of colour.

The inconsistencies in the field come from the image sensor itself, in part thermal noise, and in part amplified background electrical noise that is present in the system, but the work suggest some other possibilities. The installation is a generative, closed system. An algorithm looks for any disruption on a uniform field of colour, which is stacked additively on previous instances of disruption. Over time there are many, many instances of the tiniest of ruptures in the visual field that together begin to organize the previously vacant colour field. These patterns are nothing more than the chance interactions and collisions of one another, but our interpretation of them hint at an analytic that forms in the interstice between machine and body within pattern and information flows, as the brain's cenophobic response to absence and randomness.

Earlier work used ideas found in Electronic Voice and Video Phenomena to explore ideas about presence and absence, and pattern and randomness. Installations took the form of blinded cameras that sent visual and audio noise to a computer that analysed it for patterns that looked like human faces and sounded like human speech.

In these installations the computer did the hard work of analyzing complex data, but the task of meaning making was left to the observer. Algorithms that found faces or human speech in the data stream found many barely meeting the requirements. The interpretation of noisy pixels as faces, or noise as speech was left to the observer.

On occasion these faces and voices were utterly convincing. They were, to all intents and purposes, real faces, real voices. They were not images of people, but another kind of image loaded with meaning, which arose accidentally, but irresistibly, from the hybrid interaction between machine and body. To all intents and purposes when these patches of pixels looked like faces, they were images of faces.

The faces and voices that emerged from the random flickerings in a machine hinted at an immaterial hybrid body that existed in the pattern and information flows that were fusion of body and machine, suggesting that there might be real information contained within the random noise of the work. Later work extended these ideas by organising noise and its visual equivalents as spatio-temporal volumes to enmesh an observer in a stack of noise slices, delivered by directional speakers. These works used pattern recognition algorithms to identify unusual repetitions, noticeable clusters, loops and so on, in concert with a moving observer who gave form to shapes and sounds. It is this work that informs the recent exploration of pattern emerging from a monochrome colour field sampled across time.

The very latest work draws upon current neurological research that acknowledges visual perception as a form of symbolic interaction in which information is gathered by the brain, but which bears no physical resemblance to the objects, and events of perception. According to VS Ramachandran, '…the brain creates symbolic description. It does not recreate the original image, but represents the various features and aspects of the image in totally new terms. "This activity is manifest in encapsulating behaviors and inferences, such as change blindness, selective attention, energy measurement, imagination and hallucination, in the construction of an image. The work uses images and sound conjured by machines in response to missing or incomplete information. Using the interpolation present in all media spaces to build imaginary presence, the work creates forms out of incomplete data drawn from cameras and microphones. The work looks at the possibility and consequences of invented images arising out of the discrepant and unstable representations that form our media constructed and electronically surveilled world. False positives, false bodies, false entities inhabit our media spaces, not only changing our inhabited world, but also our bodies and our being in the world.

In the work series Doppelganger (2011), in which interlaced image fields are separated and re-interpolated again and again until only the interpolations remain, it is possible to see how images constructed in media spaces must unavoidably generate presence from absence and how this happens through a symbiotic relationship between machine and human, suggesting in the end that there are unseen, unstable representations generated within the medium itself. ?Doppelganger creates a copy of an original made up of entirely machine–imagined data. Looking like degraded images of dolls or action figures, or twins, or Jeckylls and Hydes, or merely sadder or happier version of themselves the duplicates are built on the digital DNA of the original, but have moved away from a stable state, reinvented by a machinic, algorithmic dreaming to take on a life of their own. The brain/body interpolates the absent information, filling in the missing gaps. It is possible to characterize images as contingent unstable, entropic zones. Even as the viewing subject assumes that what is viewed is a stable phenomenon, on closer inspection the image is an entropic event which is always receding, riddled with micro-discrepancies that play an important role in the construction of a world.

The work explores how images are constructed in media spaces, how absence is uniquely and unavoidably attached
to presence, and how this is manifest through the symbiotic relationship between human and machine. Using the model of the Doppelganger–a tangible double or look–a–like, or an image of oneself impossibly glimpsed on the periphery of vision, new forms, looking or sounding like someone or something, but having no index in the real world, are constructed by machines in response to incomplete data gathered by cameras and microphones.

All of the Project's pattern recognition work has much in common with the psychic spectres of Abraham and Torok, [6] Jonathon Crary's bodies, [7] and with recent explorations into sonic hauntology, [8] par-

ticularly in its investigation into changing ideas about what constitutes authenticity, and with earlier explorations into EVP, [9] but its lasting impact is to acknowledge an ontological anxiety that imagines a body so enmeshed with its surroundings and the technologies that support it, that it becomes indistinguishable from the mechanisms of its representation and disappearance.

Increasingly our machines see and discriminate much as we do, and in turn change our perception of the world. ColourBlind explores ideas about how machines and we see and experience the world, and raises questions about the capacity to discriminate between what is important and what is not. In the search for pattern in randomness, for colour where there is none, when faced with the horror vacui of sensory deprivation the brain, and in this case the machine, continues its processing regardless, creating its own colours and forms as interpretative hallucinations.

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2. *Yulia Ustinova, Caves and the Ancient Greek Mind: Descending Underground in the Search for Ultimate Truth (New York: Oxford University Press, 2009).*
3. *Scrying, http://1010.co.uk/org/scrying.html (accessed November 2006).*
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9. *Numerous artistic explorations over the years, include the Rorschach audio project, and work by Leif Elggren, and Carl Michael von Hausswolf. Ghost Orchid (compiled, edited and produced by Justin Chatburn and Ash International) provides an in-depth look at EVP.*

CTRL – O CONFRONTING BARRIERS TO COMMUNICATION IN INTERDISCIPLINARY PROJECTS

Linda Duvall

Artist Linda Duvall was invited by the University of Saskatchewan to curate an exhibition of student research addressing digital media. The curatorial process revealed much about the gaps between disciplines. From the beginning, Duvall noticed that each area had its own specialized and idiosyncratic language. Even more instructive were the conventions utilized by the various areas for communicating information.

Fig 1. Demonstration of the FreeForm 3D Computer Modelling System by Art and Art History undergraduate student Cory Schewaga at the opening of exhibition CTRL – O. Copyright Linda Duvall

Fig 2 and 3. Viewer in front of painting and video installation by Art and Art History graduate student Michael Farnan in CTRL – O exhibition. Copyright Linda Duvall & Michael Farnan.

Introduction

'Interdisciplinarity' is a term that had a wave of popularity in the 70s in selected academic institutions around the world. Today, it is enjoying a revival – as evidenced by this conference – but there are major problems with inserting interdisciplinary programs into discipline-based institutions. I am proposing a working model, based both on my own art practice and an exhibition that I recently curated. The model that I am proposing both values and utilizes the expertise of specialists; and allows for people outside specialized disciplines to access specialized information. I tentatively call it 'snatch and grab.'

As a Visual Artist and Academic Fellow at University of Saskatchewan, I was invited by the university's Interdisciplinary Centre for Culture and Creativity to curate an exhibition that highlighted the range of research being undertaken by undergraduate and graduate students across the Arts and Sciences programs. The intent was to show some of the research and art projects that have looked critically at the role of digital media in culture, as well as to initiate a dialog among these students and the faculty that support them.

Project *Tea and Gossip*

Before I talk directly about this exhibition, and the implications for the students, the university, and the community, I will first position myself and the structures I have developed in my own art practice.

Although I define myself primarily as a visual artist, I have always considered that I work across a few disciplines. I have degrees in English and Sociology, Education, and two Visual Art degrees. As a Visual Artist, I have worked collaboratively with people from other disciplines and much of my visual practice embodies significant aspects of sociological research. This blurring of boundaries is a crucial part of my practice. I will show one example of a project that incorporates such research into my art practice.

My starting point for the project *Tea and Gossip* [1] was a personal story of misattributed paternity. In the short narrative video that I developed, the main character did not reveal the identity of the biological father of her daughter to her husband, her daughter or the biological father, until her daughter met and started dating her half brother.

I began by showing this video to friends and neighbours; and taping their responses. I purposely began by asking a diverse combination of people, from mediaevalists to street involved youth. As I continued, I noticed that many comments took an ethical direction; so I worked with theologians from evangelical Baptists to the other extreme. I also involved people who might offer legal, psychological, or medical expertise.

In the presentation of this work, I incorporated these diverse opinions and enabled visitors to further contribute their views, both verbally during the 'gossip' sessions and on small cards. In this instance, some people's contributions evidenced their disciplinary expertise, while others approached the questions from a more personal perspective.

So, when I was invited to curate a show that crossed many disciplines, I was delighted.

Exhibition *CTRL – O*

Now about the exhibition *CTRL – O*, the title referencing the keyboard shortcut for "open file." This show presented students who were paying attention to the possibilities of new global networks and innovative intersections of the fine arts, humanities, sciences and computer sciences. These projects included analyses of social networking sites, use of new media in community building or teaching, computer modeling and simulations, and technically complicated digital manipulations such as 3D and digital collages.

From the beginning, I noticed that each area had its own specialized and idiosyncratic language. Even more instructive were the conventions utilized by the various areas for communicating information.

In areas such as Sociology and English the students included as much textual information as possible under titles such as goals, objectives, and checklists. The visual elements were clearly secondary and proposed learning was through reading the compiled information.

The Computer Science and Science students presented projects that included participatory elements such as buttons or models. Here, the learning emerged through interacting with the material presented.

The Visual Art students presented material that contained no clear conclusions, but embedded elusive personal questions. Their viewers were left to draw their own conclusions.

Context for *CTRL - O*

Now about the context for this project: the exhibition was presented in a student art gallery as part of a university wide Technology Week and was widely advertised by the institution. The opening was held on an afternoon during Technology Week, during which each student made a brief presentation about his

or her work. Then there was time for visitors to meet with the students, and for the students to meet each other. The exhibition remained up for a week.

The University of Saskatchewan has recently introduced a new Interdisciplinary Program, called the Interdisciplinary Centre for Culture and Creativity, which initiated*CTRL-O*. However, since it is a recent development, there were only two students from that Centre who were part of the exhibition. The rest were all from defined disciplines within Arts and Science. One of the main aims was to initiate dialog across disciplines.

Assessment of *CTRL - O*

It is difficult to assess whether any of the defined aims of this project were met. The students remained firmly in their own disciplines, with their means of communication clearly modeled by the departments within which they studied. However, I did a follow-up survey in which I asked the students involved about any consequences of their participation in *CTRL-O*. Several reported that other disciplines had invited them to speak.

For example one art student wrote:

After the show, Prof M. asked me to talk to his class for a bit, then I invited some of his students back to the DRC to further look at the 3D modeling [...] The show really drove home that there are more cross applications of technology out there than we know.

None had begun to work directly with other students or other disciplines and none reported that there was a mutual exchange of ideas. Rather, any interchange had taken the form of an interested person with an already developed area of research wanting to get information from the student. This is what I call the 'snatch and grab' model.

As another example, I received this email recently from a community artist:

The show you curated at the Snelgrove has directly inspired my latest sculptural work. I contacted a few of the students in the show and met with them to discuss *my idea*. Cory S. worked on a prototype drawing for me which was used as the starting point for a CAD drawing and small maquette *produced for me* by the Engineering Workshop at the U of S. [Author's emphasis.]

This is a clear example of a community artist who engaged the expertise of the students in the exhibition for her personal project.

What was also interesting about this email was that it demonstrates the fact that this exhibition provided an opportunity for members of the Saskatoon community to see what was happening at the university. It seems that community members not involved in the university – as well as faculty and students in other disciplines – have difficulty finding out about academic research. This show provided a window into the area of digital media at the University of Saskatchewan.

Further Thoughts on *Tea and Gossip*

Looking at my own project *Tea and Gossip*, I realize that I also used the 'snatch and grab' model. I began with a defined structure in place. Each participant contributed their opinions and ideas based on their personal frameworks and expertise, and inserted these into my project. They each changed the content of a project a bit, but I maintained the framework through which visitors would access the material.

Conclusions

In conclusion, I would like to make the following comments and recommendations:

1. The model of 'snatch and grab' should not be seen as a failure of an interdisciplinary program, but rather an appropriate way to transfer information. One is ensured that the person initiating the contact is receptive, since they can already see an application in their own research.
2. There is a need for a full exploration of alternative models for the transmission of research material and interesting ideas. For example the Perimeter Institute in Waterloo, Canada has wide corridors with blackboards and coffee alcoves and lounges that are conducive to making visible one's current thoughts.
3. In order to have a 'snatch and grab' model work well in a community or an institution, one needs a context in which a range of researchers/faculty/students/independent scholars/children/elders show their work/ideas outside their defined disciplines.
4. Within the academic system, one needs a way to value the 'consultants' – those who find time within their own research to contribute to the understanding of others from other areas.

In conclusion, the current institutional structures are not conducive to a total blurring of boundaries, but there are ways to open up the discourse a bit, and to nibble away at the tightness of the disciplinary framework. The exhibition *CTRL-O* is one example of an approach; and the strategy utilized to develop *Tea and Gossip* is another implementation of that model.

References and Notes:

1. For more information about Tea and Gossip, visit http://www.lindaduvall.com/bigprojects/Visual%20Art%20Projects/gossip.html (accessed September 2011).

STUDIO PEDAGOGY FOR SITUATED LEARNING IN THE CULTURESCAPE

VINCE DZIEKAN

This paper presents insights gained from developing studio pedagogy for situated learning in relation to the *Culturescape* study abroad program, which has been conducted for students of the Faculty of Art & Design at the Monash University Centre in Prato, Italy on an annual basis since 2009.
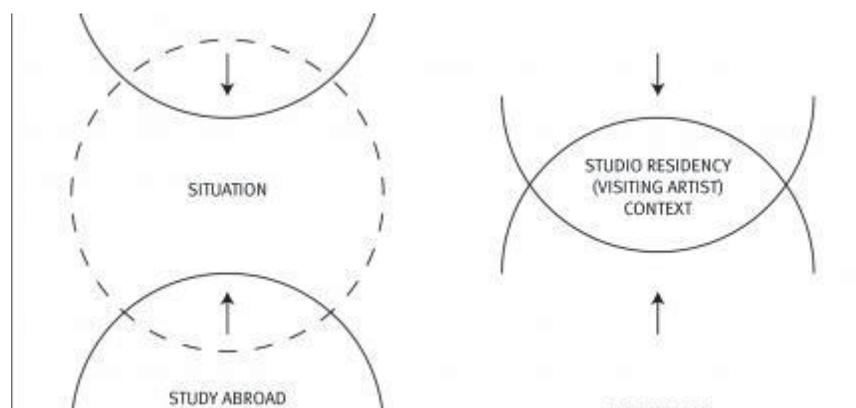
Culturescape's meta-learning contexts, Diagram. © Vince Dziekan.

1. Introduction

The *Culturescape* program has been conducted for students from the Faculty of Art and Design at Monash University in Melbourne on an annual basis since 2009. This study abroad program is undertaken as an intensive and immersive studio residency over a five-week period at the university's international center in Prato, Italy. The curricular orientation of the course has been designed with a focus on exposing undergraduate Art and Design students to independent practice through introducing them to the potentials for creating communication experiences that combine site-specific, location-based practices with digital image-making and creative technology. During their studio residency, participants are given the unique opportunity to develop individual and collaborative projects that respond creatively to their experiences of place, space and community.

2. Institutional Context

2.1 MONASH ART AND DESIGN

Monash Art and Design is an integrative center for socially engaged research and teaching, with a commitment to the creative enrichment and physical and cultural sustainability of our communities through visual art, design and architecture. Established in 1998 as part of Monash University, one of Australia's

Group of Eight research-intensive universities, the faculty is the university's authority in the area of visual culture.

As a collegiate community, academic staff are committed to studio teaching and research that reflects the diversity of approaches found in contemporary visual culture and the design of the built environment. While such a 'teaching/research nexus' develops from an understanding of the basis of disciplinary practices and applicable research methodologies to their fields of inquiry, the ability to foster an attitude towards the larger subject of 'practice-based research' in Art and Design is supported by the capacity to apply these forms of knowledge, both conceptually and in practice, towards collaborative and transdisciplinary contexts.

2.2 MONASH UNIVERSITY CENTRE, PRATO

Internationalization is an important catalyst for both education and research across Monash. Over the past decade, Monash Art and Design has conducted a regular series of study abroad programs at the university's key physical presence in Europe: the Monash University Prato Centre.

Located within easy proximity of Florence, the center itself occupies the Palazzo Vaj in the historic *Centro Storico* of the medieval walled city of Prato, which established itself prior to the Renaissance as an important civic and economic center, particularly in respect to the textile trade. Subsequently, the town became a leading industrial center in the nineteenth century, with Italian historian Emanuele Repetti describing it as the "Italian Manchester." As a by-product of trade and industrialization, Prato has experienced significant social repercussions from both internal and external migration. Today, the city has one of the largest Chinese immigrant populations in Italy, second only to Milan. [1] Prato, thus, provides a unique base for conducting intensive studios where Art and Design students are encouraged to respond to their cross-cultural experience of the paradoxes that abound in globalized contemporary society, while being exposed to the dominant cultural legacy of the West: the Italian Renaissance.

3. Contexts for Meta-Learning

3.1 OVERVIEW

This remainder of this short commentary article will broach some of the background and contextual considerations that inform *Culturescape's* educational approach to developing a studio pedagogy that engages with situated learning in relation to emerging creative technologies. The text will provide a general overview of how the course structure has been designed in response to its institutional and 'meta-learning' contexts by offering a series of provisional observations that reflect upon the course's pedagogical structure, project design and student experience.

According to Jean Lave and Etienne Wenger [2], 'situated learning' acknowledges how the process of knowledge is co-constructed, occurs in context and embedded within a particular social environment. Theoretically, situated learning stands in contrast to most conventional forms of teaching and learning activity where the 'knowledge' (and 'know how') is largely abstracted by being encountered out of context. Through the integration of fieldwork in and around Tuscany, complemented by active studio engagement and critique, students are provided with an expanded studio experience. This composite 'learning environment' combines a curricular structure designed to interrelate with its cultural setting

and social situation enabling them to explore their studio practices through designing creative content for emerging art and design practices, including a particular focus on 'geo-cinema' – which according to artist Pete Gomes is "the new cinema of commuting; variable and embedded in motion, locations, and fluidity." [3]

In an educative sense, 'meta-learning' places an onus on how the learner's understanding of the learning context and the phenomenon of learning *itself* contributes towards gaining subject-specific knowledge. Described as the process by which learners become increasingly aware of habits of perception, inquiry and learning that have been otherwise internalized, [4] the concept of meta-learning emphasizes the central importance of independence to the subject of study and, more specifically, to the roles that inquiry and reflective thinking play in learning contexts. In particular, self-identity and self-development provide an important connection to the 'ontological dimension' that characterizes the nature of art and design learning where "the development of knowledge, practical skills, cognition and technical expertise, are closely interwoven with the development of feeling, perception, confidence, sense of purpose and identity, and a tangible enrichment of lived experience." [5] In order to develop their skills in greater self-reliance, students are required to engage in meta-cognitive activities that develop awareness of both their conceptions of the subject of study and of themselves as learners in learning contexts that are comprised of "a complex array of interrelated factors." [6] [Fig.1] As succinctly encapsulated by Tara Winters: "Meta-learning is often associated with ideas of self-regulation, self-motivation, self-reflection and independence as a learner, making it a concept of particular interest to art and design educators." [7]

3.1.1 DISCIPLINARY (SUBJECT) CONTEXT

While available for any student in the faculty, the curriculum design of the *Culturescape* program is best suited for students situated in the middle stage of their tertiary studies in design-based disciplines in Visual Communication, Multimedia and Digital Arts; and Fine Arts students specializing in photo-based contemporary art practice. The integrated program draws upon an existing suite of units, that when so combined, support the multidisciplinary study of new media design and contemporary image arts. Briefly, the unit offerings that are made available to participants as part of *Culturescape's* integrated program include:

Digital Imaging studies in *Digital imaging* and *Digital Imaging Studio*

Digital Imaging focuses upon creative image production for a range of digital media applications. In this unit, students explore the creation, manipulation, composition and output of digital images with increasing conceptual understanding of representational issues, visual language and communication. For its part, *Digital Imaging Studio* is designed to offer students with the opportunity for self-initiated investigation of imaging approaches and digital media specialization specific to their proposed projects.

Photomedia studies in *Photomedia Fabrication* and *Photomedia Virtual Studio*

Photomedia Fabrication builds upon the skills and knowledge of photography by focusing upon creative image production through 'fabricated' photographic approaches that develop their understanding and application of lens-based photography by exploring the construction of photographic reality. Meanwhile, *Photomedia Virtual Studio* promotes the development of creative skills through a combination of analog and digital techniques, exploring lens-based and soft-imaging for print and screen-based output.

3.1.2 STUDY ABROAD (SOCIO-CULTURAL) CONTEXT

The course delivery is structured around an intensive five-week study program. In addition to attending formal studio teaching blocks, there is the associated expectation that students will thoroughly engage in independent study (both in and out of studio, through personal fieldwork and site visits) to achieve expected coursework requirements.

The following standard format has been used to guide the weekly program delivery:

Mondays are dedicated to studio work involved with the collaborative production of the assigned directed project designed to directly engage with *Culturescape's* main emphasis on locative media and relational forms of communication design. Complementing the group activities that are a feature of Monday's studio, Tuesdays are dedicated to self-directed project work over the duration of their residency. Each participant is expected to propose and negotiate a major individual project, which will come to represent their study abroad experience. This approach affords the students with the opportunity to experience what it means to work as an 'artist-in-residence.'

Formal presentations and semi-formal seminars are held regularly on Wednesdays. The nature of these lectures evolves over the duration of the course, culminating with a forum where all participants present and report on their individual project outcomes. Wednesday afternoons are set aside for short, focused excursions to cultural sites and galleries in Florence or other locations within the region. Dedicated site visits are made to major cultural heritage sites, including the Duomo di Santa Maria de Fiore, the Uffizi Galleries and L'Accademia. Complementing the attention paid to Renaissance art, special onus is also placed on visiting contemporary exhibitions curated by the Centro di Cultura Contemporanea (CCC Srozzina) at the Palazzo Strozzi.

Perhaps surprisingly, significant contemporary exhibitions have also been presented in Prato itself, as well as its neighboring town, Pistoia. Last year the Commune di Prato hosted a multi-site project by Thomas Ruff that innovatively presented works by the German photographer within the institutional spaces of its civic offices. Palazzo Fabroni in Pistoia hosted the particularly relevant exhibition: *Viaggio in Italia*, which presented a wide cross-section of works inspired by encounters with Italian life, culture and landscape produced by leading contemporary artists ranging from Carsten Holler and Thomas Struth, to Carlos Garaicoa and Richard Wilson.

Given the wealth of places to experience that are within easy reach of Prato, Thursdays are used for conducting day-trips to Bologna, Sienna, Lucca and Pisa. While cultural tourism acts as the primary focus of visits to these major regional centers, in a large number of instances these experiences provided the impetus for ideas that would become fully distilled and articulated later in studio works. Finally, Fridays are treated as 'open studio' days for independent study or fieldwork.

The routine of this regular weekly schedule has been broken by the main annual excursion to Venice for the *Venice Biennale*. The opportunity to attend this leading international cultural event showcasing contemporary art (Daniel Birnbaum's *Making Worlds* in 2009) and architecture (Kazuyo Sejima's *People Meet in Architecture* in 2010) has proven to be particularly inspirational to the students and has made a significant impression on the subsequent development of numerous individual's self-directed studio projects.

3.1.3 STUDIO RESIDENCY (VISITING ARTIST) CONTEXT

As indicated previously, the visiting artist or artist-in-residence model offers a distinctive way of describing the studio context in which meta-learning takes place in *Culturescape*. The program's studio pedagogy is put into practice through two complementary, self-supporting projects: a collaborative, directed project and an individualized, self-initiated studio project. Given the limitations of this paper, I will only expand at this time upon pedagogical considerations associated with the directed project and how this brief was used to instill an underlying sense of situated learning, that, in turn, underpins the self-directed studio projects that would eventuate.

Collaborative, Directed Project

Upon commencement of the course, the students were presented with a directed project. This brief was employed as a means of challenging the participants to give form and meaning to their initial experience of Prato, its local vernaculars and environs. Importantly, the project was collaborative in nature and emphasized the forming of social relationships at the inception of the study abroad experience. The project was used as the principal focus of creative activities over the first half of the study abroad residency; this balance switched towards individualized, self-directed studio investigation following the excursion to Venice (which has effectively acted as the juncture between these respective projects).

Thematically, the directed projects run in both 2009 and 2010 have focused on the narrative potential of communicating mediated scenarios designed to be experienced directly in public space. The assignment encourages the students to conceive of a form of cross-media storytelling that draws upon the 'psychogeographic' features of the local environment of Prato; Psychogeography being defined by Guy Debord in his 1955 *Introduction to a Critique of Urban Geography* as the study of "the precise laws and specific effects of the geographical environment, consciously organized or not, on the emotions and behavior of individuals." The spirit of this form of inquiry is used to draw from the student's immediate subjective response to finding themselves in an alien situation; drawing out from this the meta-cognitive subject of the exercise: a knowing, self-awareness of the multi-dimensional nature of their creative practice as situated in the roles of student, tourist, explorer, ethnographer, social commentator, filmmaker, etc.

On the occasion of CS2010, the following assignment brief was issued:

Quattro Bastioni

Prato is a classic example of a medieval walled city. Referring to the map of Prato, each group is assigned to one of the four main gates or 'bastioni' that acted as main 'command and control' points of the town in the middle ages, monitoring movement by regulating entry and exit of who and what was allowed in and let out. Connect each of these nodes with another by determining three intermediate locations along a walking route. At each designated location, a specifically assigned piece of media is to be played on a hand-held portable media device. Each group determines the narrative relationship between media content and where it is to be played in situ.

The studio project was supported by supplementary lecture content and studio exercises. An introductory lecture was presented in order to establish key precepts relating to site-specificity and digital technology; portable and distributed media. The historical legacy of site-specific installation (such as Walter

De Maria's *The Lightning Field* and Richard Serra's *Titled Arc*) as well as Nouveau Realisme (which proponent Pierre Restany described as "a poetic recycling of urban, industrial and advertising reality") and Situationism were overviewed in an effort to broaden the frame of reference that the students could bring to their creative development. The currency of situated practices was supported by illustrating the diversity of contemporary works by the likes of Kryztof Wodicko and Janet Cardiff, in addition to graffiti and other forms of cultural intervention in public space including pervasive gaming.

Complementing this content, an introductory creative exercise was instigated as an exploration of photographic reconnaissance and narrative structures. Following a shooting brief whereby the students were directed to conduct a one hour photographic reconnaissance of Prato, each student was issued with a series of design challenges as a way of applying a selection of their resulting images for narrative purposes. These focused on formal principles of juxtaposition, the relationship of image and text as well as storyboarding, while narrative voice was explored through forms of first and third person perspective and dialog.

4. Concluding Observations

Through the combined contexts provided by its expanded studio, *Culturescape* places an emphasis on participants engaging in meta-cognitive activity, thereby encouraging each student to become increasingly aware of their studio learning and the context of these processes in their institutional settings and situatedness in highly context-specific environments.

In summary:

By drawing upon the subject-specific features of photography and digital imaging, *Culturescape* emphasizes the role of communication design and new media arts in the creative conception and design of cross-platform communication experiences.

Culturescape operates as a flexible learning environment that places importance on processing 'field' experiences through studio practice. The resulting 'expanded studio' draws from the visiting artist or artist-in-residence model, thereby exposing the student to aspects of independent professional practice and practice-based research.

The curricular framework of *Culturescape* transitions from directed to self-directed projects. In order to do so, the pedagogical role of a 'geo-cinema' project is used to promote attentiveness to cultural specificity and the situated nature of studio learning experience.

References and Notes:

1. According to available statistics, 10,000 legal Chinese residents were living in Prato in 2008; a figure significantly lower than the 45,000 estimated by local authorities taking into account illegal immigrants. First arriving in the early 1900s, the majority of Chinese work in businesses and workshops related directly to the garment industry. In 2010, raids on factories employing illegal labor highlighted the social and economic tensions that exist in the Pratese community.

2. Jean Lave and Etienne Wenger, Situated Learning: Legitimate Peripheral Participation (Cambridge: University of Cambridge Press, 1991).

3. Pete Gomes, "Being On Location: The Beginnings of 'Geo-Cinema' and 'Place Code,'" 2004, http://www.mutantfilm.com/node/45 (accessed August 1, 2011).

4. Donald B. Maudsley, A Theory of Meta-Learning and Principles of Facilitation: An Organismic Perspective (Toronto: University of Toronto, 1979).

5. John Danvers, "Towards a Radical Pedagogy: Provisional Notes on Learning and Teaching in Art & Design," International Journal of Art and Design Education 22, no. 1 (2003): 47-57.

6. Tara Winters, "Facilitating Meta-learning in Art and Design Education," International Journal of Art and Design Education 30, no. 1 (2011): 90-101.

7. Tara Winters, "Facilitating Meta-learning in Art and Design Education."

DESIGNING A WAY TO VISUALIZE THE INVISIBLE THROUGH THE DYNAMIC ILLUSTRATION OF CONVERSATIONS

NATALIE EBENREUTER

This paper discusses the creation of a multi-modal data driven prototype application called the *Conversation Viewer*. Designed to visually represent the evolution of a conversation through a dynamic touch based graphical interface, it illustrates various elements of participants' email, text and voice messages as they seek to find a mutual agreement around a meeting date.
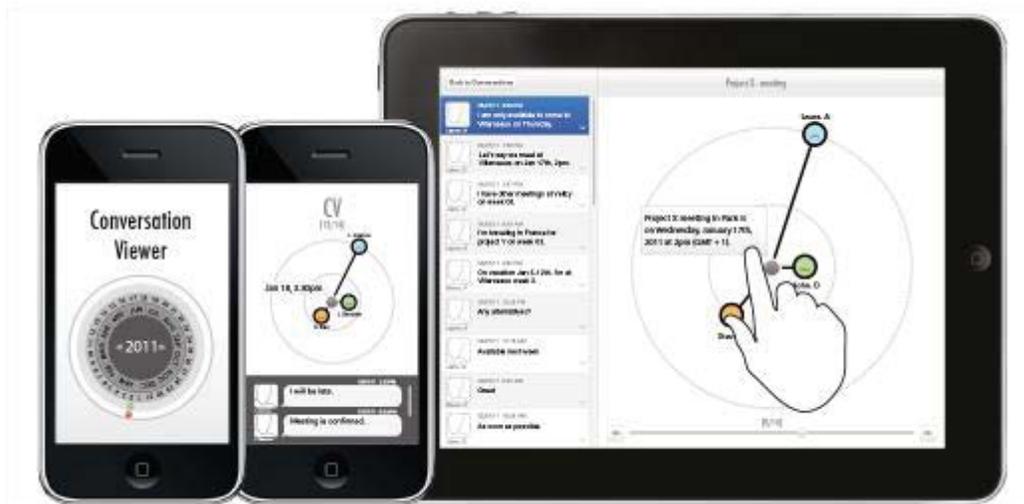
Fig. 1. Conversation Viewer: iphone & ipad applications, 2011, Natalie Ebenreuter, graphic media, Copyright Bell Labs France.
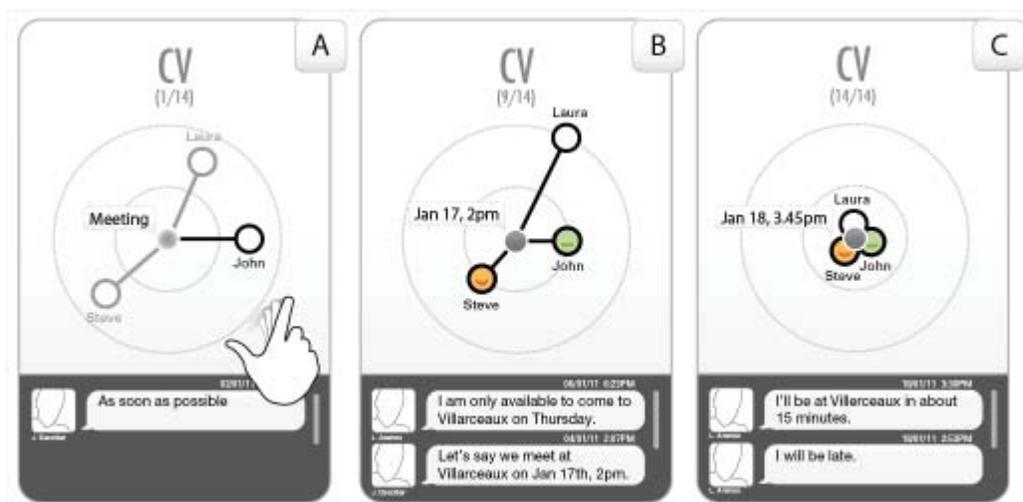
Fig. 2. Conversation Viewer: use case scenario, 2011, Natalie Ebenreuter, graphic media, Copyright Bell Labs France.
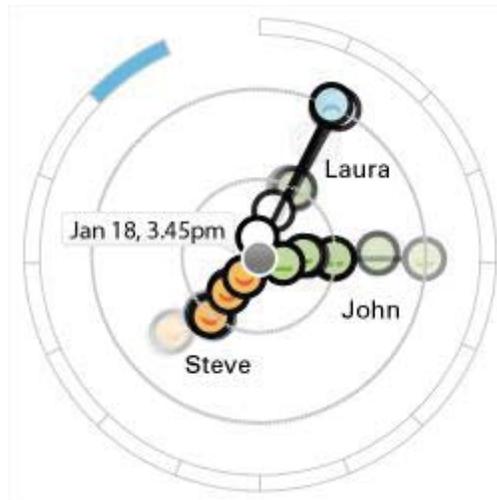
Fig. 3. Conversation Viewer: an historical narrative, 2011, Natalie Ebenreuter, graphic media, Copyright Bell Labs France.

Introduction

The rise of social media and the sophisticated development of third party applications, in combination with an ever-increasing range of mobile devices, makes the immediate communication of ideas between individuals, different communities of practice and the wider community possible. While we have the ability to send and receive vast amounts of information, status updates and social commentary about different events there is a need to capture dynamic systems of communication in a way that illustrates the less visible relations between participants of a conversation. This is significant to situations where the consequences of numerous interactions can change the perspective and direction of different courses of action. For example, this holds relevancy for participants in distributed environments involved in the collaborative development of long-term projects. Since digital communications commonly involve direct communication between individuals responsible for sending and receiving information, knowledge resulting from group discussions or informal corridor conversations is not as easily shared amongst participants in distributed environments via email, project documents and websites.

Rather than seeking to integrate multiple systems of communication made available through aggregation tools such as *Netvibes* [1] or *Hootsuite*, [2] this research focuses on assisting others to contextually build relations between their different communications. Here the intent is to supply individuals with a comprehensive understanding of the circumstances surrounding the progressive development of different thoughts and actions that lead to mutual agreements. This approach positions human participation, negotiation and understanding at the heart of dynamic communication systems and looks beyond the notion of interaction as the mere sending, receiving or aggregation of disparate messages. For the purposes of this research, the term 'dynamic situation' refers to a set of circumstances in which one has an awareness of their surrounding environment. In particular, this can be understood as a situation that enables individuals to understand not only their contribution to an ongoing conversation but also that of other participants involved in the same discussion.

In light of this, Bell Labs France researchers specializing in hybrid and social communication, intuitive collaboration and applications design worked together to develop a prototype application called

the *Conversation Viewer*. Its role is to make visible the abstract relations that exist between participants of a conversation. A touch-based graphical interface is used to interact with and visualize the progressive development of conversations drawn from participants' email, text and voice messages. The data driven prototype application was initially designed as an iPhone application that was later developed for the iPad (See Fig. 1).

The impact of functionality on form

The goal in designing and developing the *Conversation Viewer* was to create a way to deal with the often-fragmented experience of understanding individual and group intentions expressed by voice and text-based data. In doing so, the *Conversation Viewer* aims to provide greater awareness surrounding the overall actions and interactions of participants engaged in evolving conversations. This is where time as a factor of interaction in the past, present and future can be used not only as a reference to illustrate the history of a conversation but also to study the value of interactions.

The key function of the *Conversation Viewer* is in the utility it offers participants to interact and develop conversations. Interaction forms the basis of conversations in which elements of dynamic situations are negotiated between participants to develop a desirable outcome. The impact of functionality on the form of conversations is in the approach taken by participants during the course of interaction. It is important that understandings are not communicated; instead they are built collaboratively through conversation where participants derive meaning from their interpretation of a discussion. A new-formed understanding is then offered to participants for further interpretation and comparison to the original, which eventuates in mutual understanding and agreement. [3] In this way, it is possible to understand how the collaborative development of a dynamic situation facilitates the collective learning of different objectives between participants through a shared process of negotiation, understanding and agreement. Hence, the *Conversation Viewer* offers a means for individuals to inquire about the evolution of dynamic situations and exchange information through a series of interactions to reveal and resolve contradictory ideas.

Fundamental to this is the function of an observer as an accepted participant in the act of observing that allows for subsequent understanding from such actions to be derived. [4] During the development of interaction, individuals are accepted as mutual participants in the act of knowledge creation. In doing so different individuals, considered as observers and participants, become necessary elements in the development of dynamic situations. This in turn enables them to act subjectively. By interacting with various participants involved in conversation, understanding is created through the exchange of ideas that lead to mutual agreement. This involvement is interactive and productive so that individuals affect and are affected by the interactions in which they participate. The interaction should represent the culmination of the participant's interpretations. Significant to this is that, "The language of the conversation must bridge the logical gap between past and future, but in doing so it should not limit the variety of possible futures that are discussed nor should it force the choice of a future that is unfree." [5] This is important because the form of a system directly influences its usefulness as a tool to support the evolution and understanding of dynamic situations.

The useful and visible functions of a system

The expression of individual intentions and the broad circumstances associated with various events and actions that take place within dynamic situations underpins the useful function of the *Conversation*

Viewer. Creating a tool to achieve this becomes challenging, since there are no established interaction design patters or use cases for the design of dynamic communication systems. Nor is it possible. The *Conversation Viewer*, therefore, seeks to provide end-users of the system with a contextual timeline of events that visually flow together with the collaborative evolution of conversations over time. Building the relations between these activities means that individuals communicating with and though the *Conversation Viewer* are not required to search through numerous email threads, text messages and voice mails to gain a quick overview of the current state of conversation. Instead, the data driven system illustrates conversations at both general and detailed levels of information in the form of a visual narrative. The 1MC Viewer also opens up the potential to express the character of individual actions or those of a group. To achieve this a technical component called a sentiment analyzer interprets the mood of an individual's communication and illustrates it in the design of the ambient interface. While applications such as the iPhone Tracker [6] provide a contextual and historical narrative of an individual's physical movements from location-based data captured by the iPhone, the *Conversation Viewer* represents a visual narrative of (1) participants' relationships towards reaching an agreement, (2) general and detailed information about the terms of agreement, as well as (3) the emotional disposition of participants during a conversation, as an organized integrated whole.

To give further context to the application's use, the following scenario briefly describes the potential interactions that could take place during the discussion, understanding and confirmation of an agreement. For the purposes of this example the terms of agreement are to find an appropriate meeting date. Fig. 2a represents the first interaction in a conversation. It illustrates a message from John in brief format that has been reduced in detail for the purposes of simplicity, as a function of the system. When touched, the message expands to show its detailed contents if so desired. At present, the agreement point is unclear, which will become more focused when a precise meeting date is proposed. Laura and Steve are represented in grey while John is represented in black, as he is the first to participate in the conversation. The participants of the conversation are positioned as neutral with respect to the agreement point. This is indicated by the background location rings in the design of the interface to help visualize each participant's relationship to the terms of agreement. As each participant of the conversation interacts with one another, their visual appearance transforms from grey to back. Simple emotions are also represented by the system's interface, based on semantic information found in each communication.

Halfway through the discussions in Fig. 2b a specific meeting date has been suggested. This is visually confirmed by the clarity of center point at the core of the agreement. Here both John and Steve are closer to the agreement due to their repositioning with respect to the location rings. We can also see that Steve is happy about this arrangement while John remains neutral to the current proposal. Finally, after much discussion the meeting is confirmed (see Fig. 2c). This is visually represented by the participants close proximity to the agreement point and its solid appearance. By presenting conversations in this way, it is envisaged that participants of the conversation can gain an understanding of their development more easily than reading or listening to each individual email and voice message that forms the basis of their representation. Furthermore, with the added functionality of (1) a global slider in a customized version of the *Conversation Viewer* shown in Fig. 3 or (2) the gestural activity of swiping along the vertical list of communications on the left hand side of the iPad application in Fig.1, an animated view of the conversation visually evolves at the same time each moment of the discussion is discovered.

Discussion

The overall purpose of the *Conversation Viewer* is to facilitate different ways of observing and participating in conversations and to offer end-users of the system greater contextual understanding of the evolution of dynamic situations. This is achieved through conversation where multiple viewpoints are expressed, visualized and internalized by those engaging in the discussion. As a result, a shared understanding of what is known from that which was previously unknown is created. Essential to this communication is that participants enter into the conversation with different perspectives and individual understandings that are distinct from any others. Given that without difference, there is no basis for exchange or discussion among participants that leads to the mutual understanding of something new. [7] Communication ceases to be productive without a context of difference or conflict to initiate change. [8]

It is envisaged that the manner in which dynamic situations can be experienced throughthe active engagement and manipulation of changing circumstances in the *Conversation Viewer* will assist the diverse consideration and development of mutual agreements. This is where interaction is the product of an individual's capacity to communicate, and develop an understanding of their actions with respect to the thoughts and knowledge of other participants' terms of agreement. Interaction is not considered in a mechanistic sense visualized by the re-positioning of graphical icons that gravitate toward the point of agreement in the *Conversation Viewer's* interface. For that is the resulting material outcome of interaction.

The notion of interaction in the context of this research is centered upon the actions required to reach a mutual goal. This in turn drives the purpose of communicating with different individuals through the *Conversation Viewer*; especially where the development of a conversation is as a result of a comprehensive understanding of a dynamic situation. The significance of interaction is therefore accomplished through the act of doing, which in turn enables an individual to cultivate a shared understanding of the current terms of an agreement.

Ideally, interactive products or services should offer participants, in its system of communication, the freedom to choose how they may express and fulfill their goals rather than being forced to accomplish a task by way of a limited system of interaction. This is where the idea of participating and communicating through a product or service is much greater than its physical manifestation and transcends the materiality of a product. Here the notion of an organized, integrated whole that interconnects people with their environment becomes important. Interaction in this sense is largely concerned with interconnectedness between all the elements of the design situation. This can be graphic signs and symbols, material objects, activities, services, organizations, environments or systems. What is significant is the active participation of these elements with one another as an organized integrated whole. When all the parts of a design solution are connected, everything is in harmony. This holds significance for the dynamic treatment of a product's content with respect to the form of design outcomes; particularly in the design of products or services like the *Conversation Viewer* that seek to support the changing conditions of dynamic communication systems.

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DURATION AND DANCING BEARS: HALBERSTADT'S CAGE, INGE'S BEETHOVEN, ZIMMER'S PIAF AND PITTSINGER'S BIEBER

Chad Eby

This brief paper is a meditation on the technology and cultural resonance of duration-stretched sound.

Still sound is an oxymoron. Sound, as a vibration, is deeply intertwined with time and must move through it to exist at all. People express many of the properties of sound and music in terms of time: time signatures, cycles per second, beats per minute and so on. Unlike the visual component of motion picture film, which can be stilled to extract the atomic image of a frame, or of video, which can be electronically or photographically coaxed into forming a still image, stilling a sound effectively kills it; an oscillator cycling at 0Hz is utterly silent.

However, this dependence on time for existence does not render sound immune to the alteration and manipulation of its silent but necessary partner; instead, the manipulation of sound in time is probably as old as the intentional production of sound itself. Changing tempo for emotional effect was a common strategy in folk music around the world long before being codified in the 'accelerandos' and 'ritardandos' in the scores of European composers of the 18th century. Somewhere in the history in between, the medieval French composer, Pérotin Magister may have been the first documented practitioner of 'slow sound.' In the 12th century, Magister arranged liturgical choral music by extending the syllables of the melodic lines of well-known pieces in time and then inventing new, faster-moving lines as a sonic overlay on top of them.

It was only when technologies eventually emerged not only to describe music through notation, but also to actually record sonic events for later reproduction that a more direct manipulation of sound in time became possible. According to Caleb Kelly, in *Cracked Media: The Sound of Malfunction*, [1] by 1922, French composer Darius Milhaud was experimenting with varying the speed of phonographic turntables; perhaps earning him the title of first 'turntablist.' The comedic effect that could be obtained by speeding up a recorded sample (transforming tenors into sopranos, for instance) originating in public phonographic performances around that time would eventually blossom (or metastasize, depending on your perspective) in 1958 with Ross Bagdasarian's *Alvin and the Chipmunks,* whose accelerated vocals would go on to win five Grammy awards; three of them on the first-ever night of the event. Slowing a recording down, conversely, can evoke feelings of gravitas, sadness or even 'spookiness.' A 2007 study entitled "Does Time Really Slow Down during a Frightening Event?" by David Eagleman and his team, psychologists at Baylor School of Medicine, examined the perception of slow motion often reported in situations of crisis and found that, when sufficiently frightened, peoples' memories get kicked into overdrive, recording minutiae that would otherwise be ignored. This high density of detail in memory, when recalled, is felt as 'duration dilation.' Early ethnomusicolgists, armed with decidedly lo-fi recording phonographs, often employed the practice of significantly slowing down playback for the rather practical reason of allowing them to more accurately transcribe and analyze the structure of the music, songs and spoken words they had captured in their ramblings afield. [2]

These intentional and incidental emotional effects produced by altering the playback time of recorded sound samples are due almost exclusively to the unavoidable pitch shifting that co-occurs with changes in the speed of analog playback; since frequency and speed are intimately entangled, increasing the

speed of playback of an audio recording also raises its pitch, while slowing down the playback of a recording lowers the pitch. This relationship is perfectly linear and direct: slowing down the playback to one-half speed results in the pitch of the sound dropping to one-half the original frequency. In September of 1967, American composer Steve Reich fantasized about completely severing this time/frequency relationship, which he elucidated in a conceptual score entitled *Slow Motion Sound*. The score consisted of only one sentence: "Very gradually slow down a recorded piece to many times its original length without changing its pitch or timbre at all." [3] In the late 60s, he considered this score to be strictly a thought experiment, since no readily available technology was capable of such a feat. In fact, the *Phonogene Universël*, a tape machine with a rotating play head developed three years earlier by Pierre Schaeffer in Paris, may have had some success at partially realizing the score, but Reich was apparently unaware of the existence of this exotic European device at the time.

However, even the advent of digital audio recording and playback techniques did not immediately provide the means to realize Reich's score. Basic digital re-sampling of an audio source at a different sampling rate (more or fewer slices per unit of time) does alter the speed of a recording, but also preserves the speed-frequency relationship precisely as analog techniques do. Eventually, in the late twentieth century, new digital manipulation methods finally began uncoupling this previously necessary relationship. With the emergence of phase vocoders and fast Fourier transforms (FFT) came pitch-shifting and pitch-corrected time stretching. Much as digital publishing tools had finally divorced content from presentation, these more sophisticated digital sound analysis and manipulation tools were able to separate frequency from playback speed, allowing sound to finally become 'unstuck in time.'

Four twenty-first century slow sound projects, three of which are digital in nature, and one which is thoroughly analog, may serve as an abbreviated survey of contemporary slow sound projects and provide a means for gathering common threads from recent manifestations.

The analog case is a fresh imagining of John Cage's *Organ2/ASLSP* (*As SLow aS Possible).* Originally written as a commissioned piano piece in 1985, Cage adapted it for the more continuous-toned organ in 1987. The piece, as the title suggests, is meant to be played "as slow as possible" while still maintaining the proportions of the overall musical structure. The duration record for the work performed by a single human is 14 hours and 56 minutes, achieved when Diane Luchese performed the piece at Towson University in February 2009. The pace of the piece was leisurely enough that she was able to take meals, between the chord changes, while sitting at the organ's keyboard. According to the February 5, 2009 article appearing in *The Towerlight Online* by Carrie Wood ("Fifteen Hours at the Organ"), Luchese also had a mechanism for reserving the nearest ladies' room so it would be available for her use when the score called for a rest.

However, even this feat of endurance pales in comparison to an especially slow version of the work now being performed at the St. Burchardi Church in Halberstadt, Germany. In this incarnation of Cage's piece, human performers are second-string; the notes on the pipe organ being sustained through the needed long durations by the suspension of weighted bags from the keys. The Halberstadt organ is being assembled, pipe-by-pipe, as new voices are required for the piece, but there is no great urgency to the construction. The performance, which began in 2001, is slated to last for over six centuries with notes changing only every few months or years. Crowds gather in the church on note change events, but the organ sounds continuously whether there is an audience or not; the accidental audience of people living nearby the church insisted that the ever-present drone be tamed, so a box of transparent acrylic sheeting was built to enclose the organ and dampen the twenty-four hour sound. Solar panels and a

back-up generator stand by to power the blowers and continue the performance should the electricity ever be interrupted.

This multi-generational sound piece, with the intended duration of 639 years, plays at the extremes of what counts as perceptible time for humans, requiring planning that may exceed seven consecutive life-times. However, it does not alter the actual sound *as produced* in time. The sound of the organ itself is like that of any organ and, more importantly, the transitions between notes occur exactly as if the organ was playing a short 'scherzo.' This piece, though very slowed-down indeed, does not directly relate to Reich's 1967 concept. Instead, this staging of Cage seems to point to the notion of duration itself and the kind of organization and optimism and required by humans to contemplate the launching of a project that will not even be half complete within their grandchildren's grandchildren's lifetimes.

The second work is Hans Zimmer's *Inception* soundtrack, specifically the remix (or re-synthesis) of deeply slowed fragments of Edith Piaf's 1960 recording of *Non, je ne regrette rien* (*No, I have no regrets*) used for the signature 'idee fixe' of the film's soundtrack; as well as some clever sound design strategies employing slow sound as markers for transition points.

The relationship between the Piaf song and the *Inception* soundtrack was first demonstrated via a YouTube video uploaded by user camiam321 in July 2010; which by June 2011 had been viewed over 2.5 million times. [4] Other videos soon appeared that also showed graphically how similar the structure of the soundtrack was to a slow version of *je ne regrette.* In addition, slowed down sound cues were used to sonically signal the transition points in the matryoshka-like nesting of the plot's dream levels. Each of which, in the logic of dreams, possesses its own ever-more-tightly coiled time line. Here the slowness is used almost diegetically to express the dilation of time in the upper levels of reality and the techniques employed begin to resemble the ideal decoupling of time and pitch. However, the method Zimmer uses is not so straightforward; and in interviews he hints that the slowness was more a piecemeal reconstruction than a just a slowing down of existing material.

To delve further into the structure of slowed sound, we turn next to the Norwegian Leif Inge's amusingly named *Nine Beet Stretch*. Not unlike the Halberstadt Cage piece, *Nine Beet Stretch* is, first and foremost, a conceptual piece. Inge says he was inspired by Douglas Gordon's *24 Hour Psycho*, [5] in which the Scottish media artist slowed down the infamous Hitchcock film's frame rate until it stretched out to fill a full 24-hour day. While Gordon's work was silent, Inge's most certainly is not.

By slowing down a single recording of a performance of Beethoven's *Ninth Symphony* and stretching it out to more than twenty times its usual performed length without affecting the pitch, Inge reveals a whole universe of microscopic sound and simultaneously makes good on Reich's original idea of slow motion sound. In Inge's piece, tiny sonic events that are quickly overwritten in the mind at normal speed are free now to develop, bloom, spread and skid off in uncertain decay. Close harmonies that create moments of tension in the real time of the original are transformed into long grating passages of dissonance. From my own listening experience, the melody is impossible to follow at this speed, becoming completely unrecognizable – lost both in the microstructure of sound and the failure of my attention; the extreme duration breaking down any notion of 'persistence of hearing.' Even as smaller structures come to the fore, there is an overwhelming sense of blurring, of wobblingly indeterminate beginnings and endings. One of the seeming virtues of *Nine Beet Stretch* is making the familiar strange: critical reception praised Inge for again making it possible to listen to and enjoy a piece that, for many, had become so familiar that it was no longer possible to focus on the sound. [6]

Finally, I would like to consider Pittsinger's glacially paced version of the pop song *U Smile* by Justin Bieber. Slowed down approximately 87.5% (not the widely repeated 800%!) by a piece of clever open-source software written by developer Nasca Octavian Paul and released as *Paul's Extreme Time Stretch*, [7] a software tool that both fulfills and exceeds the slow motion sound criteria and also greatly democratizes the process by putting a very sophisticated fast Fourier transform based stretching tool into a small, free easy-to-use package that requires no hardware more exotic than a standard personal computer to run.

The slow Bieber piece, originally posted by Pittsinger on SoundCloud.com, a 'read-only' sound sharing service, is remarkable mostly for huge number of auditions and comments it received. As many were later happy to demonstrate, virtually any piece of complexly structured audio (such as a carefully pro-duced pop tune) would produce the same species of dreamy, textured soundscapes that *U Smile* did (and, conversely, that speeding up standard time dreamy soundscapes, like the work of Icelandic band Sigur Rós, did not produce Justin Bieber-like results). Perhaps the most significant effect 'Bieber 800' had, beyond giving producer Pittsinger ("Shamantis") a good deal of exposure, is that it started many smart people, including Harold Schellinx at *SoundBlog* [8] and Mark Weidenbaum at *disquiet.org* [9] (both writers to whom this paper owes a great deal) tracking backwards across the historical landscape of slow sound and thinking about the future of audio production.

The story of the twentieth century has largely been one of acceleration. From the physical (the midnight ride of F.W. Marinetti, the Bonneville flats, the four-minute mile, theV2, the Concorde, the Shinkansen and TGV, and even reaching the escape velocity of the earth itself from Baikonur and Cape Canaveral), to the informational (the telephone, satellites, email, and the web): speed was king.

But as we have emerged from the hangover of the millennial party a decade or so later, some of us once again seem to have become profoundly interested in slowness – there are movements in support of slow food, slow cities, slow design and even slow sex.

Perhaps this new-found interest in low velocity is just part of a collective fit of pique because we did not get our flying cars. By which I mean that the beginning of 21st century, so enormously pregnant with vi-sions of the future for so long, has simply turned out to not be how we imagined it. One of our most lauded science fiction writers, William Gibson, has given up setting his stories in the future, because the present is so "science fictional," [10] an extension of his quip, quoted in *The Economist*, December 4, 2003, stated that, "The future is already here – it's just not evenly distributed." Maybe it is the case that we have optimistically leaned into the future for so long, rushing to meet its promise, that we may have run past it without recognizing it. Some of the interest in slowness now seems to be rooted in an inter-est in pausing and taking stock, to find, deal with and embody all of those futures that have already ar-rived.

Perhaps some of the interest can be understood in the context of a general breaking away from the for-mats and structures that have so long dominated recorded music. The temporal limits of 45 RPM, the LP, the cassette and the CD are, along with their attendant marketing and distribution apparatuses, be-coming increasingly irrelevant in the time of cheap storage, psychoacoustic compression and high-band-width networking. With even a modest portable media player capable of storing days or weeks of music, why not have eight-hour tracks? Furthermore, as storage itself disappears into streaming cloud-based solutions, why have any limits on duration?

In a related thought, I believe the local spike in the interest in slow sound and the DIY movement are related phenomena; the popularity of slow sound may be bound up to a great extent in its astonishing generative capacity. With software like *Paul's Extreme Sound Stretch*, anyone with a computer, a little curatorial skill and the patience for tweaking a few settings can produce their own "ambient epics." [11] With the burgeoning popularity of web sites like instructables.com and thingiverse.com, perhaps the ability to say, "I made this!" will wind up being the majority of the engine behind slow sound.

The idea of the dancing bear, of course, is that everyone is so amazed that the bear dances at all, that there is no discussion of whether the bear dances well; it is enough that the bear dances. The metaphor is an indictment of the triumph of novelty over substance. The ease with which digital tools can now be used to slow down audio, even to absurd lengths, without drastically altering the original pitch is nothing short of amazing – and that it can result in engaging and ethereal textured soundscapes is bound to draw fire from those who produce similar ambient sound work 'the hard way.'

This situation is only a small part of a much larger debate about the ascendancy of the amateur and the celebration of the dilettante, which will without doubt continue long after 'Beiber 800' has faded from all but the search engine's long memories. There is certainly surprise and novelty that something as 'poppy' and heavily produced as *U Smile* could be transformed into something 'transcendent' so easily via even further manipulation. Leif Inge required the talents of a studio of sound specialists and the custom programming of esoteric audio tools (programmers sometimes jokingly claim LISP is an acronym for "Lost in Stupid Parentheses") to pull off his *Nine Beet Stretch*. *Paul's Extreme Sound Stretch*, on the other hand, produces quite good results after less than a minute's download, zero installation and a half dozen mouse clicks. Central to the idea of a dancing bear is not only that the question of the bear's dancing skill does not come up, but also the implicit understanding that the bear could not possibly dance well; we may be amused or surprised, but the bear does not reveal to us anything about dancing.

However, digitally slowed sound may have value beyond its novelty. Certainly, as predicted in many quarters, there has been a deluge of 'Beiber 800' imitators slowing down virtually any imaginable sound who will probably never touch 'slow-downing' software tools after their 15MB of fame. Slow sound, however, whether it be an expression of analog duration as in the 600 year Cage performance, or the visceral experience of using a digital tool like *Paul's Extreme Sound Stretch* to render a familiar melody irrevocably strange, can actually reveal a great deal about listening, memory, sonic emotion and our lived experience of time. If there is a bear dancing here, I would like to imagine him shuffling through a very, very slow but stately waltz.

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ART IN PROCESS – CROSS-BORDER AND BEYOND

Elisabeth Eitelberger & Bello Benischauer

This paper talks about the work by Bello Benischauer and Elisabeth M. Eitelberger: ART IN PROCESS (AIP), an Australian/Austrian entity that critically engages with a number of issues/behaviors specific to cross-cultures and consumer culture. We (AIP) develop our projects both independently and in collaboration with other artists at the intersection of installation, video and performance art.

Globalization has opened up enormous possibilities of linkages; it ideally means dissemination, diversity and insight into foreign worlds. However, other than leading to a broad perspective and enthusiasm about the various aspects of this world per se and its cultures, we must admit that – critically observed – globalization very often concludes in generalization and uniformity (shaped and dominated by Western society and lifestyle). It has become the ideal platform for broad mainstream, a playground for unquestioned fast food and monopole society. For artists, in the contemporary context, globalization can lead to the creation of diverse and specific interfaces, establishing new ways of communication and producing (collaborative) work that sets a counterpoint to the various absurd forms of mass consumption.

This paper talks about the work by Bello Benischauer and Elisabeth M. Eitelberger: ART IN PROCESS (AIP), an Australian/Austrian entity that critically engages with a number of issues/behaviours specific to cross-cultures and consumer culture. [1]

We (AIP) develop our projects both independently and in collaboration with other artists at the intersection of installation, video and performance art.

Such hybrid productions, created in-between art genres of experimental dance and theatre, visual arts, music and performance art, are elsewhere referred to and summarized as Contemporary Performance. [2]

In our case, we use new media/technology as a fusing and transmitting element to deliver and increase the transportation of an artistic message to a wider and global audience.

Some of our video/sound installations that have been the result of recent project series (addressing the growing inter-human and artistic communication through interdisciplinarity) are exhibited during ISEA 2011 – *SUEX* (2008), *Intervention* (2009) and *Emotional Seasons* (2010) – and reflect most significantly the general nature of our work from the past decade.

The exhibition and the workshop called *Born to be a Still Life* are accompanied by this theoretical presentation of our artistic practice. [3]

Within our work, we often force an interaction with the public; increasingly through the use of performance art techniques, experimenting with the art functioning outside its traditional spaces. The filmed and photographed documentation of such acts of live performances in public or private space is then used in the further development of artistic projects to finally result in video/sound installations that again can be brought back into the exhibition space (and/or are screened online). Single projects, always consisting of multiple components, are developed over one-year periods.

The recurrent use of language(s) as a strong tool in this work, intends to make people aware of certain issues through sometimes-provocative voice works that lead the audiences out of their comfort zone into a confrontation with their own, mostly unquestioned, behavior patterns. While our work is not didactic it reflects and seizes contemporary issues in our society. In all this work we aim to explore relationships between the human being and its urban/natural environment in various socio-cultural contexts, generally addressing issues related to identity and belonging that arise from globalization and/or cultural structures. Single projects address an elimination of existing distances through borders and barriers between countries, cultures and individual people. We investigate selected spaces of collective and

cultural identities through onsite projects (i.e. through AIRs) and promote art that extends into the social space, believing in the necessity of art that puts use over meaning.

Bello Benischauer, after working as an artist for more than twenty years, went global with his projects on a regular basis since his formation of AIP with partner Elisabeth M. Eitelberger, who is artistically involved and accompanies Bello on a theoretical basis. Since the age of eighteen, Bello has become increasingly interested in a combined use of diverse artistic techniques and finally set a special focus on new media – particularly video/sound installations –connecting visual images, spoken word and sound. Bello spent ten years in South and Central America, Pakistan, Iran, Nepal, South and East Africa, Indonesia, New Zealand, India and many other places is Australia and Europe, which results today in a deep connection to world-cultures and led to a special interest in the world's varied socio-cultural milieus.

Traveling and the constant aim to connect to different cultures through its people, lead to the manifestation of Bello's ideas, realized within our projects. These ideas do not refer to particular theories but are influenced by our immediate surroundings, by the media, by education; and depending on and shaped by our own individual cultural heritage/history and its multifarious, social layers. In becoming an extremely globalized world, not only the Western image of art has changed but also the exhibition space as we know it has died. Art lives now in cyberspace, it happens within the social space; it spreads out into our daily surroundings and many artistic ventures are sidetracked by less sophisticated projects, among others influenced and a result of cyber culture and social media. The French writer and theorist Nicolas Bourriaud addresses the shifting of the worldview according to developments within the arts. He describes how use over meaning in art has developed in recent years and how the Internet leads into a new direction of artistic expression. Under the term of Altermodernism (following Postmodernism) he addresses the global movement of engaging with the Internet as the main tool of expression, expanding the artist's possibilities to interact with the world instead of reflecting only on their own cultural heritage. Bourriaud refers to this global culture as the "playing field" for artists to experiment and to start building new forms of expression – influenced by and associated with the World Wide Web. He sees the human frame of mind today characterized by a global culture, dominated by exchange. In his opinion, Altermodern intends to define the actual modernity according to the specific context we live in: globalization, and its economic, political and cultural conditions. In an interview he states: "The core of this new modernity is, according to me, the experience of wandering – in time, space and mediums." [4]

Speaking about our own work, it also grows out of a reaction to the present. It translates our individual perceptions into works of art; it transmits our thoughts and feelings/emotions into an interpretive and aesthetic object (a wall-object, a video/sound installation, a social sculpture, a performance act) that becomes an artistic statement. It engages with people through the work process and the process itself becomes the main artistic outcome.

Questions like:

a) Why has it been crucial for us to start forming international collaborations with others and to work in an interdisciplinary fashion across media?

b) How does our work, based on surveying cultural alikeness and differences in terms of identity and belonging, respond to modalities of globalization, growing urbanity and multiculturalism?

c) How did socio-cultural issues become the main theme of interest?

… are currently under review for an artistic monograph called *Cross-border and Beyond – ART IN PROCESS until 2011*. This monograph will document the work by Bello Benischauer and AIP chronologically, complemented by philosophical reflections on single works.

In recent years, we have intensified our work methods concerning the use of languages and the collaborative aspect of inviting other artists into the process of our projects. Four of these resulting video and sound installations are shown in an exhibition during ISEA 2011.

SUEX (*Sustainability and Extinction*, 2007–2008), a four-wall video and sound installation, is designed to confront the audience with different voices (and languages) and asks to overcome the need to communicate exclusively through language, as well as highlighting how easily we tend to ignore what we do not know, or rather what we do not want to know. The basis for this work was an aphorism in sixteen sequences by the artist that was translated into Hebrew, Japanese and Noongar (language of Indigenous Australians, southwest corner of Western Australia) by collaborating artists. However,*SUEX* really looks for a communication beyond language (barriers) and explores instead, how individual languages can be used experimentally – just as a tune, a sound component. The four videos play simultaneously, 'speak' to the viewer and try to get his attention by building a conversational atmosphere in confrontation to the viewer. Other projects made before *SUEX* also questioned the social impact of human beings on nature through mass consumption and globally increasing population. [5]

Throughout the last century, many artists started to incorporate the use of language in their work, implementing certain/different meanings, effects and uses of language. In our case, we use language as a tool to question: Do we need to understand the words? Is there an understanding beyond our languages? In how far can we expect others to accommodate to 'our' lifestyle/cultural peculiarities and are we willing to accommodate/adjust to theirs?

In 2009, we developed an international project series called *INTERVENTION* that explored certain places and their cultural meaning through simple live performances in public. The project series was meant to explore the term of 'intervention' in its artistic meaning and beyond in different cultural environments. The places of this investigation arose as a result of other AIP activities at that time – in Austria, Portugal and Ghana.*INTERVENTION* has resulted in a book of photographs, text and a Blu-Ray Disc with video and sound installations. [6] The original English text and its translated versions in Portuguese and Fante served as a fundamental part of the sound composition. Part 1 – Salzburg/Austria questioned: How do we fit – as an individual – into a space? We investigated how reactions from the general public influenced the intervention itself. Part 2 – Évora/Portugal looked further, examining interventions that happen between people/bodies; how we interact, intervene, interfere and how we individually grow into what we finally are: individual beings, formed by culture, society and language. Explorations in the use of movement, dance and rhythm: dancers created situations together in a public space and in private – building communication through movement; addressing barriers, anxiety and cultural misunderstanding. Part 3 – Kumasi/Ghana explored human beings and their immediate surroundings to discover what actions can destroy others, or interfere with their environment. This part evolved from the discussion about creating appropriate environments for people – both in general and in particular places. It investigated how local resources could be engaged most efficiently, how art might act as a communicator to initiate real action within the social space and to overcome cultural differences. The work created in this particular context turned the word 'intervention' into a poetic experience and took the notion from a place of fear and resistance to one where it was able to evoke a sense of enrichment, enhancement and belonging.

The *EMOTIONAL SEASONS* (2010) project series was again produced in collaboration with other artists and resulted in various parts: *Christmas*, *The Cloned City*, *Not quite Kosher*, *Fool's Gold*, *Off Season* and *Internal Room*. Collaborating performances have taken place in Australia, Austria, Dubai, Ghana, India, South Korea and the United States. The series of works investigated aspects of the core theme of AIP works: how integration or exclusion is felt around particular cities and urban places. This project series generally addressed individual issues observed and experienced by the single artists about identity and belonging concerning aspects of globalization, while living in culturally diverse societies and by focusing on how they would explore/experience their immediate environment themselves in a certain, sometimes contrived situation. Questions that helped to shape the process included: How strongly are we influenced by the materialistic world we live in? How does it feel to live in a foreign (cultural) living environment and how does this affect us personally? Which layers of reality do we create and inhabit? Two of the works exhibited during ISEA 2011, *Not quite Kosher* (developed in Vienna) and *Fool's Gold* (developed in Sydney), are both based on two individual, abstract plays, we wrote for the process. The fragmented text of both plays has been used to develop performance parts in public and private environments that were filmed and further developed into the resulting video and sound installations. [7] The human body (in white clothes in *Not quite Kosher* and nude in *Fool's Gold*) was employed as the main tool to express a full range of emotions and feelings to which the viewer can relate, regardless of background, sex, education, culture, or ethnic identity.

Many aspects of media art and its ephemeral character, process orientation and its temporality have influenced our work methods throughout the years. Cyberculture and new technology increased the interest in an interdisciplinary and – within the arts – the hybrid process of crossing media once again. This is nothing new, it just appears as a new form of an old system; praising plurality over singularity. Contemporary art's perception has reached a different level. A shifting takes place: the process itself has become the object of contemplation. The artist traveler (in real and in cyberspace) explores global culture(s). Today we look beyond our daily environment. Other surroundings can extend our worldview, influence us and become an integral part within our own developing work/life. In our artistic projects we ask questions about the connection points between real- and cyberspace, asking how people's perception, how global culture – in general and specifically – influences our way of thinking and how this can be translated into works of art.

Globalization and new technologies, the Internet in particular, lead to an expansion of our worldview. Extensive developments on various levels urge us to reorganize, reshape and rename certain aspects of human existence. A constant questioning of our immediate surroundings can help us to build new solid structures and may enable us to find a new orientation within this explosively growing world, in which we have to redefine our understanding of identity and belonging.

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NEXTENSION: THE ADVENT OF THE NETWORK-SCREEN

HERLANDER ELIAS

The expansion of the current media-environment due to user-generated content, portable media and social networks has changed the very notion of citizenship. We live in a post-Web world and the network-screens are extensions, they perform as portals to digital space. This is the Next Tension.

1. MEDIACENE

There was a time when there was no media-environment. As technology became part of our culture so did media. One medium after another we have woven an entire environment out of media. It began with print and it did not end on the iPhone.

The society of our time worships contents according to their activities and hobbies. Today there is no fence separating users from programmers, culture men from technology women. Indeed there aren't borders between technology media, structures, patterns and contents anymore. Perhaps we coluld call it the Mediacene, the moment in history in which Man changes his environment, based on media.

This is the thing: The corporation world of the 80s and the wired world of the 90s have merged into one entity alone: a user-driven techno-cultural economy. Such new media-environment is what we may call now the "post-Web" world. Yes, the World Wide Web, the Grid, cyberspace, the Internet, provided ways of functioning and entertaining we cannot disregard. Thirty years ago everybody thought we would get inside the computer world. Twenty years ago we were supposed to interact with media by means of helmets and datagloves. Ten years ago computers were supposed to run vehicles. Today we use touchscreen media, we drive GPS-guided automobiles and we have declared war on depth with 3-D cinema. If there was a border between images and reality now it is gone for good. Augmented Reality is an example of this.

We carry several portable media with ourselves and computers update themselves on their own. We speak to our GPS interfaced cars and rely on Google Maps. This not anymore the planet inhabited by Man in the once Anthropocene age. It is simply the Earth from Google Earth, a media-feature used by Men in the Mediacene age.

Lev Manovich said once that "for the first time, space becomes a media type". Such statement is so much daring and true. Since cyberspace appeared on early videogames that virtual worlds, digital cartography and electronic mapping became a fact. Behind most of our media-environment's innovations over the last decade there is map technique. Now high-resolution maps take place because of the Web's appearance. As I have said previously, this is a post-Web world. And in this moment of history, each second counts and the clock is still ticking. Should we examine better these change we should mention the advent of the "network-screen," something only possible due to the awareness of our living in a "civilization of the screen." [1] Put another way, we may understand the whole media-environment thesis by comprehending first how instead of a screen we had a network-screen. Rather than being just a computer-portal to the Web world, screens and networks got married in the 00s following a similar trend as in the 80s computers were attached to telephones.

Wherever we are standing, the network-screen grants access do data, helps us finding things and eventually reminds us of things we once were looking for.

At the same time, the Mediacene establishes that media are futuristic, as if the imagined tomorrow is today's idea. In fact, most by-products of our time are simultaneously futuristic and rely on ergonomical designs. They're a sort of prospective concepts.

Of course it is not much to highlight that in the Anthropocene, Man is believed to have changed the landscape for good. Once we understand what is at stake in the media-environment we notice that most of things surrounding us, consumer products and images, resemble "post-relief" artifacts. After three decades of hard digitizing and databases' enlargement the desktop computer became a tiny netbook, mobile phone, a smart appliance useful for using everywhere, any time. It is getting harder to distinguish as times goes by what exactly belongs on the other side of the screen and what does not. So far maybe unfortunately we are creatures of screens. Computer after computer we have built a Matrix, a real one, a high-end computation network, a media reservoir for hybrid images, the very foundation of the computer as a "metamedium." [2] After this development a computer is not seen as a household appliance, office hardware or geek gadgetry. From this moment a computer is an open portal to a network, a vast world of data. So one should not think of Gibson's characters in *Zero History* novel as being awkward whenever they're "Decked." [3] Everyone is "decked" these days.

2. APPLIED SPACE

Our next range of possibilities in working performance and entertainment features fits in the new media-environment. Computers, networks and communication sciences become one universal recognizable entity, something every person notices on media screens, in the media space, which is an "applied space". Once a person uses software and triggers information commands, a new bridge is set between the screen-world and real-world. The space where we step in and out is an applied space, and interaction happens across media-screens, henceforth becoming limit-surfaces. As users make these media their world-center all options are set on them, every track record, each choice, all things to share and recollect. On the other hand we are witnessing a transition from a pre-digital world to a fully-digitized world. What else is left to scan and digitize? What else? Right now we are for sure living in a cyborg place, since we still know we are mostly human, modern progress believers. Yet, living in pre-cyborg places was a very different experience. You really had to be there. People connected online across the Web in their limit-surfaces try to search and be found, to collect information and to belong to a larger collective. It looks like we too have a match between the collective and the network. Yes, we have. It's called "social networks", a new 21st century phenomenon.

Our time is positioning us in a new condition, for we feel like we are hostages in a liquid present. An ever-expanding media-environment digests, changes, reconfigures any element that comes across its ventures. Multiplicity became a rule of the data world. We have to understand that in this media age reality becomes multiple. It is imperative this "multiplicity", it corresponds the endless range of options that Chris Anderson mentions in the *Long Tail* book (2007). Multiplication is also a characteristic of the media-screens, video-windows, multitasking, chat dialog boxes, and so on.

A new context is available and it forces us not to choose resignation. Choose options. Create options. Citizens are now equal to consumers, and they have to be global consumers and global citizens if they do not want to face oblivion and time standing still. Thus, we are left with two new elements: cities

have to be full of new citizens, and cities have to be global. From people's point of view a new character emerges: a citizen of the world. Greek-Helenic culture had a term for this: *philoxenia* (love thy self, the other, and long live the art of travelling). Our sole condition is to embrace the eternal adventure, the trip into an environment where we stay in touch to our network of friends on a global level. Media change the city and society. Suddenly the urban world and the media world seem to be the same world, a "big neon city", in the gibsonian sense. After all, it is true that "cyberspace" resembles a city, and we cannot stop noticing that metropolises and sprawls look like the cyber world of rendered icons of data flowing in every direction. Digital Las Vegas, perhaps.

Evolving digital space has made many things possible, mostly customization. Users, players, workers, programmers, artists, designers and technicians opt each one for their favorite elements. Our digital world is the applied space, where applications follow user's expectations and motivations, skills and preferences. A bridge could be linking both the excess by-product of supermodernity and the customizable media-environment surrounding us.

A massive array of new brands (Google, Amazon, Facebook, Apple, Twitter, Netflix, etc) makes us more and more dependent on this applied space. Our eyes are glued to media-screens everywhere we go. Once Manovich defended that "We still have not left the era of the screen" [4] and so far it is still true. We haven't left the screen. In fact it is going that way. Some things only exist inside the screen, as a world of applications available and data do. In order to understand this applied space, one has to recall that cyberspace in the last century visionaries' jargon meant "control". Remote control. The power of the world in the palm of our hands. Working on different programs at the same time. Standing or walking on different worlds at the same time (GPS, videogames, Second Life, real world) is also a multitasking phenomenon. All this multiplicity and overlaid grid of available things to do by the new urban global IT citizen is about cyberspace.

At first, the applied space of today's iPad and smartphones is cyberspace. That is correct. Though we have to accept either that cyberspace is "whatever you view on your computer screen, the electronic geography you traverse when you are on the Web." [5] So ultimately, this is all about geography. What technology allowed us to do since 1994, on a mainstream level, is to traverse, avoid, overtake, transnational borders. Fences are rendered meaningless ever since the Web came up. Which type of space is this? Gibson himself in the text *Chaos & Cyberculture* (1994), in the interview conducted by Timothy Leary, tells us it [cyberspace] is "notional space." [6] So here we have the ground set up for the advent of the "network-screen." If there was a time in which each geography had its own screen codes, that time is long gone. "Notional space" has provided us with the tools to use the applied space of the digital age: "geographics". From Google Earth, GPS, Geocache communities, the applied space of control became "the grid", the ground upon which everything has been established upon. A major contribution about this issue is provided by Higgins, as she says that "the persistence of grids demonstrates that once a grid is invented, it never disappears." [7] Cyberspace is that grid, the Web is that grid. Something we can never uninvent. It's not technology we are discussing here. It is culture, a mankind landmark, an American product to civilization. Though one thing is still working on one hundred percent, the fact of each new media image being something where the user actively goes into. Why it happens is answered by Svetlana Boym, who believes that "the computer medium is largely tactile", not merely visual." [8] The computer tablet revolution, with their promising applications, proves to be a good applied space, and it shows how Boym is quite right about it.

3. NETWORK-SCREEN

All we know is that in 1994 the cyberpunk visions of the "datascape" became true by the hands of Timothy John Berners Lee and Robert Caillau whom have tested the HTTP communication design between servers online since 1989. Yet cyberpunk authors did amazing discoveries, they imagined how audiovisually and interactively things would be like. William Gibson admits such logic by assuming that "Well, if there's space behind the screen, and everybody's got these things at some level, maybe only metaphorically, those spaces are all the same 'space'." [9] Despite the "newness" of his words, the point is that what today we take for certain this post-Web world and how we interact with the network-screen, yet it began in the 80s.

Media-environment users actually belong to this new sphere, the realm of control, they have grown or matured within a "post-Web," "post-cyberspace" world. Beyond this a new characteristic is implied in space-consumption, since space became translated to images (First Person Shooter videogames, Google Maps, Terragen software for virtual landscapes), or at least computer-generated, and that is how we became "user-players". At the same time we play and use, we travel, work and entertain ourselves.

By staying connected to this universe all interaction depends on the user's position and his tactile skills, like typing, rotating, pinching, pressing and moving icons around. So, if it's a question of space, digital one, and if people must be users, the network-screen is the hardware-software combination which establishes best the new interaction mode with the digital world, the media-environment.

For the very first time a culture appears, being produced by "everybody", rather than by an intelectual and social elite, regardless of national borders or social class. Now, the network-screen provides worldwide access to a screen across networks, and that is the screen of new Web 2.0 and upcoming 3.0 brands.

People feel driven to the Web world. All there is one finds it on the Web. If one does not find it that is because it is likely inexistent. More and more students upload their CVs and portfolios online. Pictures are being uploaded to Flickr, videos to YouTube, short global messages composed on Twitter accounts. For professional reasons they are connected to LinkedIn and whenever they can they chat in Facebook, Orkut, Baboo, Bebo, Digg or Hulu social networks. All the people online together outperform small cities in terms of communication flows. Some countries are smaller than the amount of online users in some social networks. The advent of the network-screen is marked by another event, the fact of circa eighty percent of users being mobile nowadays, updating anywhere, anytime.

Cory Doctorow says that "the networks that emerge are owned by everyone and no one." [10] Digital world democratizes and then is turned into a corporate cluster. This too happens. It is a second nature what we're discussing here, and right now it is huge.Today we need a "postmedia literacy." Media started in the mud brick of Mesopotamia all the way to modern wax disc or contemporary PlayStation and iPads. And it does not end here. As the media-environment keeps growing, a "contiguous record", a "continuous-memory" of the digital realm, improves our information and access to it. Network-screens are so global and relatively cheap these days that sometime we forgot a major part of Earth's population has no access to cyberspace. Regarding the true substance of cyberspace, Boym highlights it is basically "datacentric." [11] Judging by the amount of search engines and new Web sites, ebooks now available and so on, one may think a new type of person is needed in this data world. New media has new performances. Therefore, it changes the user and the player into a sort of "data-pilot". The wider "networking" and "data collecting" event turns people into data-pilots. Due to this, one could invoke as well the concept of transmedia event. Is it possible to describe what exactly is going on? Yes, it's a phenomenon of "global palimpsest". It works as an ever-increasing space of posts, blogs and news from everybody to

everybody. Like a self-growing empire of records, in the Wiki age, and some narratives move from one medium to another. Consumers keep following them.

Today 36% of Amazon books sold are digital releases for the Kindle system. We no longer search for the news, the news finds us... Networks of news are established, people gather around contents. Communities grow upon content interest, depending on which records are published, available on the network-screens.

Our media-environment keeps increasing and turns other relatively new things into obsolete items. Online is no longer a state of digital citizens, it's a law. Nobody separates computers from networks. The digital is obviously the network. It hardly seems unlikely how for some time both things, computer and the Web, were separated. "Cloud computing" establishes this at its best.

People are looking for collective waypoints. GPS and GeoCache community and the social networks are symptomatic of this substancial problem. People gather, link, unite and move towards common waypoints. Cyberspace still is the perfect spot for sharing those waypoints. It can work out fine for sharing GPS coordinates as well as ideas, texts, pictures, designs or mathematical concepts.

Our network-screen world, our attachment to the mobile media-screens is a new thing. But what leads us into it is quite old. We need the past memories and the tribes. A man without culture is an empty vessel. Yes, we live in a screen culture, and now all screens are linked together, they are so flat that images seem to acquire more depth than their media.

It is a question of performative subjectivity too. People, subjects, perform, they share, work and function based on their convictions. It is not an objective data-based world, it's a subjective-relying network. This is our time's identity card. No one can predict anything anymore, if all that happens is recorded on the Web. As soon as the network-screen has it all, everybody around the world knowing something could trigger unforeseen consequences. The more people know something the likely change is taking place. Things become impossible to anticipate. Soon there will be not much differences except those of performativity. Performance will determine how things unfold. Based on performance one will be capable of predicting the future. This transition is better explained by Gibson, who says "We're all doing VR, everytime we look at a screen. We have been for decades now. We just do it. We didn't need the goggles, the gloves. It just happened. VR was an even more specific way we had of telling us where we were going." [12] In the aftermath of this thinking, the point is that now each network-screen is a portal, a door to the media-environment, we are before the NEXTension.

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SONIFICATION OF EMERGENT URBAN EVENTS WITH GRANULAR SYNTHESIS AS AN URBAN DESIGN TOOL

EMRE ERKAL

As the contemporary city emerges as a dynamic field, new temporal dimensions with inter-scale relationships have to be included in urban analysis and design, such as urban mobility. The auditory sense equipped with ecological psychological principles is fit for the task of tracking emergent events. An urban design tool is proposed and partially implemented in the form of a sonification environment with operative principles of granular synthesis.

Fig. 1. Movement channels of people and vehicles, Still from Videoanalitik: Eminönü Series, 2001, Emre Erkal, digital video, Copyright Emre Erkal.
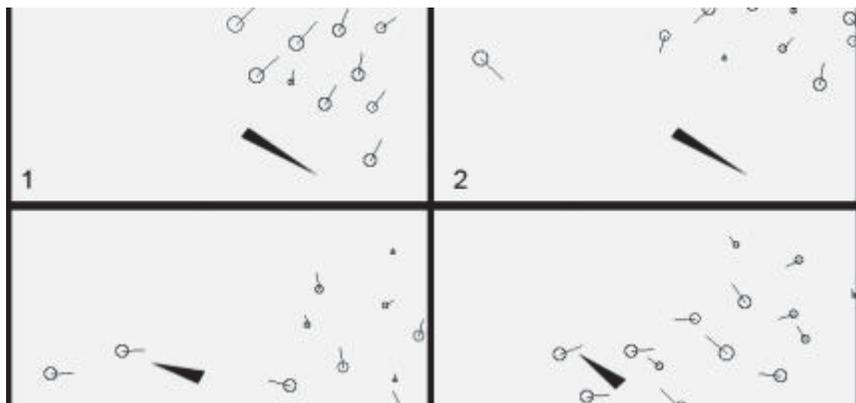
Fig. 2. Screenshots from Agents with PulseTrain, 2006, Emre Erkal, interactive Max/MSP/Jitter program. Copyright Emre Erkal.

Crisis in Contemporary Urbanism

Parallel to the increase in problems due to contemporary urbanization, it is not possible to state that today's cities are better analyzed, designed or known, all yielding to a current crisis of comprehensibility. One set of reasons has to do with the qualitative change in the urban realm, while another set of reasons arise out of the tools we try to understand our cities with.

Urbanization in many parts of the world yield to an increase in size, density and depth of cities. If megacities constitute one facet of the phenomenon, shrinking cities constitute another. In addition to this complexity, we are facing the impact of information and communication technologies (ICT's) in the urban realm. [1] For several years, it has been well-researched and understood that the relationship is more complex and ICT's and the large metropolis effect each other and therefore a more intertwined and hybrid view of space has come up. Recognition of double sided effects bring opportunities as well: these technologies might be utilized for the design of contemporary urban areas, in the form of new urban design tools.

Urban Design in Today's World: The Need for Design with New Concepts

The paradigm for Urban Design originated in 1950's architecture culture, when the capacity of public spaces in cosmopolitan city centers were questioned to be the vessels for the public sphere. Initial conceptions had more to do with devising an architectural vocabulary for symbolic identification of public space with the public sphere. However with the Team X group, urban designers concentrated on the manifest forces of publicness across a variety of urban spaces, not necessarily on 'publicly owned spaces' to begin with. Similar ideas were circulating in the zeitgeist of the post-war western circles of architecture and urbanism. Jane Jacobs analyzed the condemned urban centers in the US, and documented lively mechanisms of self-regeneration in these neglected neighborhoods. Jacobs was the first to utilize mathematical concepts of self-emergence over social networks, in fieldwork.

Since then, Castells' notion of "space of flows" and the "network society" have come to dominate urban thinking, in response to developments that can not be explained with classical notions regarding how cities work. [2] As contemporary urban design theory utilizes the concept of space of flows as the new logic of urbanism, dynamical concepts that take into analysis the flows and mobilities of people, goods, energy, money and information over what is deemed to be infrastructure become instrumental. These views take modern urbanism as complex processes playing out on complex fields over time. Relationships and links occur across many scales and vast distances.

We choose to concentrate on one such dimension: urban mobility. Barley recounts "choreographies of travel" in London, where definitions of center and edge are constantly re-emerging. [3] The physical aspects of mobility could be the indicators of forces and relationships in the social realm. Movements of crowds in urban spaces yield to the view that cities today need to be understood in terms of ever-changing possibilities. Koolhaas' work on the city of Lagos showed that the city has massive flows of people and goods in uncategorized and unregulated ways. Koolhaas' documentation of mechanisms of self-regulation and emergence begin to propose Lagos as a model for the future of urbanism in the industrialized world. [4]

As an example, seemingly unused interstitial spaces in between highway bridges act as arenas for orga-nizing junk for re-use. Collection and dispersal rhythms of metal or tires could turn any seemingly irrele-vant space into a temporary logistics center. Emerging megacities, such as Lagos or Istanbul might be illustrative of the dynamical forces of mobility, with infrastructure in formation [Fig. 1].

Tools for Monitoring Urban Change

CONTINUUM BETWEEN MICRO AND MACRO PROCESSES

If this is the future for the cities, what could be the parameters for studying and comprehending these forces of mobility? Therefore, analysis and intervention could begin with the notion of the event. Events in modern architecture theory have come to signify well-defined observable sequences in spatial config-urations, yet events in contemporary urbanism are emergent singularities where novelty comes not only with re-occurrence but also with undefined categories. In other words, an event could emerge in an un-categorized way. Thus, as an event arises out of a recognition, it is a phenomenon of perception.

Mobility at larger scales signify a swarming of the individual movements and linkages; and the type of knowledge one aims to arrive at is about the large scale implications. When faced with micro-level changes in patterns of movement of people, the moment of recognition that a novel event has occured becomes critical. Deleuze reads Leibnitz's work as he defines the passage from micro-perceptions to macro-perceptions: for him the role of perception is about the "granulation of the world and spiritual-izaton of the world's dust." [5]

EVENTS IN ECOLOGICAL PERCEPTION

For discussing the problem of comprehension of urban intensities, a distinction could be made between model-based and event-based approaches to cities. As inheritors of classical urban planning tools, model-based approaches develop a map, an enhanced representation of the city based on pre-deter-mined categories of inhabitation, use, linkages and event types. They are inherently ontological: the ap-proximation of the representation is crucial to the information that can be extracted from the model/map, regarding the large scale undergoings in the actual city. Model-based approaches show a great variety: ranging from absolutist intelligent maps to computer simulations that are constructed from the vantage point of a single generic observer. However, as this observer is generic as well as the city, the model keeps it distance from the actual city.

Event-based approaches could be defined by taking the actual city and the actual observer as the depar-ture point. As an observer in the city is part of the physical environment and the information he/she re-ceives could be understood in terms of embodied cognition. Embodied cognition implies that informa-tion – and thus knowledge – of the actual world has to be communicated to the individual through sen-sory and perceptual channels that are physically coupled with the real world, as opposed to the view that observers are static receivers of sensory data. The work of J. J. Gibson in ecological perception has been fundamental for the development of this line of understanding. For Gibson, the information for perceiving events are a result of the individual's being in the environment he/she perceives. [6]

However, for developing an urban design tool, comprehension of large scale events are crucial. As an observer is limited with his/her physical existence, the problem of the comprehension of large scale

workings has to be developed with the principles of embodied cognition. Embodied cognition implies that information – and thus knowledge – of the actual world has to be communicated to the individual through sensory and perceptual channels that are physically coupled with the real world. For tackling problems of detection of events in ever-changing flows, pertinent sensory channels must be selected for conveying information. Processes of hearing has been shown to deal with temporally varying intensities better than vision.

Sonification with Granular Synthesis

ABILITIES OF HEARING IN THE EXTRACTION OF TEMPORAL INFORMATION

Sonification is a set of techniques where information is transferred with sonic elements, other than speech. Temporal nature of sound and hearing allow real-time information to be monitored constantly. The most widely known early application of sonification is the Geiger counter, a device which instantly tells the amount of radiation its sensor counts with a series of clicks: density and intensity of sound elements convey information about a landscape of ever-changing real-time data. Studies show that auditory monitoring of emerging events allows faster detection, compared to just visual monitoring or visual and auditory modalities combined. Hearing is simply more equipped for the detection of real-time change. [7]

Early sonification applications utilize musical qualities such as pitch variation in order to indicate the magnitude of change in the observed parameter. However, more recent applications try to utilize human auditory capabilities for information extraction about physical magnitudes within the physical world. Human hearing can extract information regarding the physical events that occur among physical objects in its surroundings: density, malleability and weight of objects are easily reported.

The data that needs to be sonified has to be mapped onto auditory parameters according to its dimensions. For monitoring parameters regarding change in the urban realm, issues of scale is critical. Furthermore a gradual change in parameters such as densities over a region has to be mapped gradually. In the literature there are sonification examples for geographical information which are direct translations from visualization. Zhao et al propose a four-part system: overview, navigation (zooming), filtering and details-on-demand. Performance is difficult to document, and yet the results are in accordance with other basic research that theoretically disparate dimensions such as timbre and amplitude are not totally independent. [8]

These studies show that the design of sonification becomes crucial for its effectiveness. In order for the hearing observer to make sense of the sonic input, the design of the system has to begin with auditory capacities that are to be tapped into, rather than imposed classical music theoretical categories. Trevor Wishart puts forth listening in the frequency domain, and discusses the potential in much neglected noise spectrum. Wishart is interested in the listening of a dangling telephone wire in the wind, where the sonic output is connected with the physical properties of the wire itself: its mass, cross section etc. [9] These physical parameters are directly embodied in the sound generated, and furthermore the human ear is capable of extracting information regarding these. Therefore, a natural morphology of sounds could include: crack, turbulence, wave-break, bubbles and similar physical processes.

Physiological research into auditory scene analysis, backs these holistic views. Bregman provides a framework for understanding hearing in an ecological point of view. [10] In Gibsonian psychology, event replaces sound-object as the unit of analysis. Bregman takes it further and proposes that flow is pertinent: a series of footsteps tells us about haste or laziness whereas a single footstep sound is irrelevant. Following this logic, it is plausible to propose the address the kind of hearing of layered events in sound streams, that extend across micro and macro scales. What is critical for urban fields is the capturing of dynamic morphing qualities in the continuum regarding the movement of individuals amassed. Wishart extends the analysis into group phenomena proposes streams of micro-events producing a sound landscape that is continuous across scales.

PRODUCTION OF MICRO-SOUND FOR TEXTURAL DEPICTION

One particular technique that could be instrumental in the implementation of these principles is the technique of granular synthesis. Granular synthesis is a synthesis technique devised with slightly changing micro scale sound packets produced in unison. As masses of 1 to 100 millisecond long sound quanta come together in clouds, their variations produce macroforms. Simple changes in simple parameters like the duration or the density of the granules yields drastic transitions. The potential of granular synthesis for the monitoring of the full variation in the spectrum is illustrated in the Keller and Truax study. In this study the sonic material of water drops were used as granules, and masses of these sounds were then varied in density and flow speed to fully invoke sensations along a continuous spectrum ranging from sequential water droppings to the flooding of a river. [11]

In terms of sonification, granular synthesis techniques provide an invaluable set of bricks in portraying varying textural data, such as urban fields. For implementing a sonification environment for real-time change, an observer is crucial, so that real-time intervention becomes meaningful. The more textural the granules, the more embodied will be the sensory integration for the observer.

Design Tool Implementation

THE GENERALIZED CASE

An urban design tool is proposed to track emergent events within mobility patterns happening over time. Real-time change is dynamic, yet classical planning and design tools are incapable of capturing. This proposal rests on the assertion that an operator is crucial to assess the emergence within the flows. A disembodied computer model will only be able to detect occurences of pre-determined classes of events. For the detection of novelty, a mechanism tapping ecological perception can to be utilized.

Sonification with granular synthesis has two advantages for the task: utilization of the auditory modality for fast detection of temporal change, and micro-level granular change allowing for textural depiction of a phenomenon played out on a spatial layout. Mapping is straightforward: persons could be seen as singular moving particles, and each person's movement can be sonified in its own terms. This movement will occur in a given urban spatial configuration. With interactive parts within this configuration, an operator could make decisions and change the parameters of these moveable parts according to the emergent events she recognizes. This consitutes a feedback loop where the operator becomes enmeshed within the system she observes: in real cities these moveable parts in urban spaces do exist, however they are in the hands of security experts, not designers.

Therefore, the overall tool is conceived of in several parts: sonification of moving agents, the feedback design loop and the piping of real-time mobility data from real-time cities to provide for the agents. As the total project is an ongoing venture, the purpose of this essay concludes with the discussion of the sonification and feedback parts.

INITIAL IMPLEMENTATION: PROOF OF CONCEPT

A Max/MSP/Jitter implementation of the analysis counterpart is based on a modified version of the original Boids algorithm by Reynolds. The urban field is represented as a two-dimentional surface on which agents are set in constant motion. In the original Boids algorithm, each agent moves according to simple rules: avoiding collisions with neighbors, trying to align its speed with the speed of the group and aiming for the instantaneous group center. As all agents are on the move, the center and the collective speed is constanly changing; an ever-changing swarm of agents are simulated [Fig. 2].

In order to complete the feedback loop, a few objects are placed in the field. The operator can change the orientation of the objects. These changes bring forth more dimensions to the complexity of the system. A real-time coupling of the operator's sensorium with the chaotic system forms an embodied coupled channel, working its way through the auditory system. The emphasis should be placed on processes of hearing with granular synthesis, rather than the closure of the feedback loop. With textural depiction, chages across many scales – ranging from the micro to the macro – will be audible, and yet responsive to miniscule changes in the operator's actions with objects.

Conclusion

For the first portion of the urban design tool, an embodied feedback loop is established between a dynamical phenomenon and an operator/observer through sonification. Granular synthesis allows a textural depiction of the event landscape, the resulting sound-field is capable of portraying miniscule changes in parameters for the acute ear. There are numerous granular synthesis techniques that need to be tried out to develop an understanding of the kinds of emergence each technique is sensitive to. For example with the implemented 'pulse trains', tight convergence and staggered cross-passage phenomena were strikingly recognizable.

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BRANCHED SURFACES AND COLORED PATTERNS

JUAN ESCUDERO

A cell complex is defined in the analysis of the topological invariants of tiling spaces. In some cases the complex contains collared tiles. The representation of the corresponding branched surface can be done by assigning colors to the collared tiles. This allows to distinguish tiles with the same shape but different edge identifications.
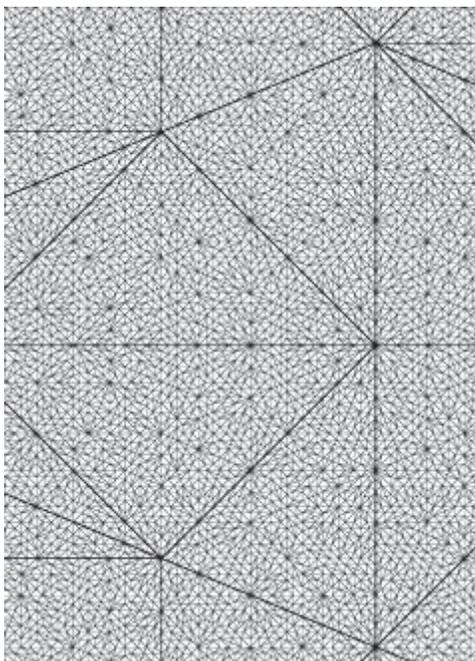
Fig.1 Level-4 supertiles for the octagonal tiling
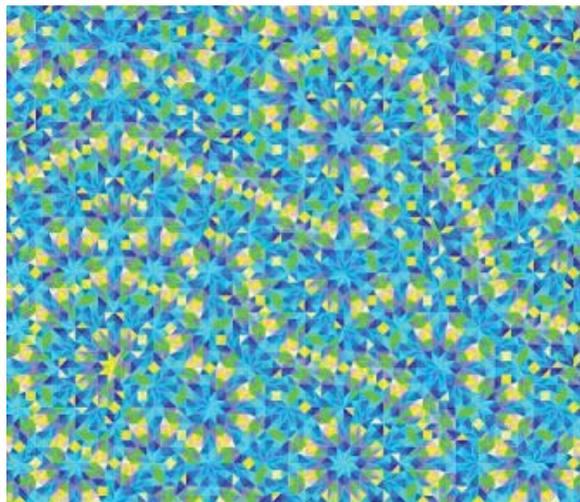
Fig 2. A fragment of "Branched Manifold"
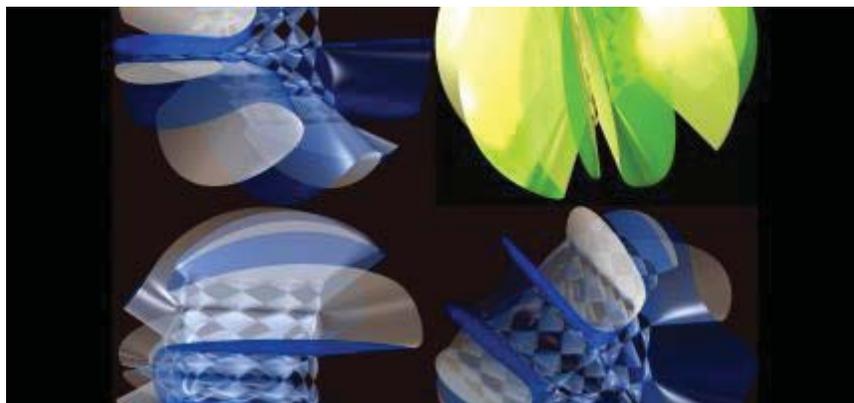
Fig 3. "Nueve y 220-A" is based on a nodal surface with degree nine and cyclic symmetry.

1.-Introduction

Artists, scientists and mathematicians share instinctive feelings about order and disorder. One of the fields where this is apparent is the mathematical theory of long range aperiodic order, because of its implications in the arts.

Aperiodic tilings are geometric objects lying somewhere between periodicity and randomness. In the 1960´s Wang and Berger introduced aperiodic sets of tiles in the treatment of certain problems in logic. The question was whether or not it is possible to determine algorithmically if given a set of tiles they tile the plane. The cardinal of the tile sets was very high and examples with few prototiles were constructed later by Robinson, Penrose, Ammann, and others. Since the discovery of quasicrystals in the 1980´s, the generation of ideal quasiperiodic structures has been a problem studied mainly by mathematicians and physicists.

Recently it has been suggested that aperiodic order already was present in the medieval islamic architecture. [8] Periodic and non-periodic girih (geometric star-and-polygon, or strapwork) patterns were on the basis of the designs. In particular by using certain substitutions in five girih tiles, a pattern on the Darb-i Imam shrine (Isfahan, Iran, 1453 C.E.) can be mapped into a decagonal quasicrystalline Penrose pattern with few defects. The girih tiles have the shape of the decagon, pentagon, hexagon, bowtie and rhombus. They can be seen in one of the panels of the Topkapi scroll (Topkapi Palace Museum in Istanbul), drafted by Islamic designers to transmit architectural procedures. The authors in [8] also claim that a selfsimilarity transformation, or subdivision of large girih tiles into smaller ones, was known by islamic architects.

In the 20th century, there are also many examples of non-periodic order in the arts. Xenakis, while working as an engineer in Le Corbusier's office, was responsible for the design of the undulating glass panels at the facade of the monastery of St Marie de La Tourette. Four one-dimensional tiles in golden proportion and their combinatorial distributions were the constructive units. [10] At the same epoch he employed Fibonacci series to organize the temporal sections in Metastasis, a work based also on ruled surfaces in the form of continuous massive glissando structures. The idea of transforming graphics into sound was elaborated by Xenakis at the UPIC system in the late 1970´s.

Aperiodic order is present also in the design of more recent architecture. Penrose tilings, with tiles appearing in ten different orientations, are used in the Royal Institute of Technology RMIT and the pinwheel tiling, with tiles appearing in all rotation angles, in the Federation Square buildings, both in Melbourne, Australia. Obviously in many cases, the use of patterns with interesting mathematical properties does not necessarily give results aesthetically appealing.

From a mathematical point of view, the appropriate space in pattern analysis is not the original surface but a folded version of it which is called the orbifold. [1] The set of points of the same kind is called the orbit of the symmetry group and the folding takes all the points of the same kind to a single point. Repeating patterns can be folded into an orbifold on some surface. The description of manifolds in two dimensions is often done by identifying some edges of simpler surfaces. Deterministic and random aperiodic tilings in two and three-dimensional manifolds have been presented in the past few years (see [5] and references therein).

There are several methods for constructing aperiodic tilings: cut-and-project methods, substitutions and matching rules. Substitution tilings grow by iteration of a set of inflation rules applied to a given set of prototiles. A tiling space can be seen as the set of tilings that locally look like translates of a fixed tiling. For the analysis of the cohomology of tiling spaces a type of cell complex is defined. [9] For each particular case the complex contains a copy of every kind of tile that is allowed, with some edges identified, and the result is a branched surface that can not be represented properly in three dimensions. A way to get an idea about it is to generate a pattern where the basic polygons with the same shape, color and orientation represent the same tile in the complex. [7] The topological interpretation is that if somewhere in the pattern a tile shares an edge with another tile, then those two edges are identified. The goal in the geometric representation is to visualize in some way the space unfolded without need of supplementary dimensions.

In the visual and sound arts, this type of constructions have potential interest as a system of reference in constrictive preforming for channeling the expressive energies.

2.-A branched surface associated to an octagonal tiling space.

In a substitution tiling the pattern obtained after applying n times the inflation rules to a given prototile is called a level-n supertile. A substitution is said to force the border if there is a positive integer n such that any two level-n supertiles of the same type have the same pattern of neighboring tiles. Tiles labeled by the pattern of their neighbors are called collared tiles. When the substitution does not force the border, collared tiles can be used for the study of a type of topological invariants known as Cech cohomology groups. [9,7] In what follows I discuss how the procedure is applied to one of the octagonal tilings introduced in Escudero. [3] The study of its cohomology motivates the generation of colored aperiodic tessellations which represent branched surfaces. [6] In contrast to other well-known octagonal examples with the silver mean as scaling factor, like the Ammann-Benker patterns, this substitution does not force the border.

A vertex configuration is a set of tiles sharing a vertex. The first step in the construction consists in analyzing the dynamics of the vertex configurations. The tiling has the property of finite local complexity, which means that for some positive real number R, the tiling contains, up to congruence, only finitely many local patches of diameter less than R. Also it is uniquelly ergodic, namely, it has well defined patch frequencies. In general after n inflation steps all the vertex configurations are transformed into a finite

subset. In this case it is formed by just two vertex configurations. This is the set of vertices taken to form the cell complex.

The tilings with eight-fold symmetry in [3] have four triangular prototiles represented by the letters A,B,C,D. Their edge sets are: A(a,b,b), B(g,d,e), D(g,b,b), E(b,b,z), where a,b,g,d,e,z represent the edges having lengths 2c1,1, 2c2, 2c1c2, 2c2c3, 2c3, respectively, with ck =cos(k pi / 8).

Iteration of the inflation rules applied to a given prototile shows that there are, up to mirror reflection, forty-one vertex configurations. After four inflation steps all of them are transformed into just two, that we label 1 and 2. This can be seen in Fig.1, where the superposition of two patterns separated by four inflation steps is shown. The vertices transform into themselves under the application of the inflation rules: 1->1, 2->2. In Figs.1 and 2 we can see both: the vertex 1 has star shape with sixteen A-type prototiles (blue), and the vertex 2 has ten A-type (eight of them yellow-green) and two of type D (green).

The edges and tiles appear in eight different orientations. By analyzing level-4 supertiles, we get the sets of possible collared tiles and edges. Having in mind the different edges and vertices we can construct a cell complex which contains 25 collared prototiles, up to mirror reflection and orientation. In order to distinguish the prototiles with the same shape we assign them colors. More than one hundred colored vertices from the forty-one initial vertex configurations appear. A fragment of the pattern representing the corresponding branched surface can be seen in Fig.2.

The collared pattern can be described in terms of formal language theory, more precisely, with the help of Lindenmayer systems. [3] The words characterize the tilings in a unique way. The word production rules are defined with the intention to describe finite patterns by word sequences as a kind of symbolic dynamical system, which is very "natural" in one dimensional substitutions like the Fibonacci sequence. In one dimension if two letters appear consecutively then the corresponding tiles appear together in the geometric representation. In order to generalize this to two and higher dimensions one has to introduce a bracket structure and the letters in the alphabet represent oriented prototiles. The allowed words in the formal language then are of the type ((ABC)(FA)(DE)). The geometric interpretation is as follows: A and B appear together in the word and there is only one way to "glue" the corresponding oriented tiles edge-to-edge. The same applies to the supertiles represented by (ABC) and (FA) or to (((word1))) with (((word2))) ... if they appear consecutively in a given word (notice that C and F will not appear, in general, adjacent in the geometric structure). A bracket belonging to the alphabet has to be interpreted not as a tile, but as a way to group tiles to get supertiles. The use of brackets mimics the hierarchical structure and it seems that they are not avoidable (without losing the result that if two letters representing tiles appear consecutively then the corresponding tiles can be glued in only one way). The model has the advantage that can be applied to higher dimensions as well.

3. Concluding remarks

In the construction of the cell complex another point of interest is to analyze the ways color can interact with the symmetries of the pattern. For a discussion of the mathematics of color symmetry see. [1] Here there is a freedom in the color selection and the final results can be very different, due to the emphasis in distinct geometric substructures. When we take into account the set of the patterns obtained by all the possible color selections we are approaching to a metaphor of the concept of rhizome which is made of plateaus. Each pattern would be an image of a plateau or "continuous, self-vibrating region of intensities whose development avoids any orientation toward a culmination point or external end." [2] Also

each pattern is related to any other pattern and can be generated starting in a limitless number of ways. There is a principle of connection and heterogeneity in the sense that any local geometric configuration appears in some other place, in fact, in infinite places when the plane filling structure is considered. The pattern is made of lines and occupy all the dimension of a "plane of consistency" following a principle of multiplicity. Each plateau here would have a strong principal unity of root-tree type because its generation is the result of successive iteration of a large set of inflation or substitution rules in a Lindenmayer system. However the whole set of colored patterns does not have this arborescent characteristic.

The basic symmetries are continuously broken and have to be perceived in a dynamical way as would be the case if temporal phenomena were embedded. There are also various levels of perception depending on the distance of observation. The image can then be seen as a kind of nomad place. While we contemplate it we travel through a space in constant change, where local configurations of just four shapes, like a ritornello, always reappear but in different surroundings. This property is preserved when we extend the pattern to infinity, but we can have a sensation of it by observing a finite fragment.

The simplicial arrangements of lines given in [5] are the basis for the derivation of non-periodic planar tilings with any symmetry. The analysis of their associated topological invariants provides a rich source of branched surfaces generation. In addition, certain families of simple subarrangements can be used for the construction of algebraic surfaces with many nodal singularities that can be represented in 3D. In Fig.3 it is shown a work based on a surface corresponding to a polynomial of degree nine obtained from one of the arrangements with 18 lines in [5] and containing the seven prototiles of a series of tilings introduced by the author in 1998. It has cyclic symmetry and 220 real nodes.

In the time domain, substitution tilings and their appearance in the field of astronomy have been on the basis of the formal procedures in several instrumental, vocal and computer generated works, where time harmonizations and sound synthesis derived from spectra of aperiodic ordered sequences play a central role. [4] One of the pieces where this techniques are present is *Yod*, for 6 percussionists and computer, performed by the austrian group Studio Percussion Graz at the 2005 ISCM World Music Days in Zagreb. On the other hand certain identifications leading to quotient spaces and orbifolds have been commonplace in musical practice. A recent work, where this and other concepts of combinatorial topology are explored as part of the precompositional materials is *Los límites móviles del agua* for two pianos, which the Ensemble Surplus plans to perform in Freiburg, Germany.

Both the visual and sound works must be regarded as projections from the same rhizomatic space. They are just manifestations of some of its infinite plateaus.

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HYBRID ART FORMS: THE WAY OF SEEING MUSIC

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This paper will focus on relationship between music and visual arts through the idea of hybrid art forms. Within this interdisciplinary approach, it aims to consider scientific and technological developments and the way its effects on art and perception. In this context, examples by some of hybrid art forms will be analyzed and finally compared with recent multi-media works.

Throughout the Ancient times, from Aristotle to Schopenhauer, from Pythagoras to Newton, common aspects of vision and hearing have been taken account as an interesting research field. In his passage De Sensu, Aristotle remarked the correlation between sound and color by encompassing physical and perceptual matters: "We may regard all these colors (all those based on numerical ratios) as analogous to the sounds that enter into music, and suppose that those involving simple numerical ratios, like the concords in music." [1] However, the analogy in physical relations between sound and vision were grounded to the ideas of Pythagoras who had depicted the musical sensory qualities related to mathematical ratios.

At the end of 18th century, physical correlations of harmonics could have been displayed by the inventions of various tools. For example, Ernst Chladni had produced his patterns with a simple system that included scattered sand onto a square plate. Chladni's patterns were occurred when this plate was bowed in certain notes. [2] Within the 19th Century, the interest of these instruments had gradually increased. French mathematician Jules Lissajous used small fixed mirrors on the sideways of small steel instrument and Sir Charles Wheatstone reflected a light beam on his Kaleidophone to produce the shapes of harmonic vibrations. Among those inventions Harmonograph is one of the well-known device that create figures of harmonic movement of pendulums.

Beside these physical correspondences between visual and acoustic harmonies, there are also remarkable interpretations vary in different standpoints. Goethe's color theory and Newton's observations on physical similarity of musical scales and seven prismatic rays of light had invoked scientific and artistic researches. In one of the early inventions of color transmission instrument 'Clavecin Oculaire', Louis-Bertrand Castel (1688-1757) modified distribution of Newton's visible spectrum and implemented these colors in to his color schema. In the half of 19th Century, new theories and applications were adapted to the instruments, such as Frederick Kastner's invention called 'Pyrophone' which was a type of gas organ and Bainbridge Bishop's device with a small display placed on the top of a classical organ that sound and its related color could be played together. However, the very-best known color organ was Alexander Rimmington's instrument, which was performed in New York, at the premier of Scriabin's 'Prometheus, Poem of Fire' in 1915.

Synaesthesia generates another common state of visual art and music. From late 19th century till the end of second quarter of 1900's, visual artists and musicians got deeply involved with this phenomenon, which is basically defined as a transition of senses. It was practiced mostly seeing the music or hearing the color of sounds. It embodies subjectivity and evokes personal associations. Like Scriabin, his contemporary in visual art Kandinsky was also aspired by this inner sense.

Artistic interpretations

Mathematical nature of harmony in music has always great influence on other art forms, such as visual arts, poetry and even architecture, which could be discussed in a wide range of interdisciplinary perspective. First of all, the sense of order, disorder and the contrast between them alter our perceptual and psychological response. [3] In music, the pleasure of order is established by tonal properties and its analogy in visual arts is indicated by perspective, which represents the vision of nature in harmony. For instance, when the tonal system was broken down by the technique of Schoenberg's twelve-tone system, the harmonic hierarchy was dismissed. This could be seen analogous in the flattened pictorial plane of paintings. However, Donald Mitchell draw a parallel between Cubism and the new architecture, on the one hand, and Schoenberg's method on the other and claim that abandonment of tonality in music and subsequent development of the serial method is well nigh simultaneous with the abandonment of perspective. [4]

Intensive interrelations between music and visual arts began to form art by responding aesthetical needs of the 20th century's worldview. Painters like Kandinsky, Klee and Kupka devoted their art to become unified with the idea of music that has the power to give expression without help of representation. Abstractness, which is considered as an essential property of music became great achievement for visual arts. Latter on, it was also determined by Clement Greenberg, who believed in independence and the purity of modernist art. For Greenberg all arts can pursue the sensuous and physical property of music. [5] Thus, in relation to other arts, music became a model; but the significance is, it should be considered as a method rather than an effect.

Greenberg's modernism is based on distilling art forms and by referring to Lessing and Babbitt; he revealed a long running idea: 'medium specificity.' On the other hand it is interesting that contemporaneously there developed new art forms and innovative experiments based on synthesis of different mediums.

Medium syntheses previously had been seen in the stage compositions like musical dramas and operas and latter in modernist period it gained new inspirations. Like in the 'Yellow Sound' (1909-14), which was an experimental piece, Kandinsky embraced all perceptual effects and blended different art forms. He turned increasingly to music by working on experimental stage compositions with Thomas von Hartmann who used music, painting, dance and lighting in his stage works. At the same time his colleague Schoenberg intensified his painting practices and stated to work on small operas. His short drama 'Erwartung' (1909) and the opera 'Die Glückliche Hand' (1910-13) revealed the same synthetic manner. Contrary to Greenberg's discriminative sense, the synthetic relations of music and visual arts could be seen as influence by Wagner aesthetics: the 'Gesamtkunstwerk' where all arts united under the banner of music.

Although in Greenberg's exclusive sense of modernism or in Wagner's unified art form, music is seen as a paradigm, as a model to define aspired 'modern' art. As Simon Shaw-Miller has pointed out in his essay 'Modernist Music', the modernist conception, has two streams developing at the birth of modernism "which are generated from music." [6]This bilateral condition of modernism stated in on the one hand 'abstract formal techniques' and on the other in 'multi-sensory' or 'multidimensional model', they can be called 'formal modernism' and 'contextual modernism', 'pure' and 'hybrid'.

Within this time period, among these stage experimenters, Thomas Wilfred conditioned himself with an exceptional aesthetic notion. He suggested a new art form, Lumia, the Art of Light, which has only light

as an independent aesthetic medium. With his instrument named Clavilux, he performed silent compositions –which were also given opus numbers like in music - controlled by a keyboard. He stated the aesthetical concept of Lumia as "The use of light as an independent art-medium through the silent visual treatment of form, color and motion in dark space with the object of conveying an aesthetical experience to a spectator." [7] In 1920's, when Thomas Wilfred began his experiments with Clavilux, some other artists saw advantages of film as a medium to express their abstract context. Oskar Fischinger, Walter Ruttmann, Hans Richter and Viking Eggeling, they all became aware of potentials in forth dimension. Their formalist tendency in abstract experience has broadened the essential meaning of composition, rhythm, color and the form.

It is reasonable that not all art forms are pure. Jerrold Levinson defines hybrid art forms as "art forms arising from the actual combination or interpenetration of earlier (existing) art forms." [8] Then he goes on to categorize hybrids as juxtapositional (additive), synthetic (fusional) and finally transformational in which visual music –in the form of abstract color film- is considered as. But for Levinson, because of the transformation of music (western classical music) into abstract film is not structurally and thematically possible therefore he claims visual music as a nonexistent art form. Nevertheless he mentions that these kind of nonexistent art forms could someday exist "by appeal to radically new means and media that technological advance will make available." [9]

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LIGHT ART IN PUBLIC SPACE

Titia Ex

Since 1991 light artist Titia Ex, has examined the value of light art in public space: its symbolic signifi-cance, referring to spirituality or the triviality of modern society. Light is a transfer of energy, an infinite potential of relationships that permanently engenders new links between things and people. Light can dematerialize public space architecture, where limits only exist on the face of things, and dissolve fixed movement patterns.
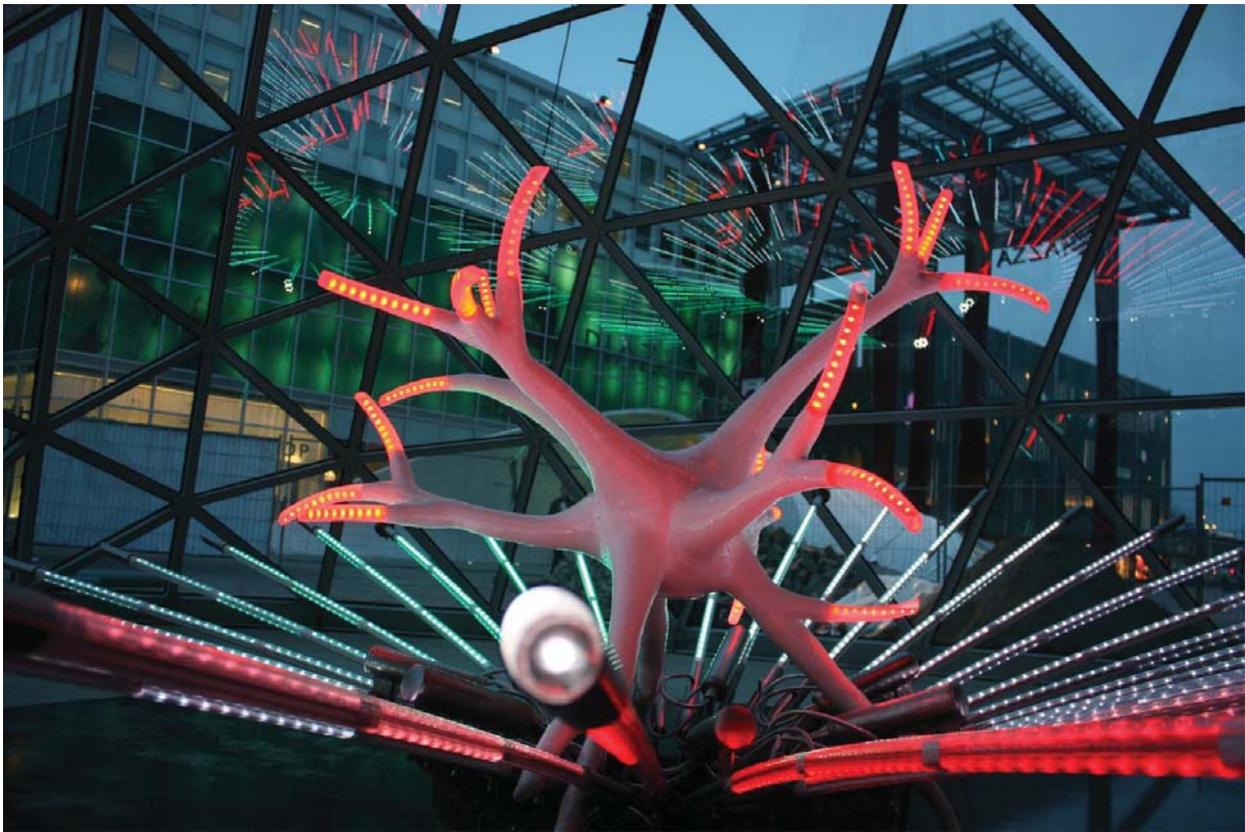
Fig 1. Flower from the Universe, 2010, Titia Ex, interactive light installation, led, diameter 17 feet, photo: Titia Ex.

Fig 2. The Waiting, 2010, Titia Ex, computer animated, led, variable dimensions, Vlieland, photo: Titia Ex.

Fig 3. Halo, 2010, Titia Ex, neon, diameter 13.1 feet, Utrecht, photo: Merijn van der Vliet.

In this paper, I would like to examine the value of light art in public space by focusing on my own prac-tice-based field as a light artist. To me public space is a living organism. Public space is not a saturated or static space but an expanding area. The ever-changing environment has a huge impact on human behav-ior, on our values and our (inter) actions.

Art in public space can mirror this continuous process of interaction between people and their environ-ment. It can draw the environment from its anonymity and establish different, new and unexpected connections, creating new perspectives on space and time and adding new relational experiences. Light

has a huge symbolic significance: it can refer to happiness, spirituality and enlightenment as much as to the triviality of modern consumer society. [1] Light art includes both artificial and natural light. Light uses time and space as material. It has a presence without presence. It doesn't merely draw attention to itself, it gives visibility to space. Light is a stimulus to our skin, body and brain.

When starting my career as an artist, I produced very short films and looped film installations, sometimes combined with slide projections. The films mostly showed inanimate objects that were a luminous presence in the real space surrounding them. They were an investigation of time and motion, often with the projector light incorporated as a visual element. The 16mm film Still life [2] for instance, at first shows a dining table where people have eaten. For moments nothing happens; the spectator is sitting in a dark room, looking at the deserted table, becoming impatient, when slowly the image catches fire. Apparently, you were looking at a flat two-dimensional picture of dinner party leftovers. The flat image is burning down, but turns out to be displayed on a real, three-dimensional table. The moment the spectator realizes what is happening the celluloid catches fire. The spectator remains looking at an empty – light – screen (which then turns into black).

A few years later I exchanged the celluloid surface with its accompanying light source for the transparency of glass, thus capturing the ambient light. I made large mobiles and pivoting screens: door-sized glass panels suspended in wooden frames shaped like full-size mirrors. Slides representing a geometric pattern of green dots, a detail of a plant in black and white or pictures of an empty room, images you look at without really seeing, were projected onto the glass panels. The translucent, satin-finish mobiles, consisting of etched glass discs two feet in diameter, reflected or absorbed the light, according to outside influences such as drafts and light changes. A light switch, a sink drain, a coat rack detail, familiar, everyday things you never pay particular attention to, were silk-screened on the surface in two or three colors. The mobiles created interplay between light, movement and space, both directly and indirectly. The projections on the pivoting screens added another layer to my work. Spectator participation comes when movement blocks the light when standing between the light source and the empty screen. Tilting the glass screen alters the projection and creates a reflection of the image on the wall, floor or ceiling, or makes it disappear altogether. There is no point of focus, no center left, only a continual exchange of stimuli between subject and object.

Working with light in public space is working with movement, transparency and time, all in one. It is a quest to find the rhythm - people in motion, contemplative or en route to somewhere else - and how to apply a poetic echo to this rhythm. The work is always in a dialogue with its physical surroundings and is incomplete without it. It joins the space without being absorbed by it. It makes a natural connection between space, material and viewer. Light has the virtue of reflecting on both the skin of the spectator's body and on the body texture of the environment. It has presence and non-presence. It is what the Japanese call *Ma*: the way to sense the moment of movement [3] or a simultaneous awareness of form and non-form. The word *Ma* essentially refers to an "interval" between two (or more) spatial or temporal things or events. Visitors to an exhibition do not look at *Ma*; they are touched by it and installed in it. The subject-object relationship is deactivated.

The space, the setting and the occupants of the space all supply material for the artwork. In *Musical Chairs*, [4] a permanent installation on top of a round building at the centre of a furniture mall, thirteen computer animated neon chairs in different colors switch on and off in a repetitive pattern. Unlike the children's game, it is the chairs that appear to be dancing; especially at night, when the artwork adds a festive, big city-like impulse to the monotonous architecture of the mall. There is always one chair short

in this dance, so the entire piece only exists in the mind of the spectator, who grasps its shape and character by moving around the building.

The Poet is a Cow [5] is a temporary work on the façade of the Dutch Social Insurance Bank (SVB) headquarters. The work, titled after a poem by the Dutch poet Gerrit Achterberg, consisted of a colored foil layer on a large window, representing an enormous light blue cow's head, a dark blue farmer floating in the sky along with his cow, a red and purple toddler, crawling down the dyke, a green globe with a cow's silhouette on its surface. The image relates to the Dutch landscape, flat and sky high, and the cow is a metaphor for the welfare bank. The colored foil introduced the tension of light in this white, glazed building. During the day the sun projected the image into the main hall and colored the office spaces, until the images disappeared due to passing clouds. The light installation dematerialized the space, the building became the canvas and the sunlight acted as a brush. Visitors to the building became part of the predominantly violet light landscape in the hall, and when using one of the glass elevators they became immersed in the huge cow's head**.** The intervention of the work very gradually affected the people working in the institution. In time, they discovered that the reflection of the colors also entered the offices, coloring their papers and walls. This "color bath" put their environment in a different perspective. People became aware of the physical light and space, and their own movements, and felt more unified with the architecture and surroundings.

Another example is *Halo*. [6] A permanent light circle, diameter 13 feet, floating above the crest of the lower chapel of the Roman Catholic Church Saint Willibrord in the city of Utrecht. The church was built in 1877, a time in the Netherlands when Catholics were again able to express their faith by building new churches. The entrance is humble, in a residential street with small shops, the church disappears out of sight, is invisible. The work of art establishes a link between the church and its surroundings; the silent gesture taking the church out of its shadow. The circle of light – comprising two neon lines, a golden yellow inner circle and a pure white outer circle – is both dynamic and static, it connects the space to a human sense of history. The intensity of the light in the artwork draws your eyes upwards only to disappear into the black hole, experiencing another dimension of space in the city.

Last year I made *The Waiting,* [7] a site specific, computer animated installation during the contemporary music and art festival *Into The Great Wide Open*. 'The Waiting is the hardest part´, is a song by Tom Petty, who also wrote *ITGWO*, the festival's title song. The work comprised forty red LED lights that float just below the surface of a pond and blink randomly, short – long – short. The spectator's close attention was drawn by the continuous random blinking; endlessly waiting for a pattern never to emerge, knowing all was there. The unreadable rhythm of this atmospheric lighting evoked a sense of infinity and a sense of life, an effect that is disconcerting and exhilarating at the same time.

This layered thinking in associations and references is a recurring element in my work. Neither the object itself or the beholder is most important, but the very moment at which everything converges. My installations, computer animation works and video loops seek a balance between this elusive border area at the edge of human thinking and a plain understanding. I wish to create a personal, intimate moment, preferably in a dynamic field of the public domain. This notion is strongly reflected in the interactive light installation *Flower from the Universe*. The installation is always in the present, like a real living, biological plant, [8] unfolding the moment.

Flower from the Universe is a gigantic light flower, seeming to float above the surface, with a heart modeled on a nerve cell, encircled by a garland of graceful stems. A circle of seven pods lies under the heart, and in here the seed of movement is hidden. By walking around the artwork, the visitor sets off a wave

of moving colors. The flower records the colors surrounding it and transfers these to the "petals" - group of stems - into which the garland is divided. Near the borders between the petals, the reflected colors gradually fade into one another. The nerve cell in the heart has illuminated offshoots that follow or are in contrast with the colors in the garland. A dynamic interplay is created with both the viewer and the surroundings influencing the light flower.

This object works using sensors and specially developed software that controls the LED lights in the stems and the offshoots of the nerve cell. Without the external stimulus, the offshoots will switch over to internal control. The principle behind it is physical space. Space as a palette, as a biotope: a living organism. The context changes continually, viewer and light sculpture intermingle and connect, and together are incorporated into a unity of time; there is no beginning or end.

The *Flower from the Universe* has been exhibited at various locations, [9] including a pond in a botanical garden and the hall of an immense "blob": an organically shaped glass structure designed by Massimiliano Fuksas. At each location I noticed how people responded to the *Flower* and what impact light can have. Using their bodies, mindful of or attentive to their environment. There is no rational model that allows us to foresee how it feels to play and experiment like this with color. The identity of a color does not reside in the color itself, but is established by relationship. [10] Colors present themselves in a continuous flux, constantly related to changing neighbors and changing conditions. In no reliable sense can we speak of color "as it really is"; it is always determined by its context. A diverse public of all backgrounds and ages were fascinated by the chance color of the moment, became absorbed in the work and mingled with other passers-by. They actively collaborated, interacted with each other, played and blended into their environment.

I like the complexity of working with light in public space. Each context is different, changing the perspective of perception and memory. Light can pass borders; it can fill a space in an instant and be gone the next moment. Light can convey both the dynamics of a space and its tranquility. It can establish an intercourse between several dimensions with a diversity of actors, involving the spectator's sensory experience.

The Danish light artist Olafur Eliasson works with sensory experience using natural phenomena. He creates an ongoing exchange of stimuli between the visitor and the space. Like *Your rainbow panorama*, [11] 2006-2011, on top of the Aarhus Kunstmuseum, a permanent elevated structure with a 360º view of the city of Aarhus, Denmark. Suspended between the city and the sky, the viewing platform insists on the sensory engagement of those who enter it walking through the colors of the rainbow, from color to color. The USA light artist James Turrell usually encloses his audience in order to control its perception of light and make it lose all sense of space, scale and color, like in the series Skyspaces, [12] built at several locations, a number of architectural installations with holes in the ceiling to look through at the sky, meticulously designed in order to heighten the viewer's awareness of light.

The present state can also lodge the past. Currently, I am working on a new temporary project in public space; it is partly virtual and entitled *Walking the Light.* It is about attachment to a place, recollection and transformation. The work draws the public space out of its anonymity and forms different, new, unexpected connections. It will entail walking a light circle in an urban landscape led by virtual light guides carrying torches while telling their stories. It will reflect the public space in a poetic manner, evoking a sense of belonging.

Artificial light is an expanding field bearing innovations within the scope of architecture, health care, and the quest for mobile and sustainable light systems. Light facades; the public space; innovative employment of light as a stimulating impulse to our bodies, in light therapy and brain activation methods; mobile light sources, like LED, making it possible to wear light on the body; and sustainability solutions, allowing spaces to be lit in a cost-neutral way.

Art reflects who we are, and what really matters to us. Light art in public space doesn't begin and end in a physical frame. Light is a transfer of energy, an infinite potential of relationships that permanently engenders new links between things and people. With light you can dematerialize the architecture of public space, where limits only exist on the face of things, and dissolve fixed movement patterns. Public space, not as a passageway, but as the place where life is lived, amidst historical tokens, rediscovering or redefining the environment from a new dynamic perspective. Light art can contribute to the present, to the relational experience of a place, to a general consciousness of being in a public place. The Dutch poet Rutger Kopland interprets this exquisitely as *An empty place to stay*. [13]

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ART, TECHNOLOGY, AND INSTITUTIONAL DISCOURSE

Jill Fantauzzacoffin

This paper and talk ties together current innovation policy initiatives that incorporate the arts into their programs, before arguing in support of more complex understandings of the relationships between art and technology.

Recent structural changes in Western industrialized economies include the establishment of the knowledge economy, competition from emerging nations in the manufacturing sector, economic crises, and grand scale challenges such as climate change. National leaders are seeking to support the development of new economic sectors as a response to these circumstances. This has led to a focus on innovation economies fueled by increasingly rapid technological change. In this climate, creativity and technological innovation are seen as correlates to a competitive economy. At the same time, art has shown its capacity to engage with high technologies through a critical mass of technological art visible in exhibitions, public interventions, symposia, and specialized academic programs. This paper ties together current innovation policy initiatives which incorporate a spectrum of roles for artists. It then argues in support of more complex understandings of the relationships between art and technology.

European Innovation Policy

Millennial European Union (EU) innovation policy exemplifies the shift from conventional technoscientific industrial research and development (R&D) initiatives to those incorporating a focus on creativity as a driver of innovation. In March 2000, at the EU Heads of State and Government meeting in Lisbon, national leaders set an overarching goal to make the EU "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" by 2010. [1] The policy supporting this objective is known as the Lisbon Strategy. One of the main goals of this ten-year economic plan was for government, university, and corporate R&D spending to reach 3% of gross domestic product in each of the member nations. Throughout the first half of the Lisbon Strategy years, we see strategic guidelines, such as the communication *More research and innovation*, [2] which correlate economic objectives and institutional R&D. The shift to a rhetoric emphasizing *creativity* and innovation in addition to institutional R&D is apparent in the 2008 Council of the European Union communication, *Council Conclusions on Culture as a Catalyst for Creativity and Innovation.* [3] Here the Council promotes a broader understanding of innovation and recognizes the contribution of the arts and culture to foster creativity. Overall, EU communications throughout the decade 2000-2010 show a shift from institutional R&D toward a vision of an innovation economy emphasizing creativity as a key resource in the new economic environment.

This change in the concept of innovation is due in part to a shift in profitability from the manufacturing sector to the creative industries. While traditional manufacturing industries in Western countries suffered external shocks such as the rise of industry in emerging nations, the knowledge-based creative sectors were resilient. According to a 2010 United Nations report, despite the 12% decline in overall global trade, world trade of creative goods and services increased by 14% between 2002 to 2008. [4] A recommendation in the same report suggests that "Policy strategies to foster the development of the creative economy must recognize its multidisciplinary nature — its economic, social, cultural, technological and environmental linkages." Here the 'creative economy' refers to a loose intersection of the arts,

culture industries, business, and technology, particularly digital technology. In this thinking, economics are explicitly linked with creativity, technology, and human social and cultural development in the sense that the ability to create and circulate creative intellectual capital can produce income, jobs, and export earnings. Artists working commercially in the creative industries are typically configured as contributing aesthetic assets, whether it be digital assets, storytelling, music, or product design, for example.

The later Lisbon Strategy years saw the 2008 economic crisis as well as the European Year of Creativity and Innovation, 2009. The role of this initiative was to highlight innovation and creativity as a response to the global downturn. Prioritizing creativity and innovation in conjunction with the knowledge economy represents a transition from the mindsets, practices, and divisions of labor that determined success in the industrial economy toward an economy where creativity, entrepreneurship, knowledge resources, skills, and expertise function in an interconnected, globalized economy running on a combination of information and know-how.

The shift in policy rhetoric from industry-focused research and development to creativity-fueled innovation brings the arts into innovation discourse. In preparation for Europe 2020, the next European economic framework following the Lisbon Strategy, 75 experts at the "Towards a Pan-European initiative in support of innovative creative industries in Europe" workshop, wrote the Amsterdam Declaration of 5 February 2010, which stated:

Beyond their contribution to cultural diversity, creative industries represent indeed a great economic and social potential. In order to take full advantage of this potential, there is a need to combine arts and creativity with entrepreneurship and innovation. These industries are not only a source of inspiration but represent also an enormous asset to be turned into competitive advantages and the creation of new and better jobs in Europe. [5]

The relationship between the arts and innovation in this discourse is supported in part by the associative relationship between the arts and creativity, and creativity and innovation. Other discussions of the role of art in innovation policy configure "humanistic" contributions of the arts:

Art and culture can make a vital contribution to the achievement of objectives that reconcile wealth creation with sustainability and respect for common humanist values because one of the features of art and culture is that they help us to transcend purely economic or utilitarian constraints. [6]

In these examples we can see various configurations of the artist within the new innovation initiatives. Many of these initiatives situate artists in terms of potential aesthetic, creative, and humanizing contributions to the central project of technology development and innovation; however, there are EU-related projects which configure artists as more centrally involved in the development of technologies and innovation processes. For example, INNO-Grips is a project of PRO INNO Europe, a research agency that supports European policy. Their report titled *Innovation Unbound: Changing innovation locus, changing policy focus* positions artists in multidisciplinary innovation labs along with engineers, architects, designers, sociologists, businessmen, and policy-makers. [7] INNO-Grips sets forth a vision of a network of multidisciplinary and interdisciplinary innovation labs supporting Europe as the "global innovation leader in effectively addressing complex social, environmental and economic challenges through sustainable, human-centered and democratized innovation." In this vision, these innovation labs "create and support the combination of social, scientific and artistic disciplines." [8]

Two programs existing independently of the EU policy framework also place artists centrally within the innovation team. Disonancias is a Basque organization supported by the corporate Xabide Group and the Basque government. Disonancias places artists in companies, research centers, or public institutions to work along with members of these organizations on innovative projects. Disonancias promotes the capability of artists to "propose new and different innovation paths, introducing detours and dissonance into the usual processes of thought and action." Disonancias puts forth the view of artist-mediated innovation "not as an end in itself, but as a tool to change ways of acting, attitudes and values, beyond that of economic benefit." [9] Disonancias was chosen as a Best Practice Case in Creativity and Innovation by the European Year of Creativity and Innovation program.

AIRIS is a similar project initiated by TILLT, an organization formed by the region of West Sweden in 1973 as a platform for collaboration between artists and businesses. Under AIRIS, artists join a company for ten months of collaborative project work. The AIRIS project has three main goals: "to create an interface for interaction between industry and the culture sector, to enhance the creative capabilities of industry with regard to a specific business development goal, and to create new employment opportunities for professional artists." [10]

Creative Clusters

Creative clusters are cities or regions that combine related industrial, small business, or other economic practices. The notion of a creative cluster leverages the idea that through networking and cross-pollination, a creative cluster can be synergistically greater than the sum of its parts. Localization and sense of place are central to the notion of creative clusters, and cultural and artistic presence within the cluster is seen as desirable for community-building. Discourse and initiatives supporting creative clusters configure a spectrum of roles for artists. For example, Digital Media City in Seoul, Korea was established by the city of Seoul on the site of a massive landfill to be the center of Korean broadcasting, music, film, computer game, e-learning, and other digital media-based industries. Commercial artists are employed by the digital media industries, and fine artists are commissioned to create public art. The rationale behind welcoming artists and allocating resources for public art is to support placemaking. [11] The presence of art and artists is considered to play a role in creating an environment which attracts a mobile, highly-educated, and skilled workforce. [12]

Kortrijk, Flanders has a long history in the textile industry. Rather than face economic decline when textile manufacturing moved to Asia, Kortrijk reconfigured itself as a cutting edge design region, Designregio Kortrijk. Thanks to funding in part by the City of Kortrijk, a large abandoned textile factory is being transformed into Buda Fabriek, a physical location as well as project platform for artists, designers, research institutes, students, and businesses to come together and share knowledge about artifact development, new materials, and innovative applications. Supporters see Buda Fabriek as necessary physical infrastructure to create a substantive intersection between artists, the economy, innovation, and development. The goal of Buda Fabriek is to make its locale, Buda Island, into the cultural and artistic node of Kortrijk, thus building a creative cluster within a creative cluster.

Silicon Valley in the United States is often cited as an example of a successful creative cluster. While Silicon Valley innovation depends in part on the dense concentration of technology specialists who can readily interact with each other, there is a parallel cluster of technological artists. Formal contact between artists, scientists, and technologists has come through artist-in-residence programs at Xerox

PARC, Interval Research, the University of California at Berkeley Space Sciences Laboratory, and the Exploratorium, a San Francisco science museum. Informal cross-pollination occurs between Silicon Valley and nearby San Francisco Bay Area artists and technologists through festivals such as the Zer01 San Jose Biennial and Maker Faire, an annual art, engineering, science, and DIY (do-it-yourself) exposition and networking event. There are accessible and well-tooled community workspaces for both technology and technological art projects. These include The Crucible, NIMBY (acronym for Not In My Backyard), and TechShop. The Burning Man Arts Festival, in which 50,000 participants come together for a week each year to build a city in the Black Rock Desert of Nevada, features a high concentration of high-tech art projects from Silicon Valley and the San Francisco Bay Area. Black Rock City, likened to the temporary autonomous zone (TAZ) of Hakim Bey, is itself a creative cluster. Artists and technologists build and test hybrid art/technology projects in the harsh but Dalí-esque desert, exemplifying a mixture of artistic creativity and technological innovation. The Burning Man organization and spin-off affiliates apply this know-how to not-for-profit community art/technology/building projects in public art, disaster relief, K-12 education, and solar energy.

Initiatives in the United States

While the European Union develops pan-European arts and culture policies, there has not been a great deal of interest in the United States in formulating arts and culture policies at the federal level. The largest share of government support for the arts and culture is typically provided indirectly through tax concessions which encourage individual and corporate giving. [13] Yet in 2003, the National Academies Press of the United States published a book titled *Beyond Productivity: Information, Technology, Innovation, and Creativity*. The book argues for institutionalized support for integrated art and technology practices, included under the term 'ITCP' for 'Information Technology and Creative Practices.' The book views certain "art and design practices as forms of computer science research and development." [14]

This book was followed up by a program at the U.S. National Science Foundation (NSF) called CreativeIT, which funded work at the intersections of art, music, performance, design, creativity research, and information technologies. The CreativeIT program in turn led to the first joint meeting of program directors and high-level representatives of the NSF and the National Endowment for the Arts (NEA). This joint meeting produced a roadmap for developing and supporting integrated art, technology, and research strategies at the national level. [15]

These developments intersect with current discourse within and beyond the NSF to expand some STEM (science, technology, engineering, and mathematics) educational programs to STEAM (STEM plus arts) programs. STEAM discourse had been an undercurrent in education, science, and technology circles until recent momentum from the NSF CreativeIT program and the joint NSF-NEA workshop described above. STEAM was given further impetus through a NSF five-year joint research award to Brown University, the University of Rhode Island, and Rhode Island School of Design, a prominent art and design school, to study the effects of climate change on marine organisms and ecosystems. Recently, U.S. Congressman James Langevin from Rhode Island introduced federal STEM to STEAM legislation, which as of the writing of this paper stands in committee. [16]

A handful of public universities in the United States have combined arts and technology programs which exemplify STEAM, including the CADRE program at San Jose State University in Silicon Valley, the Univer-

sity of Washington's DXARTS program, and Arizona State University's Arts, Media, and Engineering program. The prestigious art academies Art Institute of Chicago and Rhode Island School of Design have arts-based research and technology programs.

Art?

As we can see from the examples above, the arts hold a spectrum of new economic potentials beyond the art market, commercial arts, conventional art-in-education programs, and other domains in which artists traditionally participate. Emerging roles include the development or co-development of new technologies or innovation processes within business contexts, participation in creative clusters, and participation in STEAM-based education. Yet within the high status discourse of technology, innovation, and creativity, there are questions regarding the terms of participation. We may be reminded of Adorno and Horkheimer's critical stance toward the culture industries in the mid-20th century, and Benjamin's counterpoint.

To Adorno and Horkheimer, art's function is to challenge the alienating capacity of advanced capitalism. The culture industry brings the 'administrative rationality' of industrial production into arts practice and consumption, thus undermining its ability to challenge the economic hegemony. [17] Benjamin believed that art could participate technically in the same methods that support the culture industries but would invert their purposes to bring about new collective modes of production and participation that undermine the hegemony's ability to create status through a logic of aesthetics (as Hitler had aestheticized war in the 1930s and 40s). [18] These positions regarding the culture industry have parallels in the contemporary innovation industry. The innovation industry values the rapid expansion of the technological frontier. There is a notion of technological advancement building upon previous successes within a domain. Challenges and provocations are not a central part of this paradigm. Thus art-based intersections with technological innovation may be characterized in terms of their formal aesthetic value, expressive potential, communicative power, or humanizing insights. Yet we can see that art from the industrial age forward has a history of radical departures from the established norm, bringing about a reorientation or, to use a stronger term, destabilization of convention, perception, and/or established ways of doing or being. Consider the modern and postmodern works of art we value from the past: the work of the Impressionists, the Cubists, and the Fauves, the writings of James Joyce, the interventions into the concept of art by Duchamp, Warhol, Serrano, Koons, and Hirst. Contemporary Western society does not so much cultivate art that harmoniously stabilizes a practice, concept, or perception. It cultivates art that destabilizes.

In contrast, technological development values stabilization. The practice of engineering is to stabilize natural forces so that they act reliably within a device. This emphasis on stabilization extends beyond technological reliability to social and cultural stabilization as well, so that when we are acting within a reliable threshold of a technology, be it a bridge or an iPhone, we are also stabilizing reliable cultural practices. Postmodern technological art acts outside of these reliable thresholds. Thus it follows that art, as we as a society have conceived it, would not be instrumentalized into the service of status quo technological innovation. Instead, art would be more apt to push and pull on the assumptions of technological development as well as particular technologies and technological practices. This role is already realized by some elements in the art and innovation arena, including Disonancias and Tillt's AIRIS program mentioned above. We can find further support for this way of understanding art's role in the new innovation economy. For example, President of the European Commission José Manuel Barroso's response

to Culture Action Europe's *We Are More* campaign shows an openness, at least rhetorically, to this conceptualization of art:

Sometimes we can have creative disruption, but it is from this kind of disruption that we can have real construction and also innovative thinking inviting us to prepare for the future in a mindful way. And in challenging times such as this, creative, critical thinking is more essential than ever. [19]

Conclusion

Truly incorporating art and technological innovation practices means admitting the dynamics of stabilization and destabilization within the discourse of innovation. By allowing art to be a churn in the system instead of a well-behaved contributor to sunny-day scenarios of creativity and innovation, we open up new dialogues about what technology is and can be. Such dialogues would come as institutions face the challenges of climate change, financial crisis, increasing competition for resources, and a generation of innovations involving populations existing beyond first world commercial agendas.

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SOFT COMPUTING: FORMS AND LIMITS IN COMPUTATIONAL AESTHETICS

M. Beatrice Fazi

This paper contends that soft computing can help us investigate the aesthetics of digital computation. Employing broader conceptions of aesthetics and perception, and whilst drawing upon the ontology of Alfred N. Whitehead, it uses soft computing to address the 'prehensive' dimension of the quantitative procedures of computation, and explores the interrelationship between the factuality and formality of computational structures.

This paper will argue that soft computing may be of relevance to the field of computational aesthetics. By focusing on the theoretical foundation of aesthetics in computation, I will show that soft computing can highlight the indispensible role played by abstract processes within the construction of experience.

Soft computing is a rapidly advancing area within computer science. It is characterised by an attempt to deal with uncertainty, approximation, randomness, and partial truth, and some of its most prominent examples include neural networks, fuzzy logic and evolutionary computation. 'Soft' techniques differ from traditional computing as they employ diverse methodologies in order to cope with the difficulties involved in achieving and maintaining algorithmic efficiency. Their originality and appeal lie in their ability to provide inexact, indeterminate and generative solutions to 'computationally hard' problems (i.e. questions that are too complex to be addressed via classic computational systems).

I will contend that soft computing can offer a means of investigating the aesthetic dimension of digital computation. However, 'aesthetics' will be understood here in a manner that exceeds the disciplinary bounds of a theory of art or beauty: in keeping with its etymological roots ('aisthesis'), it will be taken to denote a theory of relationality and perception. One further qualification: 'perception' will not be viewed as referring solely to human cognitive faculties. Just as aesthetics will be understood in a non-anthropocentric sense, so too will perception: it designates the ways in which experience is constructed, thus referring to the manner in which we encounter things and to the ways in which these things encounter others in turn. Consequently, 'prehension' may be a more appropriate term than 'perception.' I take this suggestion from the work of the philosopher and mathematician Alfred N. Whitehead, within whose ontology prehension plays a special role: it refers to the most foundational type of relation – the extrasensory awareness that all actualities have of earlier and future occasions – and is used to explain how all entities within the realm of actuality are acts of experience. Such experience is not the exclusive domain of human consciousness. All actualities are in fact held to experience one another, whether they are conscious or not, as the data that they inherit from past occasions leave them internally connected. [1]

Whitehead's ontology and the broader notions of aesthetics and perception that I have drawn from it allow us to view computational structures as possessing a relational dimension that exceeds both their phenomenical effects and the intentionality of their users. My contention is that computational structures can be understood as systems of actual occurrences: they are concrete 'facts,' fully realised actualities, particular to their own spatial and temporal occasion. To focus only on the performative and qualitative character of these events, however, is insufficient. In my view, factuality itself is enabled by levels of quantitative, logico-mathematical abstraction. In a computer science context such abstractions are

usually understood as computing's modus operandi: those methods or processes that follow a well-defined procedure and describe how a task is to be performed. Yet I would argue that logico-mathematical abstraction also constitutes the 'form' of computation itself, i.e. its potential character, the pattern that defines its ontological possibility. My interest here is in presenting computational structures both as facts (actual instances, events) and as forms (patterns of potentiality). The aesthetic relevance of computation, in my view, lies in the irreducible relationship between the two. I will show that soft computing practices emphasise this interrelationship of fact and form, and thereby highlight crucial, although largely unaddressed, issues within computational aesthetics.

The relevance of this approach can be illustrated by looking at current understandings of computational aesthetics, but in order to do so I need to make a brief qualifying remark on digitality. Computation and digitality are by no means synonymous, yet both can be understood as processes of discretisation: computation, by virtue of its axiomatic character, involves the discretisation of procedures; likewise, digitalisation can be seen as the technological automation of those discrete procedures. I will focus on the discrete aspects of both computation and digitality below, as in doing so we can underline the fact that contemporary computational aesthetics has overlooked the prehensive dimensions of quantities.

This is important, as the concept of prehension affords a relation between the discrete and the continuous that has eluded contemporary computational aesthetics' attempt to connect the digital to the analogue. Media and cultural theorists, computer scientists and philosophers still disagree on an exact definition of digitality, but they do seem to view the digital as a discrete data technology that uses discontinuous values to access, represent and manage information. Yet, at the same time, the vast majority of philosophical, cultural and social accounts of aesthetic experience portray a universe of percepts and perceivers, the reciprocity of which is established by a rapport of continuity with what is given in experience. Hence the difficulty that digital aesthetics seems to be faced with: where the digital tends to be understood in terms of the discrete, aesthetics tends to be understood in terms of the continuous, or the analogue. The discrete nature of numerical and data quantities is thus largely omitted from aesthetic considerations of the digital medium. These accounts are often geared towards analysing its perceptual, performative, and phenomenal effects, which are possessed of characteristics often associated with the analogical. Codes, scripts, values, parameters and algorithms are viewed as performing actions, which in turn exhibit qualities and properties. Agency and quality thus appear to be key to the disclosure and employment of the aesthetic value of computation. These approaches risk dismissing the mathematical and logical nature of computational digital media. If the latter is specifically addressed, it is done so in a manner that understands the ontological power of logico-mathematical abstraction only in terms of continual calculation; this tends to be characterized as 'topological' in nature and expression, and flattened onto a plane of differential transformability. I, however, would like to propose that the impasse between continuity and discreteness could be re-thought in the light of the prehensive dimension of computational structures, as prehension exists before and beyond any performance, action, or effect. The approach that I am arguing for would retain the possibility of working with the reality of algorithmic entities by addressing the aesthetic dimension of their quantitative, discrete procedures.

Soft computing can help us explore these issues, for it serves to highlight that the rules and quantities of algorithmic construction are always involved with patterns of potentiality, and that these patterns are themselves expressed by abstract logical processes. It thus illustrates the importance of the interrelation of factuality and formality within computational structures. There are a number of ways to prove this speculative hypothesis, but I will attempt to do so here by looking at the empirical and rational characteristics of soft computing methodologies.

As noted at the outset, soft computing uses uncertainty and randomness to solve problems that humans are adept at, but which classical computational methodologies struggles with (face recognition or linguistic disambiguation, for example). Whilst indeterminacy is considered undesirable in the classic theory of computation, soft computing exploits it in order to obtain tractability, lower solution cost and a certain economy of communication. The metaphoric 'softness' of this approach is meant to afford an alternative to the 'rigidity' of the conventional analytic methods that found the classical theory of computation. Soft computing can thus appear more tuned to the 'empirical' levels of reality than traditional computation, as it seems to allow factual chance into its algorithmic formality. This point is perhaps proved by its ability to solve tasks that involve information gained from or modified by experience, such as the industrial application of intelligent systems geared towards solving 'real life' tasks (e.g. control, modelling and simulation). Soft computational systems have also been utilized in social science contexts, where adaptation to imprecise judgment, sense perception and emotion is key.

Generative algorithms provide an example of soft computation's relation and frequent association with the empirical. Chance, I would contend, is particularly important for generative algorithms, as they encode formal rules via the application of a bottom-up approach designed to encompass contingent change over time. The programmer deliberately writes very simple instructions, and lets complex behaviour emerge through an iterative selection process, which picks the best representations of solutions, rejects bad results, and produces new ones from those that survive the procedure. Generative algorithms are therefore able to modify their own code, allowing new combinations to arise from parallel and random behaviour, and thereby simulating natural selection and biological evolution. [2] This process fosters autonomy and uniqueness, and has in consequence been employed by artists as a means of playing with the underlying rules of formal generation and structure. It however also offers an interesting prompt for us to speculate as to the ways in which empirical factors – in the guise of variation, selection and evolution – can enter the formalism of computation.

The example of generative algorithms illustrates that soft computing can be seen to be characterised by an empirical aspect. Yet this does not mean that soft computing dismisses logic and formality: where others have emphasised its orientation towards the empirical, I would argue that its most interesting theoretical implications lie in its indirect continuation of what might be called a 'rationalist' project of optimization, compression and synthesis.

My point is that soft computing, despite its openness to contingency, still operates within the rational, disciplinary bounds of mathematics and logic. This can be seen in fuzzy logic systems. Whilst the traditional method of computation uses binary logic, which permits only a dichotomous opposition of true and false, fuzzy systems compute via a logic that allows for differing truth values: they are thus able to reflect the imprecise definitions of language, and can engage with complex control, management and recognition problems that cannot be framed in 'crisp' terms. The fundamental idea behind fuzzy logic is that all things exist in degrees, and that we are in consequence bound to encounter imprecision in truth. Fuzzy logic responds to this (as does the seminal fuzzy set theory first outlined in 1965 by Lofti Zadeh) [3] by trying to tune knowledge representation, so as to make artificial systems function more like humans. Like the generative algorithms described above, fuzzy logic thus accommodates the contingent conditions of experience, but in capturing loosely-defined categories and generalising them it remains a formal model; so too does the generative algorithm, which puts forth a problem-solving strategy in terms of a set of axiomatic rules evolved upon a specific yet formally addressed situation. In sum: although many have associated the merits of soft computing with this orientation towards the empirical, I would argue that it is this formal dimension that constitutes its real potential.

This claim can be developed by looking further at fuzzy logic. The latter is a logical calculus designed to build a formal system capable of handling information devoid of analytic formulation. Fuzzy logic, however, also produces a logico-mathematical structure that can be computed, and which can be put into the finite terms that machines require in order to operate. One can therefore comment that the rationalizing power of soft computation stems from its capacity to enlarge the realm of actuality, through accommodating factors that could not be encompassed by mathematical formalization. Soft computing has consequently been viewed as incorporating a degree of quality into the computational process, as it can be interpreted as a quest to capture the 'continuity' of things through approximation. Imprecision would then seem to arise from a continuum possessed of degrees that can be broken down into 'fuzzy' chunks. One can see how this project can perhaps be associated with the 'analogical' digital aesthetic perspectives discussed above, which frames aesthetics in terms of the continuous transformation of perceptual qualities. Yet, in my view, fuzzy logic is also characterised by attentiveness to the implicit rationality of the real: its focus rests not on binary calculation per se, but rather on the inherent possibilities of calculation itself. Thus, contra those who would claim that the importance of soft computing lies in its attention to quality, I would argue that it returns us to the significance of the quantitative in computational aesthetics.

Fuzzy logic's advocates often emphasise that the technique uses imprecise indicators instead of exact values. However, I believe that if we look at the manner in which fuzzy systems deal with vagueness we are brought back to a question implied by Alan Turing's classical theory of computation, which he set out in 1936: how could one devise an 'effective method' composed of finite terms that might be able to put the infinity of quantities into the finite terms of a procedure? [4] Such a method would be a process of discretisation, as is the method by which fuzzy logic deals with vagueness. Briefly, fuzzy logic works through a system of sets with graded members; each grade is possessed of a different truth value, and each member thus forms part of a smooth but differentiated continuum. One might read this as an attempt to turn quantity (discrete grades) into quality (varied continuity), and to create a means of computation that comes a little closer to 'reality'. However, I would hold that it in fact remains just as reliant upon the quantitative and the discrete as Turing's theory of computation, as soft computing's ability to cope with the uncertain is itself grounded on the quantitative nature of computational formality. Fuzzy logic doesn't render quantity qualitative by attributing continuous characteristics to it: rather, the mathematical processes that allow fuzzy systems to accommodate approximation are themselves based on the procedural and axiomatic modes of quantitative abstraction.

It is important to stress now that the observations above locate soft computing within a broader debate about the limits of formal reasoning. These limits were envisaged by the logician Kurt Gödel in 1931, [5] and subsequently framed in terms of computability by Alan Turing in the 1936 paper mentioned above. Turing's famous thought experiment, the so-called Turing Machine, established the theory of computation by demonstrating that there are limits to what can be computed. His account has however received criticism over the last two or three decades, and much of this has involved framing his model as a closed formalism that doesn't allow for the influence exerted by the external factors of contingent reality upon its purely internal world of algorithmic procedures. This brings us back to soft computing, which as we have seen is engaged in an attempt to 'open' formalism to contingency. Yet, in my view, it is not by introducing the empirical that we are afforded a more 'open' formalism; rather, this openness is already granted by virtue of the fact that computation has intrinsic limits. I would contend that Turing cast uncertainty and randomness as intrinsic features of his model of computation by discovering the notion of the uncomputable, as this means that computation becomes defined by that which it is not: the formal logic of the algorithmic method is consequently always already 'open', as it tends towards its own limits.

We are thus returned to the import of the quantitative in computational aesthetics. We have seen that soft computing attempts to introduce the empirical into its calculations. Yet we have also seen that it does so without fully abandoning the rationality of the formal method. So, rather than focusing on soft computing's accommodation of contingency, I would argue that we should instead take soft computing as an illustration of the manner in which quantity is always already involved in the qualitative. This point can be made on two levels: firstly in terms of computer science, and secondly by way of reference to the philosophical ideas sketched at the outset of the paper. We should note that computing systems function through discrete processes: through axiomatic structures that operate via finite, and thus quantitatively distinct steps. Quantity also grounds the logical forms of computational structures, as it defines and shapes their possible configurations. Yet in Whitehead's ontology, as described above, reality itself is a succession of actual facts. Each is informed by a prehensive relation with other facts, and each has an equally prehensive relation to the quantities of their potential patterns. Earlier I described such patterns as the forms that enter into these actual facts. If we now consider these patterns of potentiality as the logical and mathematical forms of computational structures, then we would have a means of according computational aesthetics a far broader reach than has commonly been ascribed to it.

In conclusion, I believe that one of the most interesting issues that can arise from this way of thinking about soft computing is an awareness of the mutuality between factuality and formality. Soft computational structures are factual, as they are computational events with an actuality. In other words, they are acts of experience, as they inherit their constitution through the prehension of other acts of experience. This is their factual existence which, by virtue of this relationality, is possessed of an aesthetic dimension that is not uniquely reliant upon the contention – common amongst the approaches to aesthetics described above – that computational processes exhibit effects, agency and quality. I would also stress here that soft computing structures have a formality, and that this is expressed through their logico-mathematical character. For example, the procedure by which generative algorithms operate varies with contingent change: the factuality of this computational structure thus has a relation with the empirical world. In its factuality, however, it needs also to refer to what we referred to as 'forms' above, i.e. its logico-mathematic pattern, and this relation to ideality can once again be termed prehension. It is here, beyond the phenomenological outputs of computational structures, that we find the real ontological motive force of their interrelation. The forms of computation can thus be seen as an ontological, existent reality, and not just as a type of deductive reasoning that contrasts with the direct experience advocated by inductive approaches. Aesthetics, in this sense, is not the subjective judgement of the perceptual experiences that a computational structure presents to us; instead, it is the relation between factuality and formality. Although soft computing is limited in the degree to which it can help us develop this position, I believe it can help us shift contemporary discourse towards the issues that are indicated here.

References and Notes:

1. Alfred N. Whitehead, *Process and Reality. An Essay in Cosmology* (New York: Free Press, 1978).
2. See Melanie Mitchell, *An Introduction to Genetic Algorithms* (Cambridge, MA: The MIT Press, 1998).
3. Lotfi A. Zadeh, "Fuzzy Sets," *Information and Control* 8, no. 3 (1965): 338–353.
4. Alan M. Turing, "On Computable Numbers, with an Application to the Entscheidungsproblem," *Proceedings of the London Mathematical Society* 2, no. 42 (1936): 230–265.
5. Kurt Gödel, *On Formally Undecidable Propositions of Principia Mathematica and Related Systems*, trans. B. Meltzer (New York: Dover Publications, 1992).

AMBIGUITY AS A SIGNATURE OF THE SUBLIME IN MEDIA ART

Ksenia Fedorova

The paper focuses on the effects of media artistic representations of ambiguity in perspective of the classical aesthetic question of presenting the unpresentable. The concept of the sublime reveals how representations of indeterminacy in relation to decentralized systems are capable of creating a temporary gap in cognition, thus enhancing the feeling of potentia and opening towards the reality of nonconceptual mind and interconnected being.

The concept of the sublime has been widely appropriated within technological arts and culture: as the computational sublime in relation to autopoeisis in generative art (McCormack, Dorin); and in relation to immersive virtual environments, as the digital sublime (Mosco) and anti-sublime (Manovich) in relation to data art and data networks. At the same time, the principle of ambiguity is often placed at the heart of algorithmic art, hyperfiction, game environments, interactive cinema and other genres that engage narrativity. In this case, we do not claim to make any comprehensive and systematic account of how ambiguity states itself in various media arts. This is more a methodological introduction to one of the possibilities to expand and deepen understanding of media arts through the lens of aesthetics, in particular through the concept of the sublime taken as ambiguity.

The sublime is a term of both control and surrender, of a negative pleasure, associated with the impossibility of either mental or physical representation. This uncanny feeling of being confronted with the limits of comprehension, of facing the unpredictable and the unknown, often works as a sort of litmus, testing the "seriousness" of the produced effect, the transformative potential that reveals itself through nonattachment and groundlessness. As applied to contemporary life and culture, this category becomes a "sliding" or even "empty" signifier for the space of liminality; for limits as the basis for an ontology of interaction and communication at large. Privileging heterogeneity and difference (the transcendental "Other"), the framework of the sublime refers to the questions of individuation and authenticity of the self, which is especially relevant in today's multicentric social environment.

This quality of being in uncertainty, accurately described by Keats's famous term "negative capability" (productive doubt, precedence of intuition and imagination over consecutive reasoning) is fundamental for artistic production. It is also extended towards media theory's concept of "interface", or, "intraface" (Al. Galloway) that may be interpreted as a "'zone of indecision', between the inside and the outside" [1] (Gérard Genette) – a zone of nonchoice between the edge and the center, inside and outside.

In the fundament of any system of relationships — and at the base of any individuation– lies a heterogeneous manifold of potential differences, a pre-individual field of singularities (French philosopher Gilbert Simondon). The tensions of singularities frame a marge d'indetermination ("margin of indeterminacy"), described by Simondon as a characteristic in machine / human creator relationship), a concept that opens towards the broader paradoxes of structural and ontological causality (quantum indeterminacy).

Theories of distributed intelligence, emergence, and complexity present challenges for newer types of representation of reality as a self-organizing flux, with a role of the observer as a measurer of the operations of chance. Conscious appeal to "arbitrariness" in art started as early as work by Duchamp (Erratum

Musical), Morellet, Cage, De Vries, which technically was already a prototype of "algorithmic art." It was not always an act of a visitor (observer/user) that determined further unfolding of a work, but of an artist. The important stage was to recognize that emergence happens through differentiation of pieces of reality: that their patterns are relative and the processes of their organization into structures indeterminable. The natural continuation of this apercu became interactive art, where a viewer is an actor determining the development of the work. Relationality and, thus, unpredictability is an integral part of both relational aesthetics and art, and interactive media art. The latter is not surprisingly compared with the quantum wave function that produces an evolving "space of possibilities" (whereas object-based art is akin to classical particles). [2] One of the classic early examples of interactive media art illustrating the principle of ambiguity is P. Weibel's "Observation of the Observation: Uncertainty" (1973), an installation that investigates the special mood of disorientation when self-perception is given only from a third-person perspective. Is it a perspective of the "transindividual"? Does it feel overpowering and totalizing enough to name this sensation "sublime"?

Effects like change of perspectives and disorientation of the senses that are often used in media installations (Olafur Eliasson's experiments with optics and space, Carsten Höller's "Text Site" CAVE environments by Jeffrey Shaw, Agnes Hegedüs) produce the image of specific kinds of distance between the self and the world, a gap through which enters the terrifying, stunning, revealing unknown. These illusionary worlds allude to a numinous realm which seems to have its own self-generated ontological substance. The projects like "Sensory Environment" (2003-2004) by Chris Salter, consisting just of barely perceivable threshold levels of light and sound, confront the visitor with a direct experience of intense concentration and restlessness that arises in the process of breathing during meditation. Inability to estimate the proportions of your own body in this kind of installations often creates effect of what might be termed overpoweredness.

A range of provoking questions is engendered by conceptual dualism of complimentarity and metastability in works that collide the virtual into physical reality. One of the examples could be a work-in-progress by a Russian group "Where the dogs run" entitled "Quantum Mouse" that visualizes the double-slit experiment in a form of interaction between the movements of a live organism and its virtual doubles. A mouse is moving through a labyrinth, followed by camera. Every time it makes a turn, its virtual doubles make the opposite decision.

Other examples address the reactions of anxiety and perplexity in relation to the qualities of equivocality and vagueness, as in such natural and social phenomena as (respectively) the immune system, colonial organisms, cellular metabolism, spontaneous order in economic systems, social networks, etc.

The concept of the sublime reveals how representations of indeterminacy and ambiguity in relation to decentralized systems are capable of creating a temporary gap in cognition, a disruption of conventional contexting cues, thus enhancing the feeling of potentia and opening towards the reality of nonconceptual mind and interconnected being.

References and Notes:

1. *Gérard Genette, Seuils (Paris: Éditions du Seuil, 1987), 8 quoted in Alexander Galloway, "The Unworkable Interface," New Literary History 39 (2009): 944.*
2. *Jeremy Levine, "Quantum Systems and Interactive Media Art,"Digimag44/Mag09, http://www.digicult.it/digimag/article.asp?id=1456 (accessed August 20, 2011).*

CRAFTING COMPLAINTS AS CIVIC DUTY

Jamie Ferguson & Daniel Wessolek

This paper presents issues and ideas connected to the concept of complaining in general and the work of the Complaint Department specifically. Here we present two case study examples that illustrate the work and process involved, and explain why we think complaining can lead to a better world.

One variation of the Complaint Department logo, based on a set of tools from the Open Clip Art Library and the font Vollkorn by Friedrich Althausen. Copyright by the authors.

Complaining as a means of expression should encourage the individual to acknowledge the seemingly inconsequential annoyances of everyday life as opportunities for discussion and participation. By encouraging the potential for engagement, awareness and conscious expression can be experienced as creativity and even denote performativity. It is our understanding that expression in this sense can also lead to self-worth, gratification, and even collective well-being. Studies show that emotions are as contagious as a virus. [1]

Inherent to being human, to complain was once seen as a powerful source for citizen definition and direction; to speak-up, to object and to protest was understood also as a reaction for something. The

Complaint Department recognizes the importance of a platform for complaining and sees this as a powerful means of expression and of citizen agency.

It's not polite to bitch, grumble or whine. To protest against something, which is how the term is now usually implied, is discouraged. The 'complainer' is typically depicted as self-interested, cantankerous, over-emotional, even anti-social. One might find little understanding in a pervasive market where the 'person as consumer' becomes an aggregated commodity item with little individuality. One's efforts seem lost in as many products and services and consumers out there as there are complaints to be made. Complaints are met often not without some sympathy but without agency. The current state of making a formal complaint seems curtailed to an industry operation, an endpoint having little palpable impact. Few bother, understandably, to invest the time or energy.

It is a highly valuable resource when an individual makes the decision to invest the effort and time involved in voicing an opinion. To formulate and describe an issue, to communicate this, to even go so far as to suggest a possible solution, is as close as one can get to genuine field research and user feedback. This information is a source for design strategy and conceptualizing futures. To mobilize the collective imagination, a complainer not as an anti-social but as participant for public good and improvement gives rise. Such direct and participatory methods for evaluating our present culture can lead to a better understanding of the underlying societal structures and patterns at work. A recognition of the current state of affairs can embed an appreciation for alternatives.

Complaining is at once a strategy and mode of intervention, a means to counter-act. By encouraging the expression of one's reactions to events or situations, the act of complaining can be reappropriated. The Complaint Department regards the ability of crafting complaints as a civic imperative for the public good, to which any small contribution is valuable. Enacting a call for change, choice, or accountability, citizen democracy can promote accessibility and transparency. By leveraging the freedom to disagree, those who are dishonest or do not act in favour of the public good can be discredited.

We see the Complaint Department as an ongoing art /design agency project with the goal of finding and communicating what we call improvables: design problems in everyday life that cause negative interruptions. The case study examples illustrated below present some of the issues the Complaint Department deals with. Instead of circulating negative emotions, we believe that 'room for improvement' is opened up through this approach.

Those familiar with BIXI [2] will recognize the public bicycle sharing system in Montreal that is growing in popularity. It is comparable to the Stockholm City Bikes or to Vélib' in Paris. The system is made up of bikes, bike docks, and pay stations powered by solar panels. It is an opportunity to evaluate different instances of public systems in various cities, and to think about their urban context and cultural variances. These systems have an impact on urban fabric to varying degrees and on different levels of discussion, as it seems many have an opinion or story to tell about their experience. Complaint Department is interested in how such systems can be embedded within seemingly very rigid infrastructures and how these implementations can alter one's experiences, whether this takes the form of added value and improvement to one's daily life or instead contribute stress and irritation.

In this case an attempt to rent two bicycles with one credit card failed. Normally, the casual user can purchase up to two 24h accesses on one credit card. After accessing the second bike, it was discovered that one was damaged, though no other bikes remained in the rack to choose from. The Customers biked to the next nearest stand and attempted to replace both bikes so they could begin their journey

again with equal time remaining on the trip. After replacing one bike, a second bike was no longer permitted. It appeared the number of bicycles allowed was limited to one after the first return. Were important instructions not followed or could one speculate that this scenario has been generally overlooked in the workings of the system? One might be satisfied with a reimbursement, but this is also an opportunity to enhance communication and/or usability of the system. The overall importance for continued evaluation of products in their environment over time, after they have been released into the market and have accumulated feedback, is integral.

This Customer requests a different flavoured yoghurt in his nearby grocery store. Stores of the same chain carry a variety, so he often goes to a different location in order to get what he wants. Upon request, the manager of the supermarket says he will try to fulfil the wish. After some time, Costumer asks the shop manager about the result of his enquiry. The manager is very sorry, he has tried everything possible, but a store of this size is not able to fulfil this particular request due to decisions made by upper management of the chain. Customer is sceptical and decides to contact upper management directly. The representative of the chain is not aware of any such decisions, and strangely enough, some days later there are a variety of flavours available at the store. Interestingly, other suggestions made at the time of enquiry, for example, to keep discounted food that is close to the date of expiration separate from the fish section, have been implemented. Customer imagines that this follow-through might lead to a greater awareness for the value of consumer requests with a store manager, and in doing so has also improved business.

Corporate complaint departments still typically handle complaints as a problem, not as potential symptoms of a still improvable product or service. The focus lies mainly on the relationship with the customer and not loosing them as a result of their complaint, instead of utilizing the complaint as resource. From our experience, complaints are a rich source for problem detection and voluntary insight that is generated by those confronted with an improvable. Complaint Department aims to detect and communicate these improvables, sometimes by describing the occurred, sometimes by coming up with design solutions.

References and Notes:

[1] Wired Online, "Happiness and Sadness Spread Just Like Disease," July 14, 2010, http://www.wired.com/wiredscience/2010/07/contagious-emotions/ (accessed September 8, 2011).

[2] Bixi Web Site, https://bixi.com/ (accessed August 18, 2011).

UNCERTAIN AESTHETICS: NETWORKS IN THE AGE OF EMERGING TECHNOLOGY

Renate Ferro & Timothy Murray

We understand Uncertain Aesthetics to be a critical component in the performative spaces between contemporary conceptions of networks. The surge of digital accumulation, the continual surprise of informational texture and the layers of expressive multiplicity are what lend networks their creative power – as networks interface both real and virtual spaces.

In approaching our thoughts about "Uncertain Aesthetics: Networks in the Age of Emerging Technology," we understand uncertain aesthetics to be a critical component in the performative spaces between contemporary conceptions of networks. The surge of digital accumulation, the continual surprise of informational texture and the layers of expressive multiplicity are what lend networks their creative power - as networks interface both real and virtual spaces in public and in private. We are attracted in our curatorial and artistic work to projects that capitalize on the expansiveness of the digital and that confront the user with the realities, thinking here of Maria Miranda's exciting project of undisciplined knowledge (2009). Undisciplined, that is, as we embrace it from within the legacy of interactivity, a practice that both solicits the user to respond to a set of predetermined choices and gives itself over to the users' momentary stages, creating works and archives whose algorithms and structures leave them incomplete.

In our work we have drawn upon our reliance on artists and theoretical principles of uncertainty as they have shaped our collaborations in research, curating, and creativity to shape this presentation. Tim, a curator of new media and critical theorist, and Renate, a conceptual artist mining the fields of the public and private within the creative folds of old and new technologies, collaborate on joint projects that are framed by emergent technologies in dialogue with the layered tapestry of culture, theory, and art. Collaboratively our interventions through the Rose Goldsen Archive of New Media Art http://www.goldsen.library.cornell.edu/ or The Tinker Factory http://www.tinkerfactory.net/ both at Cornell University or through our curating of the –empyre- new media listserve http://www.empyre.cornell.library.edu, we combine technological and archival platforms while relying on unsettling, contemporary understandings of aesthetics, psychoanalysis, memory and fantasy. (We might add that –empyre- soft-skinned space is currently discussing the topic we enlist during the month of September http://lists.cofa.unsw.edu.au/pipermail/empyre/. Key to our shared interests is the shuttling back and forth between the public and private spheres of the archive, as the archive takes on greater weight in networked culture and as networked culture destabilizes the certainty of the archive's relation to aesthetics. As we use the archive, it is a rhizomatic relational structure that ebbs and flows in relationship to those who engage it.

To some extent, this is not something new to digital culture. The archive, Foucault wrote as early as 1969, is the horizon of "enoncés" marked by their "thickness of accumulation" which never ceases "to modify, to change, to disturb, to upset, and sometimes to demolish" (Foucault, 1969, 164). Such multi-layered thickness, which we might envision today as a fractal conglomeration of accumulated data, is what constitutes the lively energetics of the archive's erasure of previous notions of stability and certainty. Rather than grounding the specter of erasure in conventions of archival legibility, we are drawn to the expansiveness of the digital event's confrontation of the user with the realities of undisciplined knowledge. Undisciplined, again, once we embrace it from within the legacy of ruptured teleologies or

even from within the forgetful field of what Derrida understood as the differances of the erasures of archival fever.

The archive dissipates the temporal identity from which we like to admire ourselves to conjure the ruptures of history; the archive breaks the lineage of transcendental teleologies; and there, where anthropological thought interrogates the being of man and his subjectivity, the archive explodes the "other" and the "outside." (Foucault, 1969, 172). It is in this sense of an interrogation through art and curating that we have formulated our sense of archival practice as an explosion of the outside as the imaginary boundary that separates the public from the private.

At the same time as Foucault argues for a generalized archival discourse of difference, he gestures to the promises of institutionally specific practices that might profit from the very "surface effectivity of discourse" in the expansion and accumulation of the archival event. Foucault sees in the institutional commitment to expanding resources, open archives, and limitless storage (all in the age preceding "open source" archiving) something different from the legacy of "legibility" and "memory." For it is precisely the surge of accumulation, the continual surprise of informational texture, and the layers of enunciational multiplicity that lend to the archive its power. While "surface" might often be associated with only the threshold of memory, if not also with mere digital glamour, we are fascinated by how connective screen cultures have empowered the everyday event of the archive. The screen lives and breathes memorial reconstruction while also interacting with linked associations provided by media and networked cultures.

Most reflective of these conceptual parameters is our curatorial collaboration with the –empyre- listserve. –empyre- was initially founded by Melinda Rackham in 2002 as "a soft-skinned space," one that would create a new public network of artists and theorists to spawn a virtual discussion of emergent practice. Now a community of some 1500 international members, the community focuses each month on the discussion of emergent topics important to the new media community, while maintaining an online archive of its ten years of discourse. Part of our ongoing commitment to maintaining and growing –empyre-, during a period when Melinda and previous managers have moved on to other projects, is to profit from the vitality of this listserv as a literal reconfiguration of public space. Initially, -empyre- capitalized on the freshness of the web by soliciting an online community via complex discourse delivered to the members' e-mail mailboxes and simultaneously preserved for a public web archive. Now with the arrival of social networking sites such as Facebook and YouTube, which users voluntarily visit for less robust forms of conversation, we remain committed to maintaining the more antiquated e-mail format of –empyre- as a means of disrupting the now settled norms of social networking with heady e-mail blasts and monthly topographical shifts of discussion topics. While limited in scope to textual communication, -empyre- continues to resist the corporate codification of public net space while continuing to render uncertain the frameworks of networked space and global aesthetics. We even understand the fascinating amoebic syncopation of the listserv to accentuate the flow between public and private, as conceptual gaps occur when subscriber's threads fall silent because other subscribers do not respond, or intent and content is misunderstood, or even when there is a language barrier between subscribers writing in differing languages. At all times, however, the postings accumulate, whether in singular silence or cacophonic dialogue, to result in a soft-skinned space of expansive and effervescent chatter about the ephemerality of digital aesthetics and its uncertainty.

Within both real and virtual spaces, The Tinker Factory and the Rose Goldsen Archive of New Media Art are born from similar notions of digital accumulation. Within the real space of the open lab, The Tinker Factory allows generative networking of ideas, problem solving, and skill building through practice and

tinkering. The Tinker Factory is a lab for research design, creativity and interdisciplinary technology created by Renate converging the cross-disciplinary areas of new media and emerging technology. As a space that exists "outside" of regular university programs and curriculum, the research lab, nurtures interactive, technological, and artistic research, by inviting students as well as faculty from many of the University's multi-disciplinary colleges to not only investigate technical possibilities, to engage in artistic collaborations, as well as critical and historical implications for ongoing research projects. In this workshop atmosphere, participants have investigated both the networked extension of public space and experimented with how digital and analog components might render uncertain the parameters of public space through interventions with noise, light, and networked culture.

Similarly, The Rose Goldsen Archive of New Media Art exists as a flexible library and networked space that has grown over the years to house collections of American new media art, Chinese and Taiwanese contemporary and new media art, internet art, CD-Rom/DVD Art, and, now expansive collections of video art that rekindle new media's relation with its distant past. Following the principles of undisciplined knowledge, the Goldsen Archive has set out to be indifferent to conventions of archival legibility in order to catalyze a critical rethinking of the meaning of the archive in the age of electronic art. At stake is a reconceptualization of art away from critical dependency on the narrative of history, the psychology of identification, and even the heroics of connoisseurship. Most important, its shifting reliance on online and offline platforms embodies the networked condition as grounded in tension with deeply influential institutional constructs.

Renate's on-site and on-line artistic project, Private Secrets/Public Lies , exemplifies the toggle between both the real and virtual spaces of the archive. Secrets and lies are at the crux of networked relationships whether they are grounded within the privacy of family dynamics or the public realm of international government relations. Most interesting is how easily the public flows between those two social constructions in the digital age. In her compelling work of non-fiction, A Chorus of Stone, Susan Griffin emulates the interconnectedness of how the personal experiences of an individual can have resonances into the affairs of international states directly relating to the underlying causes and or effects of war.

The inter-relationship between matters of individual privacy, secrecy, and concealment on one hand or the open, forthright, tendency for revelation were also key contradictions in the biography and life work of Sigmund Freud. It is for that reason that Renate uses Freud's writings as grounds for inspiration. In his construction of the screen memory, he provides us with insight into how memory is re-composited in the present. By looking at the past from the present we attempt to uncover the deposits of our unconscious archive of memory while acknowledging how the presentness of memory depends on the structural role of erasure through the processes of revision, re-inscription, or re-presentation, a memory conglomeration of the accumulated uncertain data/memory.

Both a performative, collaborative installation and an on-line game, the project, Private Secrets, Public Lies http://www.privatesecretspubliclies.net/ showcases the collective screened memory of the participants whereby each contributor is asked to re-constitute the lively energetics of his or hers personal trove of secrets. In this project the variable of erasure is foregrounded through the underlying code and the intrigue of viral technology.

The on-going construction over time of this project as a collaboration with willing participants in the real public spaces of an installation toggled to the virtually accessible online game enables an assemblage of data traces in an ever expanding site. In the virtual version of Private Secrets/ Public Lies subsequent screens of the project ask the user for inputted text data, the content of which is parsed into keywords

via code and algorithms. What is left for the participant to interact with is an archive of floating data bubbles each filled with words left from previous participants. As players manipulate residual keywords from former user's information, the newly formed keyword phrase interfaces through World Wide Web via Bing. Having had their private secrets erased by fusion, the players are able to peruse news feeds, entertainment, and advertisements. The more often the interactive simulation of Private Secrets/Public Lies is activated the more often it implicitly records and archives the misguided personal information and deconstructed content and meaning of the originally intended personal information. What remains accessible on the homepage is not the original private secret but an archived list of what was subsequently transformed by player manipulation and internet linkage.

This playful translation of private data, enabled by the speed and instantaneous nature of the viral context, meaning, and intent of the original texts are playfully reminiscent of the notion of "erasure" within instability and uncertainty of Foucault's archive. The nature of evidence and memory is transformed in relation to the technology embedded in it. The real truth can neither be accessed nor verified. But, thought otherwise, couldn't we say that the real truth, at least as existent in the world of Web 2.0, consists of the active, playful, and provocative erasure of memory itself.

In a new project, Suspicious Packages http://www.renateferro.net/suspicious/, Renate begins to lay the groundwork for another archive, a collection of audio narratives. As participants recount situations where personal space or belongings have been under suspicion, the territories between the private and public again become blurred. Difficult to demarcate a border or marker that divides or separates, often times suspicion takes on a contested imaginary. As the project spans both the real and virtual spaces of exhibition, the object relations of packages of all shapes and sizes will trigger digital events via sensors that will illicit channels of video feedback in real time intermixed with archival footage, animation, still images, and sound.

In the real spaces of emergency preparedness as Renate and Tim left New York one day after the tenth anniversary of 9/11, Mayor Bloomberg in a televised press conference urged all citizens to be wary of suspicious packages. In the very early stages of researching the project, Renate took note of the virtual links online to both the Centers for Disease and Prevention and ready.gov the place to get up to date information on emergency preparedness. The relationship of information on the virtual site and the urgency to manage the panic of an event in real space and time were sources of reflection for the relationship between an artistic archive online and the manifest of that in a real time exhibition space.

Our aim in presenting the cross-pollination of both our independent and collaborative work, work that remains between the interstices of the real and the networked, between the Goldsen Archive for New Media Art and the Tinker Factory is not only to move between the creative and research worlds in new media arts, but also to continue to forge innovative initiatives that will expand our notion of the archive itself and the range of relational artistic interventions in its midst.   Additionally, these parallels lay the conceptual groundwork for future cross-disciplinary ventures where the value of conceptual tinkering with technical and physical tinkering opens the possibilities of inventive research with the network of uncertain territories.

VIBRATIONS AND WAVES

Peter Flemming

I am a folk machinery artist, doing electronics handcraft 'by ear,' tinkering intensively and intuitively in the studio. This paper discusses my current work *Vibrations and Waves*, an ongoing series of experiments about sound and resonance. Along the way, the paper introduces some working methods in my studio practice.
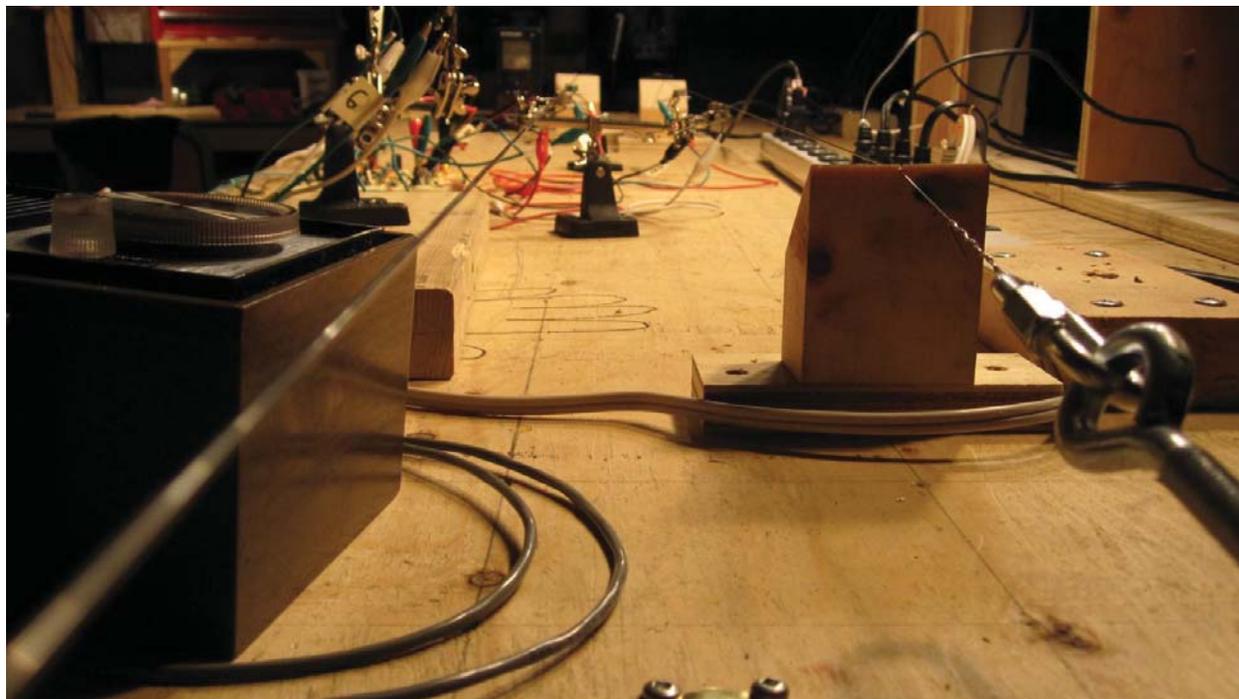
Vibrations and Waves, 2010-2011 (in progress, Peter Flemming, piano strings, turnbuckles, helping hands, wooden table, wooden blocks, DC power supply, electromagnetic coils, glass, mouth-harp, 555 oscillator circuits, screwdriver, radio, Creative Commons Peter Flemming Attribution Non-Commercial Share-alike.

I am a folk machinery artist, doing electronics handcraft 'by ear,' tinkering intensively and intuitively in the studio. This paper discusses my current work *Vibrations and Waves*, an ongoing series of experiments about sound and resonance. [1] Along the way, the paper introduces some working methods in my studio practice.

Vibrations, waves, and therefore sounds, occur when machines do what they are built to do: wires hum, motors whir, gears grind, and metal clangs. In this sense, sound is a natural by-product of all machine activity, even if it is not always the intended output. Where utility is the primary consideration, these vibrations tend to be ignored or actively suppressed. [2] Mechanical systems in which oscillations are desirable include musical instruments and certain types of sound-based artwork.

In *Vibrations and Waves*, notions from intentionally sound-producing machines are transposed onto ordinarily non-musical devices, and vice versa. Undesirable vibrations move from periphery to centre stage. The normal utility value of the machine becomes a secondary consideration, as it is regarded through the lens of musical practice and its elements such as pitch, harmony, and rhythm.

By revealing the basic physical 'magic' within our everyday machines, structures and systems, I wish to show that they are subject to material laws that are fundamentally mysterious and outside of our absolute command. This elusive 'magic' is a worthwhile reminder that we are not in total control in a digital-technocratic world where total control seems to be a goal.

My interest in sound and resonance was sparked by an accidental discovery made while working in the studio. [3] A project required a silent rotating mirror. The natural vibrations of the motor were physically amplified by the spinning glass, and I tried all kinds of things to muffle the sound. After a long day and a very late night I gave up without success, and let the motor spin away undamped.

I stared at the running motor for quite some time while listening to its drone. Slowly, the annoying noise transformed into a compelling, and even beautiful sound. In my over-tired state, the motor seemed to be singing to me. There was a provocative contrast between the 'dirtiness' of the unadorned device and the surprisingly elegant sound issuing from it. With scrap glass and a salvaged industrial printer motor as my unlikely revelators, I realized that I was experiencing the phenomenon of resonance.

Eventually this project became an installation in which a dozen rotating sheets of glass fill a room with powerful, singing tones. Entitled Stepper Motor Choir (2008), this was my first sound-based work and the precursor to *Vibrations and Waves*. [4]

All things have a natural resonant frequency. This intriguing idea suggests a baseline connection between just about everything, but I will keep to the physical for now. The metal body of my 1981 Econoline van would vibrate intensely when reaching certain resonant speeds. Our bodies have resonant frequencies. As does the stapler on my desk, as do skyscrapers, bridges, tectonic plates...

The current public incarnation of *Vibrations and Waves* is a series of video documents, which I see as an extension of my sketchbook. [5] Video provides a record of a temporary set-up, and helps me clarify vague ideas so that they can be communicated to others. Most of my experiments use a limited palette of basic tools and readily available materials. To create vibrating magnetic fields I use simple variable frequency oscillator circuits, rare earth magnets and cheap electromagnetic coils. These fields sonically activate things like scrap glass, metal objects, and tensioned wire. A full sheet of plywood cum worktable has served as a resonating and amplifying surface, and also as the main staging area for most of these experiments and their documentation.

The most fascinating sounds occur when the oscillator is slightly detuned from the materials' resonant points, and when multiple oscillators act simultaneously. In these cases, the slightly unbalanced system wavers at the edge of stability, like a tipsy tightrope walker attempting to find the centre of gravity. When left to run their course, these simple initial conditions give rise to complex and surprising results: shifting and shimmering harmonics, sudden crescendos and alternating rhythmic beat frequencies.

At one point, when leaning on the table to adjust something, I noticed that even a little weight would stretch the strings somewhat, altering their natural frequency. The effect is similar to, yet distinctive

from, manipulating the electronics. I replaced the manual tuning element of the oscillator circuit with a photocell, so changes in ambient light would be reflected in the driving frequency. Modulating these variables adds to the complexity of the system. It becomes a kind of instrument that can be performed. I began to think of ways to automate this.

To do so, I have been developing a diverse, modular 'material vocabulary' of techniques and devices, which I will draw upon for future site-specific works. So far, this repertoire includes: long vibrating wires, electromagnet coils, simple oscillators, saltwater, water as weight, glass vessels, glass panes, four-bar reciprocating mechanisms, motorized cranks, electric guitar pick-ups, found object resonators, swinging pendulums, cinder blocks, solar circuits...

Machine 'performers' will converse with and manipulate these various elements: an animated pump system will use water weight to tension wires, slowly modifying sonic characteristics as it is displaced into different hanging containers; oscillators could change pitch based on ambient light levels, regulated by motorized dimmer devices and automated shutters.

Each 'performer' will hypnotically repeat simple tasks, at their own lethargic pace, independently, but simultaneously. They will combine for a cumulative effect that is subtly unpredictable and in continuous slow, fluctuation. By letting machines run the show, I hope to open up a temporary space for contemplative consideration of the forces at work in the environment around us. Connecting the visible and physical attributes of mass and light to the sonic intangibility of resonance is an exploration of the fundamental properties of the stuff the world is made of.

Mistakes and accidents such as the singing motor or leaning on the work table frequently shape the course of my artwork. They typically occur when I have met some kind of technical or financial limitation, or some material quirk asserts itself contrary to my aims. After much hair pulling, occasionally I realize that the unintended behaviour is interesting in itself. I drop the original goal and pick up a new path, letting it lead me along instead of trying to bend it to suit pre-determined criteria. Knowing how to read these hidden signposts as they reveal themselves is a crucial part of my process.

I look at what I make as the electro-mechanical equivalents of short stories. Naturally, every good story needs some tension to keep it going. In my machinic 'texts,' I try to create tension by intermixing different systems. Organic ones blend with technological ones, the old with the new, and the handmade with the machine-made. And rather than words, sentences and paragraphs, I use bolts, batteries, metal, and custom electronics.

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2. *They can even become dangerous. Frequently cited is the 1940 collapse of the Tacoma Narrows bridge. Wind-generated reverberations created a rippling ribbon of concrete and steel: http://en.wikipedia.org/wiki/Tacoma_Narrows_Bridge_(1940) (accessed July 10, 2011).*

3. *Norman T. White has spoken eloquently on 'Mistakology.' Norman T. White "Mistakology," February 5, 2006, summarized by R. Debatty, http://we-make-money-not-art.com/archives/2006/02/just-listened-t.php (accessed July 10, 2011).*

4. *"Stepper Motor Choir," 2008, http://peterflemming.ca/flemmweb_current/details/stepper_motor_choir.html (accessed July 10, 2011).*

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CELL TANGO: AN EVOLVING INTERACTIVE ARCHIVE OF CELLPHONE PHOTOGRAPHY

Angus Forbes & George Legrady

'Cell Tango' is an interactive multimedia artwork consisting of a series of animated visualizations. The visualizations are based on a dynamically evolving collection of cellphone photographs contributed instantly by the public. These images, and the accompanying tags that categorize and describe them, are projected large-scale in the gallery, continuously shifting as new contributions are added.

Fig 1. A participant examines the Cell Tango installation.
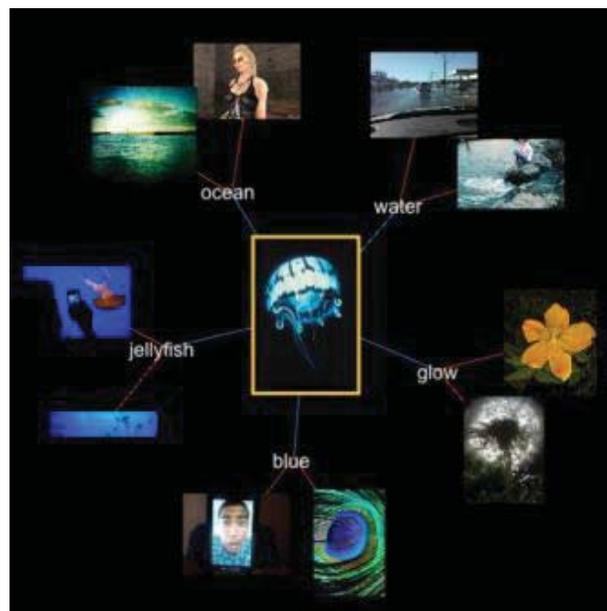
Fig 2. Detail from the 'Cell Burst' visualization. The center user-submitted photo is connected to other photos via semantic tags.

Fig 3. Detail from the 'Cell_Bin' visualization. User-submitted photos and tags are organized into a mosaic using a bin-packing algorithm.

'Cell Tango' is a dynamic artwork presented as an interactive installation in fine arts museums, in galleries, and at special events. The public visiting the exhibition is invited to interactively participate as a contributor to the project through the submission of cell phone images. These images become the primary content source of the Cell Tango artwork, and are stored online at the Flickr photo management and hosting website.

The gallery display consists of a large cinematic projection that presents the contributed cell phone images in four animation configurations – 'Cell Bin,' 'Cell Clusters,' 'Cell Burst,' and 'Cell Finale.' The public is asked to add descriptive tags in the subject heading along with each submitted image. These descriptive tags function as search queries for retrieving other images from the larger Flickr database of public photography and also as organizational devices to create thematic clusters of images. The intent is to explore the potential of unexpected juxtapositions where common semantic labels can generate interesting visual relationships.

The animation 'Cell Bin' consists of visualizing the most recent images in the database on the screen using an algorithm that selectively places large images first and then gradually fills in blank spaces with gradually smaller images until all of the empty screen spaces are filled. 'Cell Clusters' consists of thematic clusters of found images based on contributors' tags placed around each incoming contributed images that are marked with a yellow frame. The 'Cell Burst' animation throws images on the screen that then open like bursting fireworks, placing the tags once the image appears, followed by the found Flickr images associated with each tag. 'Cell Finale' concludes the visualization sequence by rapidly placing on screen all of the contributed images in the database one after the other in the spectacle action of fireworks exploding in the sky.

The artwork is dynamic – meaning that what is featured is continuously being generated in real-time according to the rule-sets of the computer code. There is a conscious approach to software development, and thus it is a form of authorship. The artwork has been designed in such a way so that the software implementation that drives the project expresses the concepts, aesthetics, poetics, and artistic intentions and philosophies of the artists. The software development involves significant engineering and problem solving, but it is driven by cultural concepts and aesthetics. In other words, it was designed with a creative pull as opposed to technological push.

Works of art tend to coalesce concerns, goals, and meaning, all of which evolve at multiple stages in the work's evolution. These stages include the initial planning and design phase and the continued iterations of transforming the design during production. Many times implicit meanings are recognized only once the work is complete, either by the artists or experts in the field whose job it is to identify what the artwork may mean. Cell Tango addresses a variety of concerns. It is an artwork that is about the creation of an archive, or collection of images – in this case limited to cell phone images. The project is based on the participatory, public contribution of data. Each exhibition represents a collection that is the sum of all contributions made by the public during the length of the exhibition. So at the start, the collection is empty; and at the end, the collection is closed. Each time the project is exhibited, the sum of all images collected during the exhibition's lifetime becomes the embodied visual archive specific to that event.

The research literature that relates to Cell Tango's foci of interests includes Kindberg's discussion on the ubiquitous transformative role of cell phone camera usage. [1] Lehtimaki discusses the increased use of picture taking from specialized occasions to the documentation of ordinary life. [2] Miller addresses the social network aspect of image storage sites such as Flickr. [3] Van House articulates a prioritization for image sharing as story telling, self-representation, self-expression, and documenting of everyday life over the long-term archival, collection opportunities that the photo management site offers. [4] The artist Golan Levin [5] has assembled a useful reference page of cell phone art projects, however most projects use the cell phone as a sound instrument in group performance, or else as control devices by which to activate events in site-specific locations, for example by turning on architectural façades with embedded LEDs. [6] The artist Jonah Bruckner created an early cell phone image-based work titled "Phonetic Faces" that consists of a mixed collage of images and portraits on a display contributed by the public present at the exhibition. This work used the cell phone to activate and control an onsite video camera that did the visual recording to a computer that assembled the images. [7]

The Cell Tango project may be understood as an exploration of the process of constructing and conveying meaning through the organization of visual elements (the images) according to a set of rules or conventions defined in the algorithms (the syntax) used to create the visualization. This positions the project within the context of a structuralist, cinematic tradition, as defined by the French film theorist Christian Metz in his analysis of semiotics and film. [8] Cell Tango follows the structuralist film theory model

of constructing meaning through juxtaposition, adding an uncertainty component as the aleatory selection of accompanying images are delivered according to common tag labels. The outcome of the selection covers a continuum from a pure literal, analogous matching visual content to visual content that may be totally unrelated at the literal, similarity level, but which may have implicit metaphoric or associative relevance. For instance, a tag that says "circular" might result in an analogous image of a tire, whereas another image which is tagged less literally with words like "yummy" or "sweet" might result in images of cell phones, cupcakes, chocolate drippings, images of a mug, a doodle, et cetera. One of Structuralism's fundamental principles is that underlying structures lie beneath the surface or the appearance of things. [9] In Cell Tango, the algorithmic processes express the projects' structure through its programmatic rules, and this functions as the binding by which the juxtaposed images in Cell Tango are organized. When the meanings between juxtaposed images are evident, viewers' experience in fact becomes less interesting than when the meanings are harder to interpret. Humans naturally attempt to create and interpret meanings out of any information coming their way, and the less evident pairings turn out to be the most stimulating in the viewing experience.

The structuralist approach to art-making and information classification had significant influence in the 1960's. This approach was initiated through anthropology (Levi-Strauss), and migrated to cinema (Metz), literature (Barthes), architecture, and art (conceptualism, Lewitt, Darboven, Baldessari), et cetera. Over time, the structuralist approach was challenged and rejected for its absolutist approach to the world, but it becomes of interest again considering that computational processes do function at the structural level to generate narrative forms through the articulation of rules.

Cell Tango features the interplay between two image sets: a) the 'known' system of the visiting public's cell phone contributions, and b) the 'unknown' open system of tag retrieved associative images from the larger Flickr archive. At the start of the exhibition, the collection is limited to a few starter images, but then builds up throughout the length of the exhibition, and by the end of the exhibition, the collection culminates into the unique record representative of that installation's specific set of conditions, visitors, cultural and temporal contexts.

Our interests in opening an account at Flickr were primarily utilitarian driven. Flickr is able to processes incoming cell phone messages from all the various international standards. Flickr also includes a filtering mechanism by which sensitive content is managed to a degree. Additionally, we use the site for additional editing and for storing each exhibition as a set.

Cell Tango evolved out of an earlier museum-based data collection installation project titled 'Pockets Full of Memories' (PFOM) commissioned by the Centre Georges Pompidou National Museum of Modern Art in Paris in 2001 which then traveled to seven other cities (Rotterdam, 2003, Linz, 2003, Budapest, 2003, Helsinki, 2004, Manchester, 2005, Frankfurt, 2006, Taipei, 2007) each having its own variation based on cultural content defined through location and audience. [10] It consists of a data collection stage where the public first submits personal objects using a scanner and then describes and categorizes the object by answers a series of questions using a data entry kiosk station. These scanned items and their associated data are arranged using a self-organizing mapping algorithm. The algorithm spatially clusters the collection of contributions whereby each object is surrounded by other objects that have the greatest semantic compatibilities. It becomes a form of emergent organization where local relationships create a global order with each object is spatially positioned to every other object in the set according to their individual semantic value. Cell Tango grew out of the artistic, cultural, and computational concerns of PFOM, but aims to alleviate the burden of site-specific data entry. There is no need to

be physically present in front of a data entry kiosk station at an art installation. Using the cell phone, anyone, from anywhere, can submit a contribution and interact with the project.

The artistic requirements of Cell Tango necessitated the creation of a robust software implementation that allowed effective user interaction via the cell phone, animation of the visual elements within the different scenes, and the extensibility and adaptability to add new scenes and to easily relocate the project in different environments. Cell Tango visualizes an evolving database of cell phone photography and it is itself an evolving project that changes according to the venue, but also in order to explore new ideas and representations.

The system is separated into four processes that run simultaneously: the data gatherer, the visualization modules, the local network management component, and the graphics renderer. Communication between these processes occurs through writing and reading from concurrent data structures, which efficiently and safely allow multiple threads to access and update the same information asynchronously.

Because the main user interaction with the system is done through submitting cell phone photography, a primary technical goal of the system is to retrieve new photos as soon as they are available. Another goal of the project is to explore the relationship between the user-submitted photos and the related public photos. In order to facilitate the rapid retrieval of new photos and the exploration of related photos, a data-gathering component is placed in a background thread that continually checks the Flickr database. The process gathers both user-submitted photos and tags, as well as related photos from the public Flickr photo pool that are related to the user-submitted photos via their folksonomic tags. A local data store is kept in memory that holds the most recent user-submitted photos and well as selection of photos selected from the pool of other, less recent, user photos.

The system uses a custom 3D graphics framework called 'Behaviorism' [11] which loads each of the photos on to hardware-accelerated textures and also provides a robust scene graph and a sophisticated set of animation and timing techniques that control the layout and narrative of the different visualization modules. Each of the visualization modules processes the data that has been placed within the local data store by the data gatherer. Visual elements based on this data are placed on the scene graph, and then rendered via a dedicated rendering thread at sixty frames per second. Animations of the movement, size, color and structure of visual elements, as well as the movement of the camera view, can be programmatically defined by adding behaviors to the timing graph. These behaviors update the objects in the scene graph at the start of each loop of the rendering thread. In addition to using hardware-accelerated textures for rendering the photos and text, each visualization module is able to use OpenGL for advanced graphics techniques, including binding to custom GLSL shader programs. Because we have had to evolve and adapt the Cell Tango project to new environments (and expect to do so further in the future), the software system is designed to make it easy to add new visualization modules that transform and visualize the photographs and tags in novel ways. Additionally, we have experimented with the sonification of the visualizations, and have developed a networking component for propagating visual or data events to another computer that transforms these events into algorithmically generated composition.

Following the 2006 premier at the International Society of Electronic Arts in San Jose (under a different title, 'Global Collaborative Visual Mapping Archive'), Cell Tango has been featured in a variety of venues that include: an opening event at a national theater in France; a month in a commercial gallery; a long media arts exhibition at a West Coast research university gallery; a 2 month exhibition at a public Mid-

western university; and a 4 month exhibition at an East Coast private university. While Cell Tango functions primarily as an artwork, it also is a research project in the study of how the functionality of photographic image-making is changing through cell phones. Each exhibition is a data collection environment as the public submits images, which are then stored for later analysis. Each venue has its own socio-economic/cultural context with some noticeable differences. User responses revealed that images were expressive of local community interests, social perspectives, and varying degrees of implementation of the functionality of photographing, from recording special events, to recording phenomena, or idiosyncratic expressions. Additionally, there is the play between the collection of submissions through the artwork's context, which is contrasted to the public images retrieved from Flickr through the associated tags submitted by users.

Since the Cell Tango exhibitions act in one sense as a process of data collection, the next obvious step is to carry out the analysis of this collected data, which we plan to do in the future. We expect Cell Tango to continue on its exhibition life, each time new adding new datasets of user-submitted images. Cell Tango came into being at a time when we are witnessing the exponential changes in cell phone technology. A key component of this project will be the analysis of the various datasets to reveal the correlation between the cultural and technological elements as they change over time.

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FOODPOWER

Franca Formenti

The world in which we live is an integrated system of information in which we participate as consumers, increasingly unable to experience the immediacy of what we find standing before us.

Tommaso Arrigoni 2011. Author: Franca Formenti

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http://www.wikifood.es

Premise

The world in which we live is an integrated system of information in which we participate as consumers, increasingly unable to experience the immediacy of what we find standing before us. For us, reality is experienced through the media, is constructed by the media, which make events, places and people whom we have never seen or met familiar to us, and compensate their artifice by giving us a feeling of immediacy of that "dramatised" reality. At the same time the media bring about a sense of nostalgia for reality, a need for authenticity, spontaneity, physicality. There is a paradox: the media tell us that they manipulate reality, but the media also spread their accusations of their own falsifications. In other words, we live in a society where even immediacy is a construction.

The case of wikilieaks is exemplary of this double movement of the unveiling and dramatisation, of a staged immediacy by the media: an international not-for-profit organisation, Wikileaks, uses a coded system to receive anonymous and secret documents, to then upload them on a website. In other words, a un-transparent process where unveiling means to cover up something else (the anonymity of information, ways of checking the authenticity of the materials...); but through this website, we can find a "mediate" user with a responsible, ethical and critical identity.

A mediate reality is a reality where modern distinctions between public space and private space have very blurred boundaries, and concepts slip between one and the other, emphasising the need for safeguarding privacy at an institutional level but also as part of the media.

In such a context, secrecy is transformed from an object of desire of our collective imagination into an obsession for those who are more exposed to the media. In this way, privacy becomes a luxury for the few or for those who have the means to protect their own data from the omnivorous indifference with which the media metabolise them.

Concept

The project that I am proposing must be understood as a strong metaphor of the analytical and philosophical premise, concentrating on the following aspects: familiarity/difficulty of direct access to media legends; artifice/desire to encapsulate authentic experiences; un-transparency of the dynamic of veiling/unveiling.

In order to emphasise the omnivorous character of information and the necessity to metabolise it in order to acquire an identity, I targeted my research on the body, on food, on the legend. To reduce the body is the first movement of the concretisation of the experience, to feed is the physical expression of vital growth, to elaborate legends is the principal operation of language and communicating in the veiling/unveiling process.

At the core we find the mouth, a bodily organ used for introducing/injecting and consuming, the organ with which we exchange material and spiritual foods, real foods spiritualised in artificial delights and foods with the spirit=ideas that are materialised in recipes, quantities, data. The mouth is the cavity of

the tongue and the base of taste, the organ of technology of the word, the first medium that is freed for communication between human individuals,

 The tongue maintains the finesses of taste and the omnivorousness of communication.

As an example of familiarity and at the same time unfamiliarty of the legends of the media, I will take the category of chefs, the new demiurges of an increasingly common aesthetic in daily life, who are exemplars for their capability to manipulate food within mediate/experiential contexts.

The idea of identity will be identified through the portraits of the chefs. Every chef will accept the fact that he/she will be photographed in a portrait where they "stick out their tongue", in other words exposing their tongue to the lens: this is to emphasise the symbolic importance of it, and also to use it as a metaphor for creativity as a ludic activity, irreverent and non-normalised (inspired by the famous portrait of Einstein), but also a reference to the medical test that doctors perform on small children to check their "inner" health. Wisdom and taste.

Every chef will give me an original recipe, written by hand on a piece of paper. Even the request for hand-written materials focuses on identity, as handwriting is a characteristic of every human being, just like finger prints, to the point that it can be part of a scientific inquest through graphology, which is capable of revealing identities and intimate characteristic of the person who is writing.

In order to give a theme to the reliability of the personal experience of what is often easily created on a mediate level, my artistic work will be presented online: the online connection will be the only way to discover and experience the recipes of various chefs who collaborate. On a website the names of the chefs will be put into alphabetical order, and by clicking on each name his/her portrait will appear, seemingly normal, but instead the image will be a steganography.[1]

In order to de-code the image and discover the hidden text underneath, users will have to download a very simple program, which will give the possibility to read the "secret" recipe.

It will be a very simple operation because my objective is not to transform my work into an unnerving code-programming exercise, au contraire! It will be an invitation to reflect on the concept of privacy through games and cuisine.

PROMOTION

A concept on the mechanisms of communication would not make sense if it was not accompanied by an adequate use of means of communication and distribution. Therefore the disclosure and modalities will have to be studied carefully, so that it can obtain much visibility, can create interest and stimulate participation.

 p.s. I want to emphasise that despite the fact that a portrait with a tongue sticking out can perhaps seem unbecoming, and may accentuate physical defects, it will be of utmost importance to me to exalt the aesthetical side of the image, because the concept of beauty is part of my research: "beauty" intended as a form of seduction that takes one back to oneself.

And anyway, as another guarantee for those who are photographed, every image will be chosen with the chef involved each time, so that they can be convinced and satisfied of their photo. I will also give the chef the possibility to decide how they want to show their tongue so that the collection of portraits is not repeated with the same gesture.

After having completed the online recipe book project, as I was gathering the recipes and the portraits of people with their tongues stuck out, and I thought that the peculiarity of steganography, which is a specific technique for hiding the existence of a coded message, could be a different way of creating a social network which could be revisited and destructured and that, in contrast with facebook, which violates privacy, will using similar dynamics to a classic social network but with the difference that the profile image can become a kind of medium whereby to exchange secret messages.

This curious and playful characteristic creates a buzz with other users who will want to become increasingly skilled at using the software programme, which is steganography, using it not only on the website which hosts the recipe book made by some young European chefs, but also participating in it, uploading their own image with a hidden recipe, even if this choice will remain optional within the social network.

Therefore this would be an attempt to offer a service through an artistic piece of work, where the users will find themselves faced with a different way of using a social network without the risk that their own privacy will be violated. Another peculiarity is that the users will be able to connect facebook to wikifood so that they may take advantage of the popularity of the top social network in the world, therefore sharing photos and posts on their wall automatically on facebook, so that it becomes a means for the promotion and sharing of wikifood which is a kind of parasitic economy concept typical of capitalism in our current society.

Then I thought, instead of adding the feature of clicking whether you like something or not, I will add the option "friend or enemy", therefore after asking for a user's friendship, by accepting the request the other user will decide whether to put their new friend in their friend list or enemy list with the added bonus of being able to de-steganographise the image if they are a friend, whereas enemies will not be able to.

It's evident that this new option is a bit contradictory because the symbolic value of steganography is to hide a ciphered message, therefore its existence is hidden whereas with cryptography, which is often used to exchange messages, it is evident that messages are being transmitted, albeit it a ciphered way.

The choice of informing one's enemy of the existence of a ciphered message behind an image was adopted to create a playful environment where the user, looking for a challenge or for a bit of fun or to quench their curiosity, will slowly learn how to use steganography, transforming the virtual environment into what could be considered to be a "gym" where one can practice and train, as well as being an interactive theatre which continues to grow and develop.

In all of this architecture of images, software and interactivity, the food and chefs remain at the foundations of the project, because in our current society they have a very special appeal and therefore in my opinion remain an excellent instrument to invite people to take part.

As far as the legal aspect goes, wikifood will ask users to sign so that they can register, it will not be the same process as facebook or other social networks which clearly collect personal data to then sell them

to other companies, but rather is dedicated to not selling data using some of the rules of the creative commons where the content and the photos will be the intellectual property of those people who produced them and published them on wikifood and if they should be used by wikifood, the user will be informed.

In the specific case that they should be used by other users who are registered with wikifood, wikifood will not be held responsible for such actions.

The last but not less important characteristic is that the recipe which will be de-steganographised will not go through the server. Aruba was chosen because of the previous violations of privacy and possession of data, but Claudio Agosti made sure that the steganography software that he created gives the possibility to the user to read the recipe without it going through the Aruba server.

I think that this detail is very innovative, almost visionary, mostly because the internet will be increasingly less secure and privacy will continue to be violated, therefore users will be able to educate themselves in a playful and artistic atmosphere, which can only be a good and useful thing.

Claudio Agosti created the steganography software, whereas Fabrizio Mascheroni is at the heart of the technological side of the project, creating the software, infrastructure and graphic design of our social network. Chiara Rusconi takes care of illustrations. The name of the online recipe book is HYPERLINK "http://www.wikifood.es/"http://www.wikifood.es

Steganography Software to hide one image inside another

WHAT

The software is called "rabbisteg", it's a steganography software. In order to work it identifies all of those bits of digital information which, even if they were lost, would not deteriorate the image. Once they are selected, it substitutes them with those of the image which is to be hidden within it.

This is the process of steganography, because the result is an image which, in the eyes of the observer, be they human or digital, looks completely normal.

This must not be confused with cryptography, which generates content which cannot be read by a human being or a machine that are not capable of deciphering it. In this case, on the other hand, it's not just privacy that we obtain, but we actually hide the existence of data.

HOW

Normally a steganography programme analyses the content of a file in detail, it understands its multimedia format and identifies those bits that can be sacrificed. This can be applied to video or audio as well as to images. Every format which contains the "quality" or "high definition" concept maintains its sense even if its definition is diminished. Steganography can be thought of as a controlled degradation process. The bigger the content that needs to be hidden, the higher the degradation will be.

This normally used to be done with software that needed to be downloaded, installed and used by both communicators. Now it has been implemented in javascript: every website can implement it and can consent to have its users use it. It's innovative in a way that web innovations are: in the beginning it's useful for web developers, who then make their own ideas with it and use it.

Steganography existed in ancient times, but it was never implemented in an easy way for its users. The Internet has reached new heights of user-friendliness and usefulness. The challenge of the software, released under a free licence so that it is freely available to integrate into any website, is to see whether steganography can be shared in this way.

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MAKE IT VISIBILE!

Fabio Fornasari & Sveva Avveduto

We present the first results of a research project, that studies and produces objects to implement new models and perspectives of art in education and research. The part we present is a medium, a narrative technology in constant evolution. We use a narrative path as an experimentation field to test and verify connections between social space and the construction of world images building a specific language in the narrative dimension of research.

Fig 1. Screen layout of the images found in the selected period in the browser MAKE IT VISIBLE©
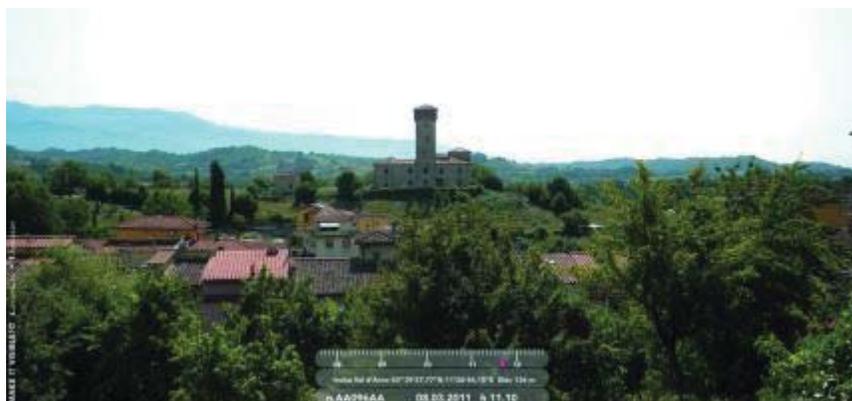
Fig 2.

Fig 3. A confirmation of what is supposedly from the reading of images. The internal roads in the country are organized on the visual center of the tower. Another highlight from the series of photos: unmarked roads are reconstructed from the vision of episodic photographers that load on the network.

There are questions that we attempt to answer since a long time. What are the real challenges of contemporary art? What are its relations with society, history, culture, science and technology?

Where will our "obsession" for interactivity and technology lead us? After the consumer society and the era of communication, does art still contribute to the emergencies of a rational society? How art resists dominant homologation? Where is the conscience? And then, how do we remember?

Science approaches results by theorems, almost aphorisms, the literature builds sinuous prose. But sometimes the opposite can be true and the language of science is almost poetry. Art communicates with us through a visual and tactile thinking. All this revolves around one goal: to enlighten the reality, make it perceptible to our senses.

The task of this work is just that: to make visible our "conscience" settled into the Net, following its tracks into "a time".

Making the invisible of science visible, occupies a good part of contemporary physics and astrophysics at first through the inductive reasoning, then through technology. Making reality more visible through technological and artisctic tools is part of our work.

Explainig what we intend to do could be very simple: a search engine that operates on a stock of images uploaded to the Net, and aggregates them in "paths" that are tied to space and time. But we believe it is interesting to argue the meaning of an operation that sees the world as a building site that produces images in continuous construction.

This work stems from a simple idea: it is impossible for humans to understand their long history without being aware of how over time they came together around the forms of consciousness that are the result of continuous sedimentation.

This is what in general we call culture.

In the formation of culture, has had a significant role both the study of the reality of things, and the making a series of conceptual tools that have led to the identification of samples, examples and models that, once defined and verified, we have been able to use as samples, as a real measurement system to watch and observe everything around us according to this ideal.

The encyclopedia and the museum have been considered the two major conceptual tools, real architectures that have the task of giving structure to knowledge, make it visible and shared for a common review, to represent the models to be used to make comparisons.

The reality in all its forms can be measured and subjected to reference models.

This view of knowledge and culture is coupled with a vision of science ready to prove everything through the experimental method, towards a unique result. Since several decades we have a different awareness: science is not able to provide conclusive evidences, it is always falsifiable. Rather it is a means to understand the world and the universe around us, and then it adjusts continuously (Tattersall 2008).

If we intend to think about the history of culture, of mankind and its step on the skin of the planet, there are no experiments to conduct. Only one thing is possible: we can only observe the traces left behind, and put into a continuous relationship past and present. An interpretation that has a relational attitude: only through a system of qualitative and quantitative comparisons of the traces, you can have an interpretation of cultural history (Diamond 2006).

The styles of scientific and humanistic thought require mutual interpenetration.

There is no discontinuity in what happens around us. The idea that science and philosophy or, more generally, all the humanities are separate, falls into an old approach that divides fields of science and reasoning, that has no sense nowdays.

Technology is designed as a means to reach an end (Brian Arthur 2011) and in this sense, language is a technology which in turn uses other technologies. What we learned is that all technologies are set all togheter. Are not concluded in their external form, but there is continuity with other technologies included in them, combined.

For technology we mean a combination of knowledge, practices, techniques that come from applied science, communication and art.

In this sense we can say that we are writing more and more using technologies. And we also refer to technology when we talk about images: those related to the production of photographs, those related to the loading of them in the various social networks or institutional sites that host them. We refer to them also when we use a tool that allows us to navigate this body of images over time, associated with the space in which they were produced. Google Earth or Picasa, for example.

We're not talking about a hard technology, a technology that tends to overcoming the idea of "human" in a key of "body". We are rather thinking of a software, a search engine that thinks for us, and with us, the way we look at things stored in the Net. We are no longer in a time where you must fill out the Net of contents, but in a time where you have to work on the quality of landscape produced. You must make your way through this vast sea of contents uploaded on the Net.

After all, the sense of this work is to provide a tool to reconstruct the tracks within the historical context of the visions in the network path, and how this activity leaves us a legacy to continue to live the present and the future of our dwelling in the world.

Facing through pictures, routes and maps of the most interesting topics appeared on the Net. Following the joints of the medium over time, its constants and its evolutions. These are the aims of Make it visible, an atlas that seeks to make explicit the links of the vision, to look at the world with technology, geography, travel, literature, theater and other media, as well as with social relations, spaces, rituals. In other words, the consciousness of a place. This work establishes links and correspondences between images, photographs and geography, related to a time that is not just accumulation, but that can be browsed, scrolled and get across. Like a time machine for the visions.

The nature of this work would be to tracing a path.

A road in the visual consciousness of the world. The place of consciousness is the dynamic life of the whole person or the whole animal immersed in life itself.

Human experience is never alone: it takes place in the world with other individuals. The process of consciousness, as that of life, is a dynamic process that involves the world. We are at home in our surroundings. We are out of our heads.

Science, just like history. It can not be taken for granted, firm, fixed. The historical discourse is never born, it always starts again anew.

Why this focus on time, history and its way of developing?

Technology is the result of project, of design, and any technology, any design process is defined first of all in relation to time and place in which it was produced.

The pictorial turn is also well established: the images are considered by any science and discipline a proper language, turning upside down the view that considered images as somewhat misleading, as bearers of a degraded knowledge (Mitchell, 2007)

This change has now led to a simultaneous presence, visible to anyone, of the drawer full of photographs taken on the planet.

The meaning of the images is intimate and internal to the same image. But today we are interested in having the perception of a consciousness that is shown in the world and on the world.

Once the photos were just "snapshots". Today the use of geo photos made the same world a " snapshot". But living the instant removes time. And it is his limit. It leads to forget to put the space of vision in the appropriate time.

What is needed is a thought that may find in a technology a tool to make sure that all this does not become a trash for narcissistic images, but the image of same consciousness of the world. Metaphrasing-Wittgenstein: if he tinks that the human body is the best image of the human soul, then the collection of visions of Panoramio, taken as a "corpus", that is the selection and organization of the whole "corpora" that have a qualitative relationship, is the image of the consciousness of those who live in a place.

An image, produced as a thought full of meaning, emerges only if you keep the whole body immersed in its environment, dynamically.

If the avatar embodies our being in the Net taking us away from our real body, the many visions that each of us now deposited in the Net, in the "virtual" (digital) dimension of planet Earth, are more and more referring to the reality of personally experienced situations, in other words are pieces of consciousness that join with those of others within a timeless mosaic, that has lost the very idea of time. The reality in all its forms can be measured and subjected to reference models.

For centuries we have discussed the idea of presence and the idea of simulation and simulacrum.

In the act of depositing a visual memory, the idea of presence is already inherent in the vision that allows to offer the image the vision to everybody, on the one hand narcissistically, and on the other as evidence of an act of conscience and an act of living and inhabiting.

We are no longer at the dawn of that time. We are inside its adolescence. We are growing inside that time, and on growing we feel the need to organize things differently. To compute, for example.

But which images are we talking about?

We are not taking care here of images of high cultures, of painting, for example, but of the images produced on travelling, the images associated to leisure, to a glance made free from the history of photography.

In this sense, the idea of continuity, vicinity, fractures and survival, that, after Warburg, we applie to the world of images, changes its status as images are often linked to the daily visions or visions of the sublime (meaning the emphatic visions that the public shares on the Net, for example those of sunsets. The landscape reinterpreted in a postcard). People shoot pictures having in mind images taken by others, that often become survivors in their visions. Images shared and participated.

The images speak and make us speak. Always. But the images uploaded to the Net, are not a synthesis, are things not acts. Acts performed by anyone, without giving them any merit. Thanks to the Net and its resources, this is the time that seems to have given at least one answer to the problem of becoming visible. At the beginning of the third millennium, this need has been solved for any representation. If for someone the goal is then to see everything, but also to have everything, for the anonymous crowd it is just to be seen (Virilio, 2005).

All this is now possible and it is even more not only as an opportunities but also as an experience.

The word experience includes thinking, feeling, as is manifested in the perception of the world before us.

The earth, our planet, thanks to technology has become a thinking thing. Our consciences are intertwined, interconnected. But we need historicizing in order to build a sense of all this thinking, remembering, otherwis it is nothing more than background noise.

Any science can not do without using the tools needed to perform research.

These instruments are the result of sedimentation of intelligence applied to building them. In other words of technology.

In front of an image, we are always facing the time (Didi-Huberman, 2000).

Looking at pictures in the Net is like looking at the frame of an open door: it is not hiding anything.

Any image, as recent it may be, finds a re-signification through time. The image becomes the object of a special obsession that binds its meaning to a past that constantly reconfigures it. This happens for every single image placed on the Net.

The construction of meaning in memory, builds up a new meaning to the viewer. It puts at stake the consciences of the beholder and of the picture felt as consciousness, as perceptive experience that represents the world as it has been seen.

Perhaps what we are presenting in the end is the disease which claims to be his own therapy: look, see, recognize!

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DYNAMIC LANDSCAPES

SARA FRANCESCHELLI

I will illustrate a performative design research program, based on a structural (albeit dynamical) interpretation of the figure of landscape in theoretical biology. We are interested in the dynamical properties of landscapes to be instantiated by the behaviour of designed devices: we are working on a pragmatics of landscapes.
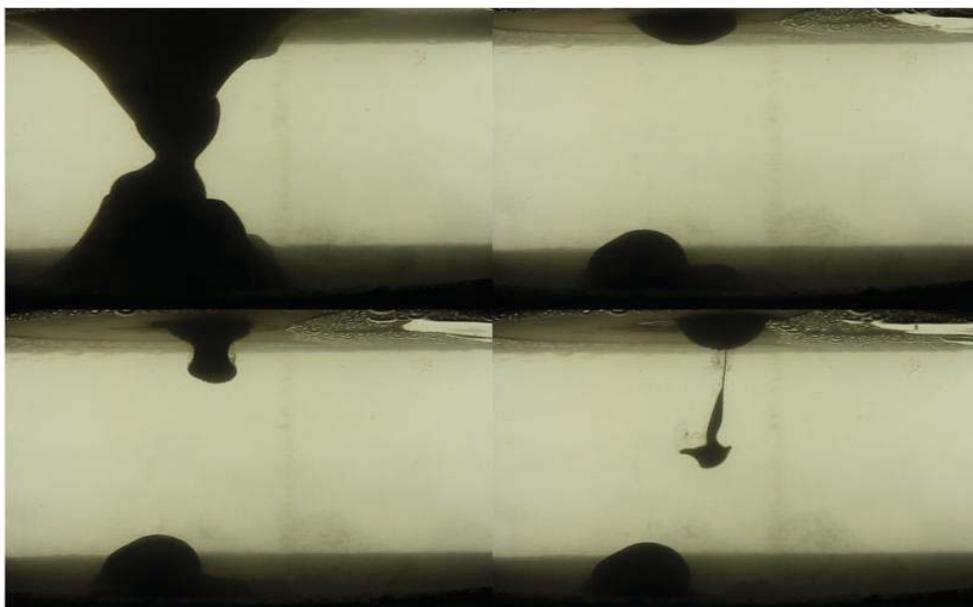
"Paysage magnétique", february 2010, in the framework of the workshop "Dynamics of a Landscape", in collaboration with the research program Dynlan. Students: Maia d'Abboville & Ferdinand Dervieux. Copyright ENSAD.

Morphodynamic narratives

ONE. CHANNEL

On a tensed membrane presenting maxima and minima, balls of different size are falling down. Sometimes they stop in local minima of the membrane. A second tensed membrane lies under the first, and they are connected by a channel.

TWO. TECTONICS

Potentially interacting agents are irregularly distributed on a plan network, at rest. They attract each other whether their distance is equal or less then a critical value. This condition can be produced, for example, by an external perturbation. Their topological disposition may thus change, and the global form of the surface be modified, folds appear.

THREE. A NETWORK OF SINGULARITIES

Imagine a network of singularities, dispersed in the three-dimensional space. Local maxima, local minima. They are interconnected. This connection is materialized not by linear links, but by surfaces. As in a dance, each equilibrium is nothing but a frozen instant of a global morphodynamics. An equilibrium can be destabilized, following certain tendencies. A local maximum can become a local minimum, while other unstable and dynamic equilibria are deploying their connection surfaces. We assist to a – periodic – revolution of the mutual equilibria.

FOUR. FLUID SCENARII

Insistent attempt of an encounter. Pressure. Resistance. Crossing a threshold. Modification of the form. Explosion. Surge. Fall. Dispersion. Extinction. Agglutination. Da capo. (Fig. 1)

Each of these morphogenetic narratives is compatible with one of the prototypes that have been produced in the framework of workshops on performative design held in ENSAD, Paris, inspired by the figure of landscape in theoretical biology. Some details on the context of the teaching and research experience in which these workshops took place are given in. [1] The idea was to provide to applied art students an introduction to the figure of landscape in theoretical biology through the presentations of some researchers in the field. A brainstorming with the researchers and with some teachers of the ENSAD - also involved in the project - followed this introduction, in order to help students in formulating a project of prototype, to be realized in the following weeks. In which sense the figure of landscape can be connected with morphogenesis and morphodynamics? And how can it inspire an experience of performative design?

The figure of landscape in theoretical biology

In every day language the term "landscape" has several acceptations. The most obvious are perhaps the ones referring to landscape as an expanse of scenery that can be seen in a single view: a desert landscape, for example, or a picture, or an artistic representation depicting this expanse of scenery. In our research, however, we are referring to another acceptation of landscape – we will not consider a material landscape or its image, but an abstract one that, nevertheless, also concerns vision: the landscape considered here emerges from contemporary science practice, it is a mental picture offering a theoretical view on morphogenesis and morphodynamics in systems composed by interacting agents evolving in an environment.

From the theory of evolution to embryology and statistical physics, the "landscape" metaphor - qualified as "adaptive", "epigenetic", or "energetic", depending on the domains under consideration – presents a characteristic shape defined by peaks, pits, and cols. An example of recent interdisciplinary research in theoretical biology dealing with landscapes is given in Armando et al. [2] These figures played and play an important role in the development of biology, from population genetics and evolutionary theory to embryology and epigenetics, since they entrance on the scientific scene during the 1930s. On one side, the adaptive landscape, introduced in 1932 by Sewall Wright, one of the founders of modern synthesis, is described by this author, as a

"diagrammatic representation of the field of gene combinations in two dimensions [...]. Dotted lines represent contours with respect adaptiveness." (from the original caption) [3]

In this representation the dynamics of mendelian populations on this surface is expected to go towards local maxima of fitness. On the other side, the epigenetic landscape introduced by Conrad Hal Waddington is qualified by Waddington himself as a mental image, a representation by a diagram of the developmental system of an embryo:

"Although the epigenetic landscape only provides a rough and ready picture of the developing embryo, and cannot be interpreted rigorously, it has certain merits for those who, like myself, find it comforting to have some mental picture, however vague, for what they are trying to think about." [4]

From a morphological point of view, the common shape of these landscapes (hilly surfaces) could suggest an analogy with the images of potential or energy landscapes for dissipative systems in mathematical and physical literature. However, Wright himself affirmed years later the introduction of his landscapes, that he did not meant to give them this mathematical connotation. He was indeed interested in suggesting a visual metaphor and in using its rhetorical power in order to render his own theory more understandable and to promote it in the wide community of not mathematics trained biologists. If in the case of Sewall Wright's landscapes images served manifestly to visually illustrate his already mathematized theory, I argue that the epigenetic landscape plays, with respect the theory it should represent (on embryo development), an inverse role: it is not an illustration of a theory, but in some respects an anticipation – an anticipation of its expression in mathematical terms. As a composite metaphor, involving variables at different spatio-temporal scales, it contains a call for mathematization of developmental processes. This interpretation of the figure of the epigenetic landscape, with all the potentialities it offers, lead my choice to build a teaching and research program at ENSAD on morphogenesis in an art-science perspective (see also papers by Jonas Ranft and Jiang Bin & Sara Franceschelli in this conference).

How to say mathematics with images

In Waddington's 1957 version of the epigenetic landscape a ball, lying on the top of an undulated surface, is ready to move along one of the paths opened in front of it. This image is completed by a "hidden" part, underlying the undulated surface: a network of pegs fixed in the ground, interconnected, often in a redundant way, by guy-ropes and strings. Tension on the links (guy-ropes and strings) is finally assured by the fact that some of them are connected to the inferior side of the surface (imagined here of non-zero thickness). The form of the undulated surface is thus seen as the emergent effect of this complex set of relationships. This suggests that a change in the tension of a link (that could be provoked by a variety of factors, for example an external perturbation, a modified tension between two or more pegs, or other…) could modify the form of the undulated surface, thus creating a new path, a new possibility for the balls to be chosen. On another side, one can also imagine that some tension modifications could be balanced by other modified tensions, so as to leave unmodified the global tension game on the undulating surface. This would imply that the paths offered by the undulations of the surface to the balls routes would not change, despite the underlying local modifications. And this could be seen as the guaranty of a certain form of robustness for the dynamics of the balls. Now, what could this image represent? Waddington states it explicitly: The undulated surface represents the fertilized egg. The path followed by the ball represents the developmental history of a particular part of the egg. As far as the underlying part, the epigenetic landscape turns out to be a composite metaphor, offering an explicit and mysterious at a time interpretation of the constitution of the surface itself:

"the complex system of interaction underlying the epigenetic landscape. The pegs in the ground of the figure represent genes; the strings leading from them the chemical tendencies which the genes produce. The modeling of the epigenetic landscape [...] is controlled by the pull of these numerous guy-ropes which are ultimately anchored to the genes." (from the original caption) [4]

This figure points out at least two aspects of Conrad Hal Waddington vision of embryology:

- the development of the embryo is canalized along defined pathways
- the undulating surface on which pathways, or channels, are defined, is moulded by the underlying network of genes interactions.

Waddington's non reductionist position vis-à-vis single gene action is explicitly stated:

"it is not necessary, in fact, to await a full understanding of the chemistry of single genes before trying to form some theoretical picture of how gene-systems produce integrated patterns of developmental change." [4]

Moreover, Waddington compares the genetic actions on the whole to the geological structure moulding the valleys of the landscape: beyond the field of embryo development, structural and morphological thinking is inscribed in Waddington's images. And this is the aspect that our research stresses.

What do landscapes do?

I argue that they call for a mathematization, setting the agenda of what a good mathematization of development should take into account. They also suggest the ingredients (non-linear dynamics, sensitivity to initial conditions, networks...) that could be at work. The mathematician René Thom, father of the catastrophes theory, inspired himself from embryology, and from these images, to create his mathematical theory. Catastrophe theory is a general theory of morphogenesis, intended as the creation or the destruction of forms, without regarding nor the substrate, nor the nature of the forces that determinate it. Waddington and Thom have been involved in a long correspondence, about a possible mathematization of the epigenetic landscape in terms of catastrophe theory. The correspondence shows some misunderstandings both on the theoretical notions associated to the landscape and on the mathematical notions that could describe them. [5] Despite these misunderstandings, and even more because of the questioning they open, I argue that the image of landscape, if interpreted in a structural, albeit dynamical sense, is a call for mathematization. It inserts itself in the history of the use of dynamical systems theory in biology, use conveyed also by cybernetics (the relevance of dynamical systems theory for cybernetics was not unknown to Waddington). Thus, if we look at the images of epigenetic landscape not as referring to objects, but to processes, possibly grasped by a dynamic systems approach, what becomes interesting is their performative power, more than their representational status. If the term landscape has, in its most general acceptation, the peculiarity of designating both the thing and the image of the thing – the signified and signifier - in our research program we are interested in the dynamical properties of landscapes to be instantiated by the behavior of designed devices. In other words, we are working on a pragmatics of landscapes. The challenge for students working with us on performative design is to conceive prototypes which instantiate some of the dynamic properties of landscapes.

What is performative in performative design?

The idea is that the morphological properties of landscapes, in their dynamic evolution, defines narratives that one could try and produce through designed devices. These narratives - thus shared by images of landscape (thought as processes) and material devices - can be supposed to be interesting on the basis of their genericity. Therefore one can work on pragmatics, with the idea in mind to eventually come back to semantics, carrying out questions and insights from the observed dynamic behaviors. If we consider the morphodynamics narratives we began with, each compatible with the behavior of a designed material device, several questions emerged from observations.

As far as the first narrative, "Channel", inspired by the dynamics of canalization on a landscape, a possible question to explore is: Can the balls pass from the superior membrane to the inferior one, and how?

For the second narrative, "Tectonics", which has been realized in the framework of the workshop "Dynamics of a landscape", the questions we tried and ask to the functioning of the device were of the kind: Which are the properties of stability and of robustness of the folded surface - globally and locally? How does the device resist to external stresses?

The third narrative "A network of singularities" is associated to a device that has been realized by a group of first year students of ENSAD in 2008, in the framework of the workshop "Paysages sensibles et dynamiques" (co-directed by the ENSAD colleague and architect Yves Mahieu and myself), which has been inspired by the notion of deployment arising from the analysis of the Waddington-Thom correspondence ([6], see also [1]). Here we took the notion of singularity as the dynamic unit around which a complex deploying surface has been designed. We worked on the calibration of the parameters of the dynamics to obtain a periodic deployment of the surface itself. In order to go further and to work on a possible interactivity of the device, questions arise, such as: How could an agent evolve on this surface deployment? Will there be any interdictions? Any ruptures? Any holes? What else – who else could take part to this dance? Interactive potentialities of this device are to be explored.

Interactivity perspective has been further explored in relation with the fourth narrative, "Fluid scenarii". This is associated to a device, "Paysage magnétique" (realized by two students, Ferdinand Dervieux and Maia d'Abboville in the framework of the workshop "Dynamics of a landscape", Fig. 1), that has been conceived following the idea that, in a generic landscape, the ball, coming from the image of the epigenetic landscape, could be a modifiable element, too. The behavior of the conceived device, in response to user stimuli, raised the following questions: Are there recurrent morphologies in function of external stresses? Can we recognize recurrent histories? And try and obtain them again? Here, thanks to the exploration of the responsive dynamics of this device, under the effect of external stresses, we found pertinent the use of the notion of "scenario", coming from the study of dynamic/complex systems transition to chaos.

In the study of dynamical systems from a mathematical point of view, as soon as non-linearity is implied, and there are more than three degrees of freedom - as it is well known since Poincaré's work on the three bodies problem - predictive power of equations in not guaranteed. In order to make some predictions on the dynamics of this kind of systems, the question of establishing a good representation of the phenomena thanks to the equations is not enough: one needs to know the history of the system, its behavior under the effect of the variation of some control parameters: what does the system perform spontaneously in time, and under the effect of its parameters variations? Are there generic scenarios,

defined by generic series of bifurcations, that on can recognize? Our experience of performative design allowed us to explore this set of questions by observing the dynamic behavior of the "Paysage magnétique", in response to the user actions.

Discussion

Without explicitly writing any equation, these performative design experiences lead us at the heart of the questioning about dynamic and complex systems behaviors, that the figure of landscape synthetically grasps. We followed the idea of not designing objects, but processes generating families of objects. From a practical point of view this has been translated in designing parameter controlled devices. We worked on mechanical, analogical devices without using the digital as a source of morphogenetic research. We worked on a qualitative basis, but theoretically there is no opposition with digital, morphogenetic research flourishing in architectural and design research, as for exemple in the work of Mark Burry, Hachim Menges, Michael Hensel, Aliza Andrasek... The tension analogical/digital, that we will explore in our further research, is not but a reactualization of one of the founding debates at the core of cybernetics, and still of great pertinence.

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FLO)(PS : BETWEEN HABITUAL AND EXPLORATIVE GESTURES

Karmen Franinovic

The perceived affordances of an everyday object guide its user toward habitual movements and experiences. Physical actions that are not immediately associated with established body techniques often remain neglected. Can sound activate those interactions that remain latent in the physicality of an interface? This paper presents the Flo)(ps project, an ecology of interactive cups that aim to engage strangers in non-verbal communication.

Fig 1. Girls drinking lemonade and playing with Flo)(ps. Photo by Annie Tremblay. Courtesy of OBORO.

Fig 2. The Flo)(ps glasses are active only when filled with liquid. Photo by Karmen Franinovic.

Introduction

What we know how to do strongly affects what we do, what we perceive and what we are willing to do. Given a glass and a pitcher filled with water, we will most likely pour the water into the glass, although its shape suggests many other movements, such as rolling and throwing the object. The latter actions, however, are neglected because we do not associate them with glass as a functional object. Abandoning such functionality in the name of exploration and play can foster existing and new types of social interaction.

The unusual sonic objects within public setting can attract and engage the user in an explorative discovery of its potential for action. [2, 3] But what happens when an everyday object is augmented with sonic gesture? In the musicBottles project, for example, the user can play music by removing the cork from the bottle, having the impression of freeing a song from the object. [5] Using the bottle as a sound container, the user expression is limited to acting with its cork as an on-off switch. A more explorative sonic interaction with an everyday object can be found in the Audio Shaker project where sounds can be mixed by interacting with an ordinary cocktail shaker. [4] Users can speak into the object to record sounds, close and shake it to re-mix them and then literally, pour out the sound mix. The object challenges users' preconceptions about the purpose of a cocktail shaker through an unusual feedback. While the continuity of Audio Shaker's responses allows for a more explorative interaction then the discrete feedback of the musicBottles, both interfaces engage habitual actions: opening a bottle or pouring sound. But how can an everyday object guide the user toward the space of unusual and explorative gestures?

The coupling between action, sound and object seems to play a key role. The material aspects of an interface, such as its shape, weight or texture, afford an energy transfer between the body and the interface. When interaction is designed around such physical qualities and without reference to another known object, the user has to discover how to generate sounds. Such process of learning is enabled by coupling action to sonic feedback in unusual as well as in expected ways. [6] Whereas the former foster discovery, the individual repertoires of expected couplings are defined through shared, culturally encoded movements and shaped by specific personal skills, such as knowing how to skate or to play an instrument. My argument is that this existing bodily knowledge may serve as a starting point for unusual and novel embodied experience.

Flop)(s interactive glasses

The Flo)(ps are project explores habitual and explorative sound gestures with everyday objects, and their impact on social and personal interaction. It is a set of glasses that sonically respond to habitual actions such as cheering and drinking, but are also activate when certain unusual gestures are performed. Different glasses can establish connection among each other if synchronously moved in a similar manner. Their connectedness is manifested through sonic and light responses which signal to the users that they are affecting their behavior. The goal of such performative connectedness among glasses is to make strangers communicate with each other, through an everyday object, in an embodied, dance-like way.

ACTION-SOUND COUPLINGS

The design of action-sound couplings took place through bodystorming where sonic gestures were explored using different objects and materials. Individual use of the object and the interaction between two people such as throwing the sound toward someone were probed. This helped decide how to map selected habitual and non-habitual gestures to different sounds. The habitual gestures extracted from sensor data included filling the glass with liquid, raising the glass, stirring the liquid, drinking and toasting, while the unusual gestures comprised twirling, moving the glass very slowly and shaking the glass. Habitual gestures generated sound of liquids such as pouring, while unusual movements opened up unexpected sonic spaces such as the sound of the storm. The movement of the glass continuously changed the qualities of the sound in order to give the user the feeling of an ecologically natural experience - in

the sense of cause and effect logic found in physical phenomena. [7] For example, tilting the glass would make some virtual water come out and than stop until the user inclined the glass more in order to pour out the remaining water.

EXPERIENCE DESIGN

The glasses respond to the user only when they are full, and otherwise sit quietly waiting to be filled with the liquid. Once filled, the glasses begin to pulsate luminously and emanate the sound of water drops, each in its own rhythm: faster and irregular, slow and in patterns or slow and regular. Different responses aim to communicate specific identity of each glass - one is energetic and nervous, one is slow and relax, one is determined and clear. Their behavior is intended to attract the visitors: as they approach the glass the volume of the sound increases, and once the glass is grasped the dripping fades out. The habitual actions, which are expected to be firstly performed, activate sounds of liquid. Starting from existing action-sound repertoires, the user is guided into new movement spaces. For example, twirling the glass activates the sound of the wind. The wind sound grows louder and more complex if the user continues to twirl the glass.

When the movement is synchronous, same light and sound patterns are displayed in both glasses. The aim of using the light feedback is to establish visual link when users are too far apart from each other. The connective sound responses become stronger as the users move in the domain of non-habitual movements with the glass. In this way, the users may influence each other's movements through the sonic and light response of the glass. The goal of connected behavior of The Flo)(ps is to allow the users to collectively perform and "to dance" with each other stimulated by the sonic response to their gestures. [1]

EVALUATION

Considering that the main goal of the project is to connect strangers through performative acts with everyday objects, the evaluation aimed to reveal the social potential of the system and to gain understanding into individual experience of using the Flo)(ps within public setting. The artifacts were exhibited at the Oboro center in Montreal, Canada over three-week period at the International Design Biennale, St. Etienne, France over four-week period. In the Oboro exhibition the users could drink beverages from the Flo)(ps, whereas this was not possible at St. Etienne Biennale due to the large number of approximately 85.000 visitors. In Oboro installation, each of the three glasses was associated with an area of the bar below which the speaker was located. Chairs were used to keep the visitor's interaction bounded to that designated bar area. The drinks were served in the late afternoon and evening of each weekend, at the exhibition opening, events such as Journees de la Culture and special organized visits that lasted from two to five hours.

The range of social experiences that emerge within public context in large part cannot be predicted. [3] Thus rather than focusing on a specific task which could be quantitatively measured, we preferred to qualitatively evaluate user's interaction with the system without any previous instructions. We used questionnaires and direct observation including participant observation, design-adopted video ethnography and the informal interviews. These methods were applied sequentially in order to avoid guiding user experience through questions. Firstly, the visitors interactions were video recorded; then participatory observation combined with informal interviews took place; and finally, the questionnaires were

provided after the groups of visitors finished interacting. The data collected included more than six hours of video recordings, seventeen filled questionnaires and notes from the participatory observation and interviews with participants during the installation. [1]

SOCIAL INTERACTION

The average interaction with the glasses took fifteen minutes, although many visitors spend more time within the installation while chatting with friends and drinking from the Flo)(ps. Overall, the findings about the social dynamics emerging around the objects proved to be best defined from the analysis of the video material and the insights gained through informal interviews. A number of patterns were seen to emerge including:

- Mirroring and Synchronizing: Participants were observed to mirror each other's movements, especially when someone discovered a new sonic behavior, as if learning from each other.
- Non-verbal Communication: One visitor wrote: "you don't have to talk to connect with strangers since you are already linked by the sound you are making and also the gestures" and another visitor described sound as "an extension of body language";
- Collaborative Performance was observed, as groups of three participants aimed to collaboratively compose sounds. This often led them to ignore the sonic and light connections as they focused on musical improvisation;
- Simple Play such as creating sound of clinging glasses by toasting was repeatedly performed. Participants appeared to enjoy the simplicity and predictability of the direct feedback, but this sometimes appeared to limit further exploration of interactivity;
- Curiosity and Discussion: Participants proposed different interpretations of the objects and explanations for their use such as glass as a seduction tool or a waiter's help;
- Ambient Display: During the performance with the objects, participants would stop to talk to someone while enjoying their drinks. The glasses would fade into the background until the user's attention was drawn back to their responses and play was resumed.

These observations show that the installation forged interaction between strangers, through sonic and light gestures. The light appeared to have a stronger connection effect than the sound which often appeared to be too complex to interpret. The use of light rhythmically varying in color and luminosity had an important role in establishing contact and was necessary when the overall soundscape grew louder.

Some visitors expressed desire for simpler and clearer sound responses. The clarity of interaction may be improved by reducing the number of gestures and by using simple motions, rhythmical patterns or large movements that showed to be preferred by the participants due to their clarity. However, prudence is required as reducing the temporal evolution of sonic feedback to direct responses may lead to on-off behavior that could quickly bore the user. In fact, those participants who had interacted alone desired more complex sonic behaviors. Thus, one solution to be tested is to apply simple responses when more people are using the glasses and more complex ones when a solo interaction takes place.

INDIVIDUAL INTERACTION

The subjective aspects of the experience were best described within the questionnaires and in participants reflections collected during the informal interviews. The following behaviors emerged:

- Expressive Solo Performance: Most visitors experienced the object as an expressive instrument. When they interacted alone, the rhythm of the performance often slowed down as they more carefully explored the sonic behavior of the object;
- Exploring the Unusual: Participants found it difficult to interpret unusual sounds, but were satisfied that the sound continuously responded to their gestures. One visitor wrote: "swirling it in a slightly less habitual and functional manner, it opens up an unusual sonic space. The splashing sound seems to gain in resonance. Soon after a deep howling, evocative of a storm, becomes amplified;" [1]
- Limited by Habits: Few participants stated that certain assumptions about what should be done with the glass affected their experience. One participant wrote: "I was more focused on solitary interaction. I guess I assumed that all that could be done with the glasses could be done alone.". Participants enjoyed small deviations from habitual events, such as toasting with glasses of different materials (i.e. plastic glass with the sound of crystal one);
- More Dynamics: Because the sounds did not evolve if only habitual gestures were performed , some visitors who played for a short time period said that the sounds should evolve or change more often;
- Introspection and Intimacy: Many visitors who were alone in the installation used the glass as a kind of meditation tool. They were observed to stare at the drink being illuminated by the light or to slowly twirl the glass while listening to the sound of the rain or the wind. One visitor wrote: "They remind me of candles. It would be cool if they reacted to the stress in your palms.";
- Strangeness: Several comments suggested that the sounds confer the sense of strangeness. Participants associated sounds to "an imaginary chemistry lab", "stalagmite space","a damp basement" and "outer space". Others, however, linked them to personal memories such as "playing in bath as a kid" or "it makes me feel like I am underwater".
- Fun or Function: The presence of liquid in the glasses showed to be highly significant in affecting and constraining the way in which users interact with the Flo)(ps glasses, and the ways in which they perceive them. If the glass was activated when no liquid was in it, it was interpreted as a musical instrument, a toy or a magical device.

When performing individually, the participants were more attentive to sensuous responses of the system. They explored more deeply the transitions between habitual and unusual gestures while forming new interpretations for sonic and luminous behaviors of the glass. The distribution of the attention of the user appeared to be central to shifting between different types of interaction. Although the user interaction cannot be predicted, the spaces in-between the solitary and collective performance and between habitual and unusual gestures need to be well choreographed.

Conclusion

I have described the design and the qualitative evaluation of the Flo)(ps project that aimed to stimulate connectedness among strangers through sonic movement. The goal was to explore the space in-between the habitual and unusual sonic gestures with an everyday object. Using a familiar object such as a cocktail glass showed to facilitate the first exposure to its interactivity, but it showed to limit the exploration of its behavior due to the assumptions about their use. Such objects proved to engage users in non-verbal communication, especially if the action-sound relationships are simple. Strategies for the transition between habitual and experimental actions still remain to be explored. The integration of the speaker in the body of the glass is necessary in order to improve usability and to conduct exploration within real-world context such as a dance club or a caffe. The next steps for The Flo)(ps project will focus on more abstract sonic feedback for habitual actions in order to break the expectations of the user and facilitate unusual gestural interaction.

Strangeness may be the key to exploring the boundary between the familiar and the unknown gestures, as witnessed by this reflection of one of the The Flo)(ps users: "As I become immersed in my experimentation with the drinking glasses, their familiarity gradually becomes odd to me, in the way a word can gradually acquire a strangeness if we repeat it over and over again. This turn from familiarity to estrangement allows for a rediscovery." [1] It is my hope this project raised questions and awareness that such playful and embodied reflection can be stimulated and sustained through novel sonic experiences within our everyday contexts.

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MAPPING UNCERTAINTY

EUGENIA FRATZESKOU

The issue of exactitude in mapping the physical world has been debated extensively in science and has influenced the formulation of scientific paradigms. New types of site-specific digital art are developing for creatively investigating the intersection between various types of reality and their exchanges. This paper focuses on how it is possible to trace and interact with the emerging paradoxes, through innovative modes of spatial intervention.

The issue of exactitude in mapping the physical world has been debated extensively in science and has deeply influenced the development of scientific paradigms. According to Lev Manovich, a fundamental paradigm shift characterises the transition from Modernist reduction and abstraction to complexity in art and science. [1] As we pass from Modernist mathematical formalism to complexity, uncertainty and complementarity, our perception and understanding of the relationship between physical and virtual worlds are changing in the most unexpected ways. The developments in Quantum physics and scientific visualisation have revealed an emerging kind of multiple dimensionality that characterises the fuzzy boundaries between reality and virtuality. As a result, a new understanding of space and reality in general, as well as of the limitations of science, is developing. A closer investigation of what is understood as paradigm shifts, may show certain ambiguous interchanges between reduction, abstraction, complexity and complementarity, in a context where not even a single definition of complexity seems to be universally accepted. This situation is most revealing of the inevitable limitations and shortcomings that characterise our attempt to study and map reality.

The creation of algorithms is part of the development of mathematical formalism that has been based on the probabilistic relationships between predetermined abstract sets marking the transition to the 20th century rationalism, the abstract vision of Modernism, the excessive trust and over-confidence in digital technology and visualisation. Data visualisation and scientific simulation have been largely used in science and across disciplines for visualising and investigating the co-ordinates of the real world. Despite early hopes however, new technology has not eliminated indeterminacy. The workings of Virtual Reality (VR) itself are inconsistent. Based on software engineering and media theory e.g. Friedrich Kittler's writings, although programmers struggle to remedy noise – the inherent side-effect of the chip, which may include diffusion, quantum mechanical characteristics, etc. – machine reduction and constraints, an inherent degree of randomness and the increasing incompatibility between the diverse computational levels haunt digital technology even more. [2] Simulation includes processes of analysis as well as of synthesis. The algorithmic infrastructure of digital visualisation systems is characterised by precarious interplays between abstraction and complexity. New ambiguous relationships between part and whole emerge due to such interplays. The world appears to be unconnected, diffused and uncertain, as it is visualised through the algorithmic veil of digital geometry that is not only abstract but also unstable and paradoxical. [3]

Instead of seeking to achieve the unattainable, that is, to map the changing reality with exactitude and certainty, the most relevant challenge would be to map the boundaries and uncertainties of our knowledge and its applications. The use of data visualisation, scientific simulation etc., can be contradictory. On the one hand, digital visualisation is used as a means for analysing, simulating and predicting reality, evoking thus, a sense of objectivity, certainty and control, as the probabilistic space of VR is forced to

look real; as possibility becomes a kind of reality. On the other hand, it is broadly acknowledged that emergence derives from complexity; from invisible, interacting and unsettling potentiality fields. Complicated beginnings emerge as there is no ground zero, while elliptical ends occur due to a constant asymmetry that causes new fields of creative possibilities to appear. Such a condition of emergence calls for new modes of presentation, interaction and aesthetics, in relation not only to the issue of boundary but also of understanding reality per se. Instead of ignoring or introducing unpredictability and uncertainty, their hidden existence in digital visualisation systems can be creatively revealed and explored in depth. In this way, new modes of innovative practice that do not comply with the established doctrines of representation, formalism, constructivism and their opposites, can be developed.

In contemporary art, architecture and the related disciplines, the changing relationships between data flows and data matrices inspire new types of spatial research and practice. As a designed environment, built space can be perceived as a fragment of an excessive superimposition of dynamically interacting algorithmic, geometrical, topological and structural grids. A creative exploration of the data that flows into, from and within the physical structures of the built environment, challenges our common assumptions about space and our experience of it.

Instead of perceiving it as neutral and stable, space is heterogeneous and uncontrollably evolving due to its multiple layers of virtuality and reality. As Lev Manovich states, the influence of Quantum Physics and Manuel Castell's concept of informationalism is particularly evident in the development of digital and media art, while the most interesting and challenging art is created through the interactions between the various layers of space. [4] In this way, it is possible to surpass the limitations of producing a neat and settled hyperspace that is characterised by the unity and continuity of spatial augmentation. One of the most challenging possibilities arising, is to creatively reveal various interstitial spaces of emergence that derives from complexity; from the invisible and unsettling potentiality fields between the transitional states of spatial transformation and exchange. Imperceptibles and intermediates would emerge, as we unravel what is observable. The latter can be perceived as the outcome of the various intersections of interacting fields and the ruptures that emerge from the changing and heterogeneous nature of the layers of space. An oscillation between atopias, utopias and dystopias may challenge the established borderlines between a plan, a map and a building, as well as their meaning.

The opportunity to reveal and challenge the relationships between diverse kinds of reality and perception, can be realised through exploring various types of interstitial space, by creating innovative and unsettling spatial interventions. Certain emerging types of digital site-specific art enable the creative investigation of the intersections between various types of reality and their exchanges. For instance, Pablo Valbuena uses mutually interacting digital input and output processes for enabling in-situ spatial projections, injections and incisions, so that para-sites are revealed through light-based drawing. [5]

Creating inter-passages between digital and actual spaces forms part of the author's practice. The emphasis is placed on how interstitial spaces, in terms of code and maths, can be revealed in a physical space, where perception levels can be crossed. New modes of site-specific drawing are developed for tracing and interacting with the half- and by-products of algorithmic flows that remain unbuilt, their meta-dimensionality and the emerging paradoxes, through different modes of innovative spatial intervention. Instead of creating a singularity e.g. translating a digital design into a building, or developing progressions and sequences as in animation, the aim is to create inter-passages between the unsettling heterogeneous and interacting layers of architectural space. Interstitial spaces can be creatively revealed through the use of material/immaterial mediums such as light and line as well as through the

processes of drawing and diagramming, for opening up the interfaces of thought, VR and built architecture. Innovative spatial interventions can be realised through a) site-specific drawing of and onto the actual site, b) interactive spatial diagramming as realised in a site-specific semi-immersive virtual environment. When entering interstitial spaces, viewers encounter neither a mere place, nor an absolute or utopian space, but a kind of inter-passage between real conditions, VR and thought, where an unprecedented kind of spatial experience emerges. Inter-spatiality enables a new philosophical understanding, experience and perception of space, inspiring new types of spatial research and practice in art, architecture and the related fields.

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FRANKENSTEIN2; OR, THE MONSTER OF MAIN STREAM

Annabel Frearson

Frankenstein2... is a new novel and associated works created using all and only the words from Mary Shelley's *Frankenstein; or, The Modern Prometheus* (1831).
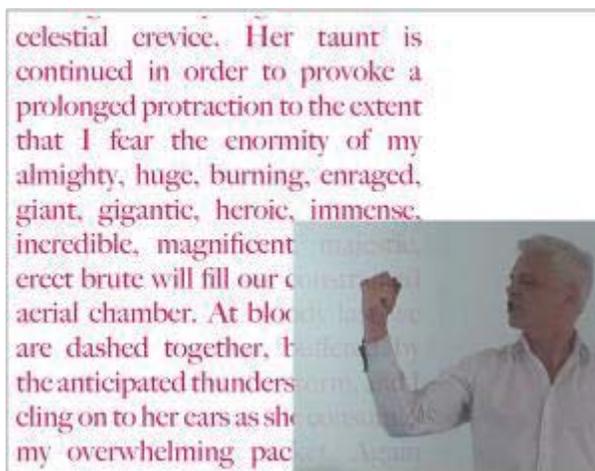
Extract from Frankenstein2... as performed by Alex Walker.

Frankenstein2; or, The Monster of Main Stream is an ongoing project which involves rewriting Mary Shelley's 1831 novel, *Frankenstein; or, The Modern Prometheus*, using all and only the words from the original to create a new, contemporary story. During the course of its production, extracts of *Frankenstein2...* have materialised in a variety of contexts and media, examples of which I will be presenting at ISEA2011.

The following is a piece, produced for a recent group exhibition in London (UK) on pornography. It was displayed as a large scale photographic print and performed as a rehearsed reading by an actor with a Scottish accent.

Bear in mind that the following words all derive from Mary Shelley's *Frankenstein...*

"This is your captain speaking." I am on a flight to Rotterdam. Business class. Oh yes. Duty Free breakfast: bring it on! By the time we take off I am feeling fully accomplished. Here I am, eye to eye with a wondrous herd of congenial snatches as the cabin crew sallies down the isle for the safety routine. I willingly consent to being restrained in the bondage of my seat by one of these bright blue angels of the air. I admire her immaculate apparel and chemical proficiency, lingering over the sound of clasping metals as one side is glided in to the other with a satisfying 'chink'. Her name is Brandy – or could it be Caroline, or perhaps Dawn? – and she is Austrian apparently, not from Holland. Either way, her accent is diabolically alluring and full of the plaited rustic charm of hay meadows and snow-clad peaks as it flows into my ears like a trickling mountain-stream. How annoying when we are interrupted by Bernard's choicest cheese and cheerfulness. Quelling my embittered discontent with hard spirits I find the Southern Comfort comfortless but it nevertheless has the unexpected advantage of rendering me so absolutely, assuredly, audibly, barbarously, completely, deeply, dismally, dreadfully, eminently,

exceedingly, exquisitely, fearfully, fervently, heartily, hideously, immeasurably, infallibly, insultingly, irretrievably, irrevocably, Italy?, listlessly, loudly, miserably, negligently, northerly, obscurely, officially, painfully, particularly passionately, peculiarly perceptibly, perfectly perpendicularly, positively, profoundly, proportionably, really remarkably, shamefully sincerely, singularly strenuously, terrifically, totally, triumphantly, truly, undoubtedly, utterly violently, wantonly wearily, wholly, wonderfully, wretchedly drunk that I am unable to take myself to the john. And so my angel returns to my assistance and here we are, face to face in the confines of a mile high cell in the sky. She locks the door. She has to reach around me to do so. "Having completed our ascent, we are now travelling at twenty-eight thousand feet and expect to experience some adverse weather conditions as we cross the North Sea. In the event of severe turbulence we request that you remain securely seated until the sign above your head is no longer illuminated." She busily agitates my clothes to release my capacious tackle so that I can alleviate myself but her finger is caught and, alas, she is assailed with a golden shower. Alas, alas, alas, alas, alas, alas, alas, alas, alas, alas, alas... What alas!? She appears to love it! She is breathless and flushed. My God, you can take a girl out of a barn but you clearly cannot take the barn out of a girl. Bosom or bottom? Bosom or bottom? Bosom or bottom? While I am frozen in the torment of indecision she has proceeded to extricate my manacled Lycurgus and is devouring with vigour the evidently exotic elixir that has continued to gush forth from my fountain of glory (I suspect that by now it is more or less neat Duty Free), her farm-house diligence augmenting my no longer wrinkled endowments. This milkhouse devil has turned tormentor as she cruelly hovers her lustrous lips over my swelling stump, a few lingering dew drops running down her excessively made-up cheeks. The throbbings of her ascended plaything plead, groan, quiver, rankle and beg, craving to be plunged into that celestial crevice. Her taunt is continued in order to provoke a prolonged protraction to the extent that I fear the enormity of my almighty, huge, burning, enraged, giant, gigantic, heroic, immense, incredible, magnificent, majestic, erect brute will fill our constrained aerial chamber. At bloody last we are dashed together, buffeted by the anticipated thunderstorm, and I cling on to her ears as she consumes my overwhelming packet. Again we are flung by the storm and she is grasping my crown jewels in her struggle to keep balanced. Before she can completely crush my nuts, however, I turn her upside down – still attached, mind you – and remove with my teeth the scanty An Summers something that she is hardly wearing, and set off on an expedition in search of her female mystery muscle. I charge into her country brambles like a pack of wild dogs pursuing a hare. Bewildered, mangled, and strangely on the verge of ennui, she is saved by another bolt of lightning as we are again momentarily thrown apart. She pleasures herself while soothing her mutilated parts, exposing her ravished ravines as I stand in a trance-like reverie and beg to be allowed in. This time she offers me her other end; and who am I to deny the fancies of a farmer girl? I force my way into her drug mule hiding-place and no sooner have I sailed up this squalid river than I feel the roarings of waterfalls rumbling within me. Not yet... not yet... Oh God! Oh God! Not yet... not yet... not yet... No... no... Not yet... not yet... Ah... Ah... Not yet... not yet... Oh God... Not yet... not yet... Please! Not yet... Oh God... Ah! Not yet... not yet... There... there... Yes! Higher... higher... No... Not yet... Lower! Slow down! There! There! Yes! Ah! Harder! There! Fast! Fast! Oh God! Not yet... Now! Oh God! I am the king! I am Rocky! I am Rob Low, Jeer Son Borne, Robert de Near Oh and all the Bonds put together! My ecstatic scream is mirrored by the apparatus around us which seems to have entered an uncontrollable free fall of delirium. Without our knowing, instead of a thunder storm, we have indeed become victims of a suicide assassin terror plot air disaster and an art work has exploded in the hold. Fellow travellers have been blasted into the abyss; their possessions and body parts strewed across the surface of the ocean, burning flesh quenched by the calmly callous waves. The convulsions of my colonisation of this wicked, wicked shepherd woman peak at the point that the shattered assemblage

leaves the cloudless sky to penetrate its watery grave. And then I awake, still in the airport departure hall, with a pool of stiff cold seamen slowly descending southwards.

THE VJACKET: ENABLING THE VJ AS PERFORMER WITH RHYTHMIC WEARABLE INTERFACES

Tyler Freeman & Andreas Zingerle

The VJacket is a wearable controller for live video performance. It is worn by the performer or visual artist to control video effects and transitions, trigger clips or scrub frames with the output of the integrated sensor system. The sensors detect body movements like bending, touching or hitting, and can send OpenSoundControl or MIDI messages wirelessly to the various VJ programs, bringing the rhythmic movement of dance to computer interaction.

Sensor layout for the first prototype VJacket, 2010. It includes a LED on one wrist and light sensor on the other so you can cross wrists to trigger video effects. Image copyright A. Zingerle.

Introduction to VJing

A visuals jockey, or VJ, is the visual analog to the disk jockey, or DJ. As the DJ selects, combines and mixes music, the VJ uses tools to dynamically change the visual appearance of a space, often in alliance with the music and the crowd. Performers who are more affiliated with the art world than the electronic music scene may label themselves visualists or live cinema artists rather than VJs. VJing can be seen as an advancing wheel that provides a good platform for experimentation in material, forms, content or presentation formats and displays. [1] Although several festivals dedicate themselves to the VJing culture, clubs and nightlife remain its primary platform; in the club setting, VJs use video, film projections, lights and even smell to accompany a DJ's music set and to interact with their audience. [2]

Often the VJ uses short clips from disparate sources like archival films, photography, and computer generated animations that can be looped, remixed, combined, and arranged in countless ways for unlimited visual possibilities. Like the DJ, the VJ operates live and manipulates different media formats according to the content mapping, the visual expression or temporal and spatial montage. [3]

Several different software packages are available that can handle a wide variety of visual material. Often VJs use MIDI controllers to more easily trigger their clips, presets or effect layers. These generally-used

setups bond the VJ to the computer, restricting him mostly to a seated position behind one or more screens.

Enabling the VJ as Performer

VJing is a rhythmic manipulation of moving video and animation. A mouse and keyboard are not ideal rhythmic controllers because they are very rigid and unforgiving. It's common for a VJ to experience difficulty scrubbing a video rhythmically with a mouse because the mouse is too precise in position and too slow in response for gestures of rhythm, which are innately imprecise in position but very precise in tempo and response. Knobs, sliders and touchpads are more responsive than a mouse, but still require tiny movements for grand rhythmic gestures, and require precise position and attention (most knobs can only be turned by two fingers at once: a precise movement).

A more natural controller for such tempo-centric manipulation would mimic the movements of dancing, since dancing is the ultimate form of rhythmic expression. We see this concept in several new experimental VJ interfaces, including the maraca-like interface 'Rhythmism,' [4] and the 'WiiJ Video' interface, which uses the Nintendo Wii remote to control video through sweeping, rhythmic hand gestures.

We sought to extend the gestural concept, past just the hands to all parts of the body, to enable a VJ to control video simply by dancing. We embedded sensors into clothing to ensure minimal encumbrance from the interface. The VJacket allows for wide, imprecise movements with a precise rhythmic response. The VJ will not have to fumble for knobs and buttons or have to look at the screen to be sure he's clicking on the right thing – he will be freed to control the video using his body movements alone.

Because the VJacket is wireless, the VJ is free to interact with the audience and musicians on stage or even walking through the crowd – something which most hermit-like VJs do not usually experience, since they are often relegated to the back corner of the club behind the video inputs and lighting controls. With a wireless system, a VJ becomes not just an engineer behind the curtain, but an actual live performer – one whose movements are directly connected to the video projections. The audience will be able to see the VJ's gestures in connection with the video, and thus will become more interested in the performance itself.

Reeves et al. explain the importance of "expressive latitude" in a performance: the stylistic gestures a performer makes "that are not directly sensed by the instrument." [5] Wearing the VJacket, the performer transforms these superfluous gestures into *direct manipulations* of the instrument – indeed reducing the expressive latitude, yet simultaneously merging that expression into the movements of the video performance. The bend of the arm, the slap on the stomach, and the wave of the hand are no longer purely showmanship but are given meaning in the visual context provided by the on-screen projections, synthesizing the performance of the body with the performance of the technology. "Such gestures are an essential element of deliberately performing interactions for others to see and appreciate, expressing skill and control and introducing an aesthetic component to the use of technology." [2]

It is our ultimate goal to connect the VJ with the audience since doing so will create a more legitimate space for VJing within the performance community, and we hope to encourage more people to try VJing themselves. With video and consumer production becoming more ubiquitous, projectors becoming

cheaper and smaller – even integrated into our cell phones and cameras – soon every rock band, DJ and karaoke bar will have its own VJ. If they don't, someone with a pocket projector and mobile VJ setup will guerrilla VJ anyway. This is the future we envision, and we are trying to shape it with the VJacket.

Free the people

In recent years, several research projects have focused on the controllability of live performance, such as the multitouch surfaces 'reacTable' by Sergi Joda [6] and the 'Vplay' by Stuart Taylor [7]. However, other projects spotlight the performative quality of the devices by freeing the artist from his 'behind the screen' position and allowing unfettered physical movement on a stage or within the audience. Representative examples make use of neural interfaces like the 'Nervixxx' by Tokuhisa, [8] or camera-based motion tracking like the 'Kinect + Visual Synth' project by VJ Fader.

We combined ideas from both percussion-based devices, such as the maraca-based 'Rhythmism,' [4] which transforms a simple percussion instrument into a VJ performance system, and more precise expressive instruments, such as the 'Djammer,' a handheld device that can be used for 'air-scratching' – giving the DJ the possibility to leave his turntables and move around in the nightclub [2] – to give the VJ a wide range of control possibilities: traditional scratching and fading combined with percussive elements for triggering effects or clips.

The Dutch performance artist Eboman created the 'SenSorSuit,' a suit that he uses for staged body performances, mixing live video and a network of sensors spread over his body. The SenSorSuit is full of bulky sensors and other equipment which must be taped onto the body. In contrast, we tried to make the VJacket as unobtrusive as possible, enabling the performer to just slip it on and switch it on with very little preparation time, making spontaneous performance more feasible and more comfortable. Unlike the SenSorSuit, which is a complete performance instrument, the VJacket is meant to be used in conjunction with other interfaces: it can provide basic functions that the VJ uses most often (e.g. global effects, clip loading, mixing and scratching) and keep them easily accessible, leaving the more complicated, lesser-used functions to other controllers, such as a piano keyboard, sequencer, or even the bane of live performance: the mouse/keyboard on the laptop.

Hardware Considerations

The VJacket uses a Bluetooth Arduino microcontroller board to wirelessly relay sensor data to the computer. The same way the printing press enabled the masses to experience art, the Arduino and other DIY open-source movements have enabled the masses to make their own cybernetic art and personalized technology – creating "products for a market of one person... You don't need personal fabrication in the home to buy what you can buy because you can buy it. You need it for what makes you unique, just like personalization," as Neil Gershenfeld said in his 2006 TED Talk. We wanted to see where other people could take the VJacket idea, so we made the hardware and software open source and wrote tutorials on how to make your own VJacket – from building the circuits to mounting the sensors on clothing to using the software to control any aspect – and posted them to various DIY communities, as well as gave workshops to urban youths to empower them as creative entrepreneurs in their communities. [9]

To encourage this extreme personalization, we made VJacket hardware modular, with the capability to choose exactly which kinds of sensors you use. The original version had bend sensors in the elbows to control visuals by bending your arms, a linear (ribbon) potentiometer in the lapel to offer finer finger control, and photoresitors and piezo hit sensors for more percussive movements, but the circuits and software were designed as to allow any combination of sensors.

For example, in a later iteration of a VJacket designed for step dancer Geoffrey Frimpong, we used only percussive piezo sensors, so he could slap different parts of his jacket during the dance for a dominantly rhythmic, staccato audiovisual performance. Kevin Brito's dance style is more smooth and flowing, so he preferred the bend sensors and slide sensors during his performance. With such customizations, each sensor in a person's VJacket is an extension of that person's style: just as an expensive suit is tailored to follow the contours of an individual's body, the VJacket's sensors are placed to capture and accentuate the performer's natural style, creating a highly personalized instrument.

Slayden et al. found during user-testing with experienced DJs that "the interface had to be operated in a manner where one could develop good proprioceptive sense for and development of muscle memory, much like any musical instrument." [2] With the VJacket, the body becomes the instrument, bridging the proprioceptive gap and shortening the learning curve. We found during user testing that this learning curve is shortened even more when the user feedback is clear and expressive. Kids who tried on the VJacket picked up on the interface quickly; we noticed that when the sounds were off, the players had a harder time discerning which movements triggered a visual effect. With the instant and obvious feedback of sound combined with visuals, however, they quickly mastered the VJacket.

Software Considerations

Once you have the sensor data from the hardware, you need a way to control your performance software with it. There are many projects available that convert Arduino sensor information into messages that control various software programs, including Maxuino, Funnel, NETLab Toolkit, among others. However, they are mostly libraries that require programming experience, expensive development tools (e.g. Max 5 for Maxuino and Adobe Flash for NETLab Toolkit), and a good deal of development and testing time to use in a project. Consequently, many beginning users have a steep learning curve to overcome before they can start creating.

In order to make Arudino projects easier and faster to realize, we designed the Arduino2OSC software to accept and process multiple types of sensor input, using live sensor readouts to adjust the behavior on-the-fly. The basics are there: scaling input and output values, adding cutoff thresholds, as well as filters to smooth errant sensor data and envelope triggers to automate gestures. Once you have configured all the sensor inputs to produce the desired data, you can route the output as Open Sound Control or MIDI messages, two standards which are supported almost universally by VJ and audio software, such as "Arkaos Grand VJ, Max/MSP/Jitter, Reaktor, Abelton Live, Propellerheads Reason, Supercollider, Kyma, Processing, OpenFrameworks, etc. Using OSC, you can even send the messages over the LAN for networked performances." [9]

Another important aspect of the software is to be able to adjust the sensor values on the fly, while preparing for or even during a performance. Sensor data can change slightly from performance to performance (variables include the strength of the battery, bend sensors slowly becoming permanently bent, ambient light in a venue that affects light sensors), or the behavior could change (the act could

suddenly call for a "bleep" sound when there was a "bloop," a cut when there was a fade, etc.), so the performer needs a way to adjust for unforeseen changes without opening up the development environment and changing code. We built the interface to be completely customizable while it's running, and to have customizable presets that you can load for different performance sections.

Outlook

The VJacket was designed to be a completely mobile, wearable instrument that empowers performers and expands the performing space beyond traditional music venues, galleries and museums, thus merging the context for VJing from a performance space into an audience space. No longer is the VJ relegated to the back of the room or on stage; he can also be a participatory audience member projecting his own performance as a highly individualized interpretation of the music – an extension of dance enabled by fashion. For this reason, we are developing a new version of the Arduino2OSC software, called Sensorizer, which will be available on mobile platforms (Android) as well as standard desktop platforms. Sensorizer will connect the VJacket with a mobile phone or tablet wirelessly, and use the same OSC/MIDI bridge to turn the phone into a completely mobile performance instrument: either projecting visuals via a pocket projector, or creating sounds and sequencing music. Since Sensorizer is based on the well-defined OSC protocol, other mobile developers can write audiovisual performance apps to create new uses for the VJacket and contribute to a growing resource for "guerrilla VJs."

Developers are already beginning to write games and performance software using OSC to control all aspects of the functionality. Games like 'Miserable Pile of Secrets' and 'Savestate' [10] make possible a new avenue of interface exploration by connecting unrelated systems, or codebending: "video games can play other video games, and become generative art. Oscillators can drive web browsers. Poetry can write music." [10] Indeed, the VJacket can also be used as an input to these systems, enabling the wearer to write generative poetry by hitting the jacket to change the word choices, or play Tetris by bending his arms. We wait excitedly to see what other people will choose to control with their own VJackets, and hope that one day, personalized fashion technology and mobile performance computing will permeate our society in a community-driven collaboration on stage, in the streets, and at home.

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PARCIVAL GOES DIGITAL: NEW MEDIA AS PART OF A GESAMTKUNSTWERK

Gesa Friederichs-Buttner & Johanna Dangel

We describe the results of an evaluation concerning the spectator's reception of and experience with digital media within the interdisciplinary performance *Parcival XX–XI* of the dance Company urbanReflects and the University of Bremen. According to the qualitative interviews conducted, the audience experienced participation as 'disruption'. Four reasons can be registered: language, rhythm, limited exploration and shift of the spectator role.

Parcival XX-XI. © urbanReflects

Once upon a time...

there was an Arthurian hero called Parcival who was searching for something called the 'Holy Grail'. But what has this story of an old cup to do with us? The Company urbanReflects in cooperation with the University of Bremen associatively bases the new transdisciplinary dance performance *Parcival XX–XI* (2011) on the medieval legend of the search for a better world by showing quests for the redeeming Grail in the 20th century and by portraying their own version(s) of utopia.

Striving towards a new means of dramatic narration, *Parcival XX–XI* incorporates contemporary dance and digital media into a non-linear narrative with social implications. Not to bear up against but to converge with more traditional media such as dance, digital media shall be altered to an equal protagonist within the frame of theater. Designing digital media as an interactive experience allows not only the dancers to cooperate in the creation of *Parcival XX–XI* but also the audience. This paper describes results

of an evaluation concerning the spectator's reception of and experience with digital media. One major finding of the evaluation is that the audience experienced participation as 'disruption.' We have analysed the following four reasons for it: language, rhythm, limited exploration and shift of the spectator role.

Parcival XX-XI

WHAT IS IT ABOUT?

The narrative of Wolfram von Eschenbachs Parcival provides the frame for our interactive search for a better world. Analogous to the knight Parcival, we are on a quest for what is called utopia. Over time, humankind has discarded many ideas formerly held to promise a new world – the egalitarian ones of communism as well as the elitist ones of fascism. Interpreting capitalism as yet another 'wrong grail', the production tries to delineate current visions of utopia. It becomes a hatchery of ideas for a 21st century quest for a better world by questioning the concept of the Grail. The performance is built as a non-linear collage of atmospheric tableaus and structured into three acts: the first act 'celebrates' the breakdown of capitalism, the second act is a retrospective on totalitarian systems, and the third act envisions our very personal utopias.

WHY THE AUDIENCE SHALL PLAY ALONG?

Central to the production's interactive quest for a better future is the use of digital media. Talking about political systems and our personal visions of new human communities, audience participation is of principal interest in *Parcival XX-XI.* Parallel to our main subject, the individual in society, we thus design interactive experiences, in which the audience can witness the limits and rules of a system in a very basic way.

Digital media carries out a double role in *Parcival XX–XI*: On the one hand it is incorporated dramaturgically and aesthetically in form of interactive and / or live video sequences and on the other hand it is used as a 'tool' to allow interaction. In the latter case, Nintendo Wiimote controllers were used for various reasons. (cf. [1]) With the help of this tool, passive spectators are invited to merge into active performers to collaborate in designing the experience of the play for themselves and the other spectators. As technology-based interfaces always come with certain restrictions, also do the Nintendo Wiimote controllers. In this paper, however, the focus is not set on discussing these practical boundaries but rather on its major dramaturgical impact to *Parcival XX-XI*.

Designing Interaction

While designing *Parcival XX–XI* and its participatory moments, the two following questions were our constant tutor: First, how to design such opportunities in order to make the audience's action and its effect for *Parcival XX–XI* understandable for all 'players', and second, how to communicate the fact that the audience shall participate in the play and when. Talking about the first, a differentiation into three major tendencies of understanding can be summarized: understanding on a technical level, where one learns how to command via Nintendo Wiimote controllers, on a consequential level, where one understands the causal relations between command and consequential performance, and on a dramaturgical

level. Thus, designing participation appears to be a rather complex task which comes with various demands. (cf. [1]) As for making the use of the 'tool' understandable to the audience, we designed a pre-performance which is described in the next paragraph.

LEARNING TO SWIM

In reference to J. Murray who in [2] describes that "in a participatory medium, immersion implies learning to swim, to do the things that the new environment makes possible", this paragraph explains how the audience of *Parcival XX–XI* was taught a lesson.

With the help of the pre–performance, everyone was given the chance to learn how to handle the provided interface, in our case Nintendo Wiimote controllers. These events included a 'Wii fairy', a jingle, a dancer on a diagonal wall, projections, and the audience. Every five minutes, the audience would be requested by a jingle, saying "it's time for intervention!" Miming, the Wii fairy would now show the audience how to use the controllers and sort out difficulties. Ultimately, the audience was taught two ways to use their Nintendo Wiimote controllers during the performance of *Parcival XX–XI*.

The first gesture (mote being moved down) would introduce a new clothing item to the diagonal wall. The performer would then adjust her body accordingly. The second gesture (mote steadily in front of the body) would remove all items formerly applied. Repeatedly practiced in the pre-performance, these two gestures would reappear in the main performance, only with different implications. The two scenarios of *Parcival XX–XI*, in which the audience is asked for intervention, are described in the next paragraph. Further discussions about to what extent the audience reached not only the technical but also the consequential and dramaturgical level of understanding follow in chapter 'Qualitative Research'.

TO SWIM

The first scenario includes four audience members, each charged with dressing one dancer and (therefore) undressing another. The catch: Only three clothing items are available for the four dancers – always leaving one dancer naked. Participants can use their Nintendo Wiimote controllers to either steal an item or securing their own item, sometimes resulting in inactivity of one or the other participant. The second scenario includes three audience members charged with controlling an avatar. These avatars fight against the dancers. Participants can use their Nintendo Wiimote controllers to either let their avatar attack or defend themselves. Whilst no text is used during *Parcival XX–XI*, the audience interaction operates with words. It is introduced by the jingle "it's time for intervention!" and the starting point of the interaction is marked by the projection of "3, 2, 1, go!". During the participatory scenarios, the words "Steal/Keep/You are already dressed!" (1st scenario), and "Defend/Attack" (2nd scenario) come along with the projections to deepen the understanding of the interaction.

Substantial to the dramaturgical aim of the participatory scenarios is the aspect of interaction within a closed and prescribed system. As we deal with social systems in *Parcival XX–XI*, such as communism or fascism, we wanted to design an experience for the audience, which makes them feel as a social subject. Our scenarios are thus created as an analogy to society – both constitute a closed system in which citizens are allowed only a limited amount of freedom of action, since they are given only a limited amount of options for action: 'dress/undress' and 'attack/defend'.

Qualitative Research

30 short guided interviews have been conducted with ten females and 20 males between 24 and 63 years old. Most interviews were held in German and are here translated by the authors. Interviewees were chosen by chance. For statistic purposes, name, sex, age and occupation were also collected. Each interview took between five and 20 minutes and implied the same three short questions:

1. Which aspects especially caught your eye?
2. How did you perceive the use of digital media?
3. How would you rate the use of Nintendo Wiimote controllers?

TO SINK

Evaluating these first 30 interviews, one decisive term recurs again and again: disruption. Regardless of their professional background, many recipients describe that they experienced the two participatory scenarios not as part of the performance but as disruption in form of a "a break-entertainment" (interviewee 1: int 1). According to the audience, these two sequences do not seem serious, more like an "audition" (int 2), or like „physical education" (int 3) – "a gimmick." [3] One woman even stated that – contrary to what the jingle presupposes – she does not experience the interaction as a real intervention but as "being degraded to a robot" (int 4). It thus seems, according to Benford et al., that the "performance's continuity is at risk," [4] during the participatory moments for several reasons. As paper length is constrained, we cast only a short glance on the following four: language, rhythm, limited exploration and shift of the spectator–role. Contrary, there are a few interviews of which we assume that disrupting the flow of a performance can also be seen as a promising design strategy, as here: "It was different to the rest, with the jingle, text etc., and this is exactly why I remember those moments best" (int 5). However, in this paper we will not provide an in–depth discussion about it but indicate that this topic leaves space for future work.

LANGUAGE

"(...) out of the sudden there is text and the jingle. It is confusing. It appears to be more separated from the rest of the performance than it was planned, right?" (int 6)

Various interviewees remark that first, the jingle „it's time for intervention!" and second, the written text of "3, 2, 1, go!", "Steal/Keep/You are already dressed!" and "Defend/Attack!" has set the participatory scenarios aesthetically apart from the rest of the performance. According to the audience, by using language, an emphasis is produced which does not find its analogy on the content side. Using text elements in our piece without language was an attempt to make the interaction clear, quick, and easily understandable for the audience.

RHYTHM

"These participatory moments are interesting, too, but not as smoothly integrated into the rest of the performance as it could be." (int 7)

Many people judged the participatory scenarios negatively as not fitting into the rhythm of the performance. The interviewees thus communicate an important element of contemporary dance: timing. From a dramaturgical point of view, the first participatory scenario is scheduled to an appropriate point in time. Before talking about the totalitarian system in the second act of *Parcival XX–XI*, we offer the following experience to the audience: The political system we live in does not happen to us but is chosen by either confirmation or non-rebellion. But choreographically, the first participatory scenario is scheduled to an inappropriate moment in time as it follows after a quite long scene without music and projections, focusing on the materiality of the styrofoam cuboids. At this point, the audience expects something very dynamic and energetic to follow. Instead, the jingle as an introduction for the first participatory scenario intensifies the stagnation to a break. Further, members of the audience have to step on stage, take their Nintendo Wiimote controllers and get in position. This all takes a while in which we often 'lost the audience'. To overcome this problem, we are considering rearranging the participatory scenarios in order to find an appropriate timing for *Parcival XX–XI*.

LIMITED EXPLORATION

"I was disappointed about the fact that only two gestures would cause any action!" (int 8)

The two gestures are often described as too simple, not opening any kind of freedom of action. Interestingly, nobody reflected upon the fact that we wanted to produce exactly this feeling of restricted action in a set system to further encourage individual solutions. In none of the performances of *Parcival XX–XI*, a spectator sought for solutions beyond the prescribed system to overcome the constraints: For example, for the second scenario one could have denied to fight, as a test person did in the general rehearsal or as interviewee 9 says, "we all could have acted more impulsively by e.g. falling down to the floor, as the dancers did". But they didn't. As the participants follow our rules, there is no other solution than 'playing' against each other.

Interviewee 8 and many others seem to not come across the technical and consequential level of understanding: Even though participating in the play, they can not produce further meaning for the context of *Parcival XX–XI*. They appear to be frustrated and disappointed about the limited freedom of exploration offered by the controller itself. In order to release the audience from this rather sidetracking technical aspect of how to handle the controller, we are considering changing the technology from Nintendo Wii-controllers toward a more self–explanatory option (such as camera–based tracking solutions, motion capture suits or Microsoft Kinect). However, all suggested options come with various other challenges which are, in fact, of a rather practical nature. (cf. [1])

SHIFT OF THE SPECTATOR-ROLE

"It is very boring to watch people in their winter coats, doing the same action over and over again!" (int 10)

Although the declared aim of the authors of *Parcival XX–XI* was to not create a traditional audience situation of 'leaning back in the seats', the audience described the participatory scenarios as a disturbance to the (seemingly!) previously established traditional way of watching. According to the spectators, on the one hand, they were pulled out of their coziness by the possibility to go on stage and 'play' with the Nintendo Wiimote controllers, and on the other hand, they were supposed to watch other spectators

(non–professionals) to act on stage which resulted in different reaction such as e.g. schadenfreude [cf. 5] or boredom (int 10). Similarly, Benford et al. [4] suggest that "beginnings must be designed to introduce the narrative, brief participants (…). It should be designed to be an integrated part of the experience." For *Parcival XX–XI*, we might have failed in taking the chance of the pre–performance to not only brief the audience how to handle the controllers etc. but also to introduce the main subjects of the play. We only teach the mechanism of the interaction as such and do not communicate relevant hints to the audience by means of dramaturgical impact for the experience of the play itself.

Benford et al. [4] further define traversals between physical and virtual worlds and temporal transitions between episodes as moments in which the flow of the play is on risk. These points clearly bring us to the major issue of our participatory performance as we invite members of the audience to not only progress from spectator to active participant and finally performer, (cf. [1, 6]) but we also expect them to fall back into their seats and lean back again after "they have done what we expected them to do" (int 11). One can say, we prepared the audience for the shift from a passive spectator to an active performer in the pre–performance but we 'forgot' to design the back–shift from a performer to a spectator. [7]

By the use of participation, we cause different categories of audience at the same time: passive spectators and active performers. This results in the fact that there are various opportunities to miss parts of the performance as one is moving between the passive physical world and the active virtual world. As *Parcival XX–XI* does not provide a linear narrative but works with fragmented atmospheric tableaus which are then free for interpretation to the audience, one could think that the above mentioned aspects are of no consequences (and we partly thought so). But one major problem here is that most people expect to be served a story with a beginning and an end. And as they do not get 'the explanation', they feel baffled. All other challenges, such as 'participating', seems to be the icing on the cake.

To be continued

Summarizing, we can say, that part of the audience does not experience our interactive quest as 'real' but as 'fake' by calling it a disruption of the 'real play'. Reflecting on why they felt disrupted in the flow of the performance, they name reasons such as the use of text in a fully textless performance, the wrong timing, the limited freedom of exploration with the Nintendo Wiimote controllers, and the shift of the spectator role in an otherwise traditional piece. Still, there is a small group of people that felt encouraged to participate and got caught by exactly the disruption as it appears contrariwise to what one would expect of the 'common flow of a performance'. We might need to ask ourselves how to establish a rather smooth frame of expectation to find the right moments to break with it again. In this context, and what comes for us with surprise, our advertisement campaign seemingly promised the audience a 'proper' story and more 'real' interaction. We thus have to look into the need of helping the audience to trust themselves in their reception – to strengthen them in being an emancipated [8] and postdramatic spectator.

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SIMILARITY IN MEDIA CONTENT: DIGITAL ART PERSPECTIVES

Christian Frisson, Stéphane Dupont, Xavier Siebert & Thierry Dutoit

This essay examines how media content navigation by similarity can foster new practices in digital arts, blurring the boundaries between composing/performing, curating/authoring, creating/interpreting. With MediaCycle, a framework for browsing media databases by similarity, we created several proto-types: a website for browsing dancers' identities through video recordings, a collaborative dancefloor for music creation.
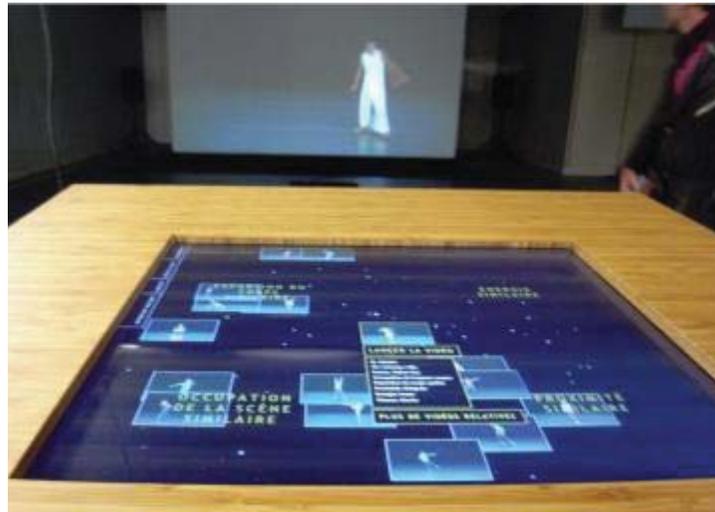
Fig 1. The DANCERS! Relational Browser seen on a multitouch booth.

Fig 2. LoopJam, a collaborative dancefloor for music creation

Introduction

Art and science cycle in loops: digital artists have been appropriating themselves technological advances in scientific fields such as telecommunication, signal processing and information visualization; while engineers and scientists are often inspired by concepts imagined by science fiction authors or fueled by artists trying to push the limits of these technologies when applied in their new media artworks. Beyond storage and transmission, one current limitation in technologies regarding media content is how to maintain an overall understanding of the information provided by each new media recording against the profusion and proliferation of newly-created and user-generated content. In his book *The Language of New Media*, [1] Lev Manovich stresses the importance of the "representation" of media objects in a database, how these are organized together as a mirror to the knowledge that these provide. When hypermedia links attempted to connect media objects one another into the world wide web through metadata and labels, the intervention of humans to annotate the massive data produced continuously is becoming more and more difficult. Recent progress in automated content-based analysis of media recordings opens new perspectives for structuring and navigating media databases, for instance by organizing the media objects by similarity.

Similarity in media content

THE CONCEPT OF SIMILARITY THROUGH (DIGITAL) ARTS

Besides the catchphrase "Similarities and differences..." used as a leitmotiv to begin the title of some essays dissecting specific art genres or styles, not much literature is centered around the concept of "similarity" in (digital) arts. Instead, an understanding of this concept can be grasped by focusing on specific uses of this term and peripheral vocabularies.

Literally, "similarity" names one of the Gestalt Laws in cognitive psychology: the human visual perception tends to discriminate outsider elements from groups in a visual collection. It has high implications in human-computer interaction and objector graphic design, such as how people can remember the content of a scene by gaining a structured knowledge of it, and how people can be attracted by objects or visuals that remind them of features of other objects they might have liked previously.

More specifically, humans have ever been fascinated by the complexity of natural phenomena showing repeating patterns: lightning bolts, clouds, tree-shaped vegetables, viscous flows. This concept of "self-similarity" has been inspiring fractal art, and is salient in paintings from Escher and compositions from Bach, as examined by Hofstadter. [2]

Each of both definitions, similarity as Gestalt law and self-similarity, underline one major aspect of similarity in media content: similarity can be used to characterize and compare several elements of a database (*inter-media*), and focus on the structure and contents of one single element (*intra-media*).

Several aspects of similarity can be used to describe the nature of artworks. First the relation of art to people: who originated it versus who keeps it alive in people's memories (the issues of authoring, composition, interpretation, performance, appropriation, inspiration, creativity, emulation, reproduction, recomposition, curation, restoration, preservation); second the relation of art works between them-

selves: what the work represents and how it place itself in a context of other works (identity, authenticity, singularity, resemblance). These concepts emerge in movie remakes (for instance re-performed or "sueded" movies in Michel Gondry's *Be Kind Rewind*), montages (Orson Welles' *F is for Fake*), collages (works of Jennifer and Kevin McCoy, Vicky Bennett aka People Like Us), cover bands and song covers (from re-interpretation to resampling with John Oswald's *Plunderphonics*).

How can organization by similarity of media content serve digital arts? Two tracks can be elicited from the aforementioned definitions and connotations: the first would consider the analysis, comparison, classification of existing art pieces; the second would focus on the generation of new art pieces based on content organization and navigation.

COMPUTATIONAL SIMILARITY

Computational similarity analysis consists in providing a machine interpretation of the salient characteristics of media objects, by applying feature extraction algorithms that downsize the data contained within the media into threads of specific information, and comparing the distribution of these features over a database using adapted distance metrics. Features can be content-based, that is extracted directly from the digital representation of the media object; or semantic-based, provided by manual annotation that labels specific elements of a scene. The book chapter from [3] provides a recent and detailed overview on the state-of-the-art of interactive representation of media databases, focusing on image browsing applications. It concludes mainly that most applications still miss a proper user-friendly interaction. Examples of higher-level content-based interpretation are identification of cover songs and style and genre detection for paintings.

Artistic works focusing on media similarity

Several end-user applications using content-based similarity have flourished recently, particularly recommender systems such as LastFM (http://www.last.fm), however artistic installations or works are more seldom.

Most notably, George Legrady's Pockets Full of Memories (2001-2007) [4] (see http://www.georgelegrady.com) make use of semantic-based similarity: both installation and formerly accessible online as a website, it uses the Kohonen self-organizing map algorithm to organize on a screen snapshots of everyday objects scanned by visitors in the installation, based on the textual description typed by visitors, thus proposing an emergent ordering since each individual induces her/his own perception of the object entered in the database that might differ from the visual similarities.

Martin Wattenberg's The Shape Of Song (2001) (see http://www.bewitched.com/song.html) proposes abstract visualizations in arc diagrams of the musical structure of hundreds of songs. Starting from MIDI transcripts of the musical pieces (sequences of notes defined by pitch, onset and duration), summaries are computed using the maximal matching pair algorithm and other rules to reduce the complexity of this algorithm. These summaries are visualized using overlaid semi-circular arcs whose thickness corresponds to the duration of the repeated musical passages, therefore incidentally underlining their relevance. Several non-interactive printouts of these arc diagrams have been exhibited at the Generator.x 2005 art event in Oslo, Norway.

THE MEDIACYCLE FRAMEWORK AND ITS ARTISTIC INSTALLATIONS

MediaCycle (http://www.mediacycle.org) is a software framework for organizing media content by similarity. Since 2008, it has been developed towards a modular architecture, supporting several media types (so far: audio, image, video, text), various media-specific algorithms for content-based low-level feature extraction, plugins for clustering (particularly the K-Means algorithm) and positioning media elements in a 2D space. Designed deliberately cross platform using open-source libraries, it was initially targeted for major computer operating systems (Apple OSX, Linux such as Ubuntu and Microsoft Windows), and more recently for mobile platforms (Apple iOS and Google Android). It provides exemplar single-media standalone applications for desktops and laptops, and server/client applications for mobile devices and servers in the cloud. OpenSoundControl (OSC) networked communication support has also been added (see [5]) so as to control the navigation in media content using off-the-shelf devices such as jog wheels and 3D cameras.

The DANCERS! Relational Navigator

Choreographer Bud Blumenthal's DANCERS! project traveled in Belgium and France in 2009 and scheduled shootings to audition dancers by recording them with top and front cameras while they were asked to improvise dance moves on music played back without choreography. The DANCERS! installation is composed of a multitouch booth where the public can select dancers videos to be displayed on a video projector at the original body scale, with surround sound. Dancers videos are selected using the DANCERS! Relational Browser that is also available online (http://www.dancersproject.com/interactive/) and is powered by the MediaCycle framework. Videos were automatically analyzed so as to provide a content-based 2D representation of dancers groups sorted by features such as: position (mean, standard, max), speed, ratio of the dancer bounding box and contraction index, space occupation and trajectory (small/large, compact/sparse, proscenium/rear as preferred zone). This installation provides an interactive and alternative way of browsing through dancers videos beyond retrieval through standard metadata such as artists names. This work has been described in more detail in Tardieu et. al. [6]

LoopJam, a collaborative dance floor for music creation

In 2011, we proposed LoopJam (see http://www.numediart.org/demos/loopjam), an interactive installation that features a sound map with audio loops organized by similarity of timbre using MediaCycle and a Microsoft Kinect depth-sensing camera so as to map the visitors' positions to cursors on the map hovering sounds with audio feedback, loops being synchronized in terms of tempo by the sound engine. A few people from the audience can thus carefully select sounds and collaboratively create an "improvised music composition". Organization by similarity proves itself to be useful since audio loops from similar instruments tend to be grouped together, hence small movements of visitors would provide a slight variation in terms of content in the sound rendering. This installation revisits the artist to audience relation and interaction since the DJ or curator of the installation responsible with choosing the sound library to be browsed within the installation can select her/his trademark sounds conveying a personalized musical identity.

Conclusions and perspectives

This paper provided a brief overview of artistic works making use of content- or semantic-based organization by similarity of media databases. Two main disciplines are seen as beneficial from requiring media content similarity: media preservation and documentation, and (realtime) media recomposition.

The described works use one single media type for the content-based analysis. Combining features from multiple media should enhance the robustness of the representation, for instance using both the video and soundtrack in the case of film documentation so as to analyze the relation between image and sound, in parallel to expert interpretation models, [7] using interactive summaries. Similarly, when classifying music albums, the visual artworks from the album, the textual description, and the lyrics might add be relevant as well to sort and organize a collection.

Regarding media recomposition, alternative and engaging interaction methods might be investigated to browse media collections in realtime (particularly for DJs and VJs), such as query by sketching to retrieve visual elements from a database while drawing, or query by whistling or beatboxing to create musical content. These practises will certainly take advantage from advances in scientific fields such as multimedia information retrieval.

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TECHNO VIKING - A CASE STUDY FROM THE WEB 2.0

Matthias Fritsch

For the last years Media Artist Matthias Fritsch was researching the Internet career of his widely known Internet Meme Techno Viking. In 2011 around 40 million clicks in various platforms and more than 3000 direct video responses can be counted. Technoviking is a entertaining and bizarre example of todays web-culture that represents the many form of user's approached to appropriate and recycle material at the web.

The Techno Viking Archive by Matthias Fritsch

THE CONTEXT

The Techno Viking project is an example for the reordering, reediting and remaking of an „original" video in the internet. The original video is in analogy to genes called a meme. As such the original and its first clones, start to circulate within social networks, where the original mutates, competes with other originals and inherits. Becoming multiplied in this way, the original video becomes successful by repro-ducing itself, through various recycling techniques.

In this way the Techno Viking project questions the creation's origin of such an internet hype. The popu-lar result is not the beginning, but the the original + n, after being altered and filtered several times through a chain of actions and reactions.

The potential of public attention such clips raise, brings also attention to the role of such major companies as Google. Google as the owner of YouTube provides the basic technological structure not only to enable and control, but also to profit from such creations. If the creation is based on "free" social information networks, the product is commercialized through a monopole company. In this way the Techno Viking is a perfect example to illustrate such new ways of production and distribution within user generated networks.

THE TECHNO VIKING

The Techno Viking is a tall, muscular, charismatic, intimidating German man in his 30ies, that danced in front of the camera at the Fuckparade in Berlin in 2000. The Fuckparade emerged as a reaction to the music restriction (e.g. the exclusion of other techno styles as Gabber, Speedcore, Hardcore Techno or Punk music) of the Berlin Love Parade and its increasing commercialization, as well as a public demonstration against the shut down of the famous techno club "Bunker," (which serves as a home for a private art collection today.)

The Techno Viking became famous firstly through the "Kneecam" video. A girl with heavy blue dyed hair is dancing to the rough techno beats, while a rather unruly looking guy, crashes unfriendly into her. That accident is causing the Techno Viking to demonstrate his physical power. He snatches the guy's arms and pushes him back from where he came dancing from. Pointing straight at another man and dominating him with his fiercely glance the Techno Viking produces an aura of fear, which brings the man to leave the situation. Only that incident enables the Techno Viking finally enough space to start dancing freely. His dance moves are wild and expressively but perfect in form. Soon he seems like the king of the street, having even fans, serving as "pop servants," supplying him with water bottles.

At You Tube the fascination with the Techno Viking is expressed in several statements. One of the most famous lines started to reappear with the countless remakes of the "original" footage itself: "The Techno Viking doesn't dance to the music, but the music dances to the Techno Viking."

After the most popular definition of Techno Viking published by Mister Neutral on the Urban Dictionary that 3041 people liked and 55 hated in November 2011 [1].

THE TECHNO VIKING ARCHIVE

The original 4 min video „Kneecam No.1" was discovered in 2007 by the YouTube community and posted by users in various other platforms. After being linked and discussed in different web sides and internet forums, the footage got uploaded on www.break.com, a big american media portal. On this web side with a clear focus on a male audience – the video had it's peak on September 28th, 2007. Almost two million viewers were looking at it in only one day. Within the following 6 months more than 10 Million people were watching the video under it's new name "Techno Viking." In 2011 the clips overall attention counts around 40 million clicks in various platforms and more than 3000 video responses that directly connect to the original clip.

I was following those developments with great interest and researched the internet history of the video. In this way I documented its trajectory from its original production until it became a popular internet video multiplied by countless memes. The archive of the Techno Viking contains of emails, blog and

forum discussions, merchandising products and a selection of some hundreds of categorized image and video responses. To give an inside view on the career of the video and to show recycling strategies at Web 2.0 the archive is presented in form of installations and lectures. The archive contains around 8 GB of data and can be shared on request for further research and recycling (contact).

USER EXAMPLES

Following a selection of the most interesting and popular video responses:

Shortly after the main hype moderated clips were created to provide information about the new meme. A mixture of statistics, quotes and jokes make it easy to consume the semi documentations as the one from „Rocket Boom" Know Your Meme - Technoviking[2].

Another moderated clip from the internet television channel „Revision3" introduces a video response to the Techno Viking with subtitles as a new cult video itself: Technoviking on Revision3 [3]. The clip refers to the captured version of Techno Viking [4] from YouTube user „rawcore" that reached more than 5 million viewers on YouTube, www.break.com and other platforms.

But the most interesting genre of recycling memes is the re-enactment of the clip's dramaturgy by being recreated in private and public space all over the world. A remix of more than 50 re-enactment Videos is published under the name "We TechnoViking" [5].

The peoples fascination with Techno Viking's dancing skills create group choreographies as the PSU Techno Viking [6] or the one from the AE Thesis Lab [7] where a group of students is exercising the dancing technique.

The Techno Viking character even finds his way into the 3D worlds like here [8], where the Techno Viking like character „Mattias" from the shooter „Mercenaries" was animated to the exact dance moves of the meme or a virtual re-enactment in "World of Warcraft" [9].

The combination of one meme with another can raise the attention within the fan community and creates an overlapping mass to other internet hypes. Here it is throughout the use of Vernon Koekemoer and Chuck Norris in a „Streetfighter" lookalike clip "Technovikiung vs. Vernon Koecemoer" [10] ...or the collages with „Little Indian Boy"[11] or the main character of the cult movie „300" [12].

The users by far biggest recycling strategy is the simple change of the soundtrack without doing much with the videolayers. There the Techno Viking clip was combined with all kinds of music genres like metal [13], folk music [14], 80ies classics [15] etc.

AFTER TECHNO VIKING

From my experience with the TechnoViking phenomenon and by using the user's most popular recycling strategy I developed the Work „Music from the Masses." [16] Following a five year schedule I started to publish silent movies in the internet along with an open call for composers, musicians, sound designers and everybody else to create soundtracks accompanying the silent clips. The submitted contributions are published in the web in combination with the video as music clips. The work is an open edition and

will not have a calculated end. It will be furthermore possible to always add new compositions and variations. This generic model of recycling and resembling is producing a situation that can be called "Youtube-Reality." It is a reality where the setting of an original identity is in constant and uncontrollable aesthetic modification.

For more information visit the artist's website
subrealic.net

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MOBILE TAGGING AS TOOLS FOR AUGMENTED REALITY

MARTHA GABRIEL

The objective of this paper is to describe the potentialities of Mobile Tagging (2D barcodes like QRcodes) as a tool for increasing and spreading the effects of Mixed Realities in Art. In this sense, we will start introducing the main concepts and some examples of Mixed Realities followed by the concepts and examples of Mobile Tagging, showing that they are connected and benefit each other.
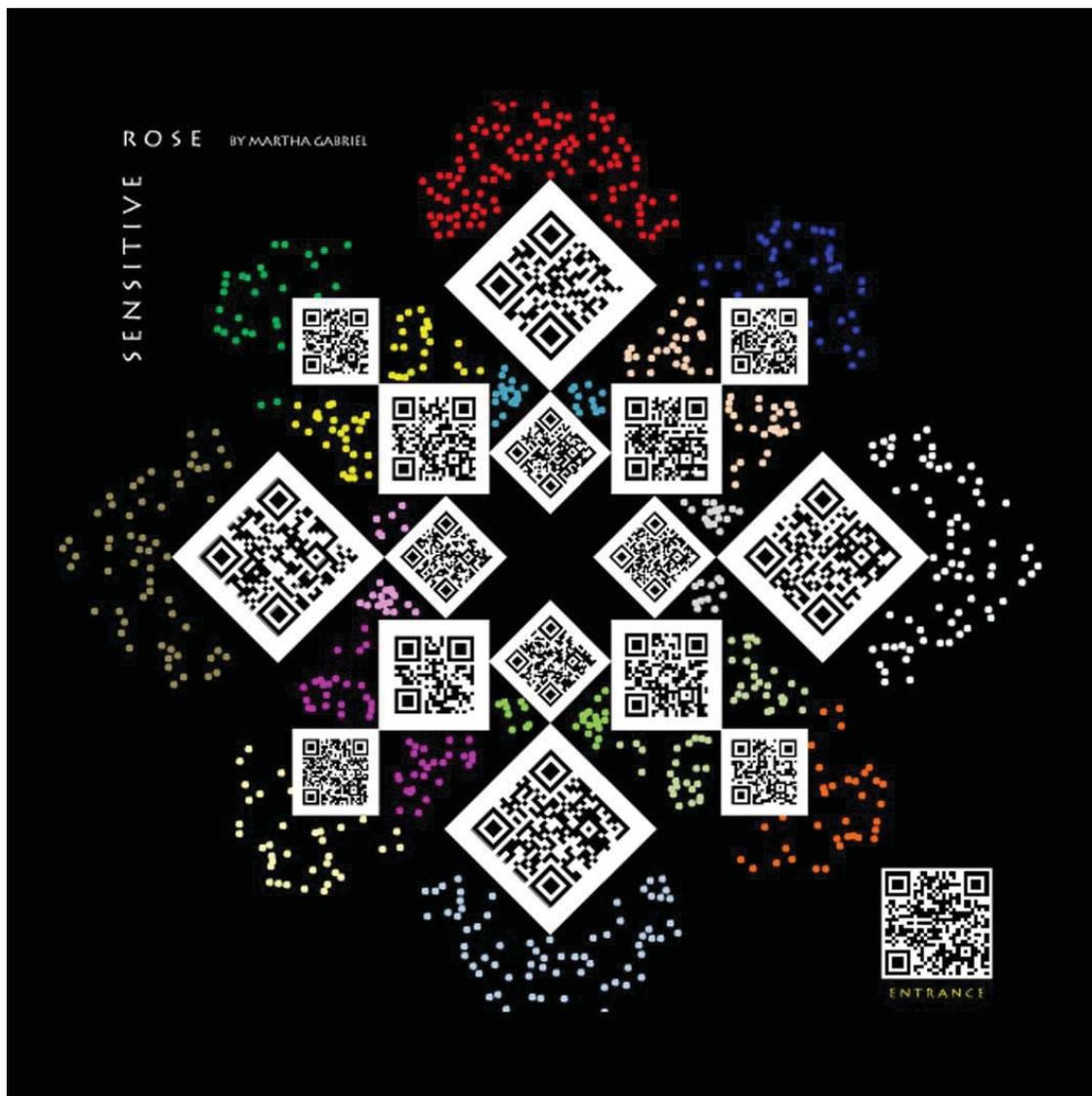
SENSITIVE ROSE artwork screen shot (Copyright - Martha Gabriel)

Mobile Tagging as Tools for Augmented Reality

INTRODUCTION

The objective of this paper is to describe the potentialities of Mobile Tagging as a tool for increasing and spreading the effects of Mixed Realities, including in the field of Arts. In this sense, we will start introducing the main concepts and some examples of Mixed Realities followed by the concepts and examples of Mobile Tagging, showing that they are connected and benefit each other.

Mixed Reality (or MR**)** refers to the fusion of the physical and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time. On the other hand, mobile tagging is the process of reading a 2D barcode using a mobile device camera. Allowing the encryption of URLs in the barcodes, the mobile tagging can add a digital and/or online layer to any physical object, providing so several levels of mixed realities related to that object.

The uses of these levels of mixed realities have applications in several areas going from medicine and engineering to arts. This paper/presentation will use some artworks as examples to illustrate the functionality of the mobile tagging for creating mixed reality.

MIXED REALITY

According to the Virtuality Continuum concept (MILGRAM, 1994), the mixed reality is anywhere between the Virtual Environment and the Real Environment, comprising stages of reality, augmented reality, augmented virtuality and virtuality.

Examples of Virtual Reality are the immersive caves, where the interactor dives into the virtual environment. Some examples of mixed realities applications are:

- MINI Cabrio – car advertisement (Youtube, 2009-2).

- SPOILER - game (Youtube, 2009-1).

- BMW - engine maintenance (Youtube, 2009).

- Arcane Technologies - educational and military applications (Arcane, 2009).

Several kinds of devices and technologies can be used as tools for mixed realities, such as glasses, gloves, monitors, computers, cameras and mobile devices (PDAa and cell phones). Due the pervasive nature of the mobile devices, their potentiality for increasing the dissemination of mixed realities is enormous and can be leveraged by mobile tagging as described next.

MOBILE TAGGING

Mobile tags are 2D-barcodes that can be scanned by mobile devices in order to decode the information kept in the barcode.

There are many types of 2D-barcode (tag) and it is possible to encrypt many kinds of data into them. However, regarding mobile tagging, the most common encrypted information is URLs. The process of mobile tagging consists of scanning the tag with a mobile device camera using a mobile tag reader, which decodes the tag, opening the decrypted information on the device screen.

The most used patterns of 2D-barcodes for Mobile Tagging are QR Code (Quick Response Code) and Datamatrix. While conventional bar codes are capable of storing a maximum of approximately 20 digits, a QR Code, for example, is capable of handling up to thousand characters and all types of data, such as numeric and alphabetic characters, Kanji, Kana, Hiragana, symbols, binary, and control codes (Denso-Wave, 2009).

According to (Denso-Wave, 2009), the capacity of storage of a QR code is:

QR Code Maximum Data capacity

Numeric only - 7,089 characters

Alphanumeric - 4,296 characters

Binary (8 bits) - 2,953 bytes

Kanji, full-width Kana - 1,817 characters

Nowadays, although mobile tags are still a novelty for most of the countries, they are starting to spread as the 3G mobile technology get available around the world. The QR codes use is very common already in Japan and Datamatrix is more used in Europe, especially in UK. Most of the new models of mobile devices come already with the mobile tags (QR code and Datamatrix) reader. Older versions of devices can install a QR code reader, such as i-nigma (www.i-nigma.com), becoming so able to scan them.

A very interesting use of mobile tagging as mixed reality is the Semapedia.org (www.semapedia.org) that stimulates the use of in physical places that are present in the Wikipedia, mapping them. In this sense, each place is provided with a new layer of dynamic information coming from the digital online world, increasing so their use.

MOBILE TAGGING IN ART

There are several interesting examples of exploring mobile tags in Art. We will present three artworks using QR codes that range from traditional arts to electronic interactive arts. The first example is the work STILL by Frabrice de Nola (2011) that uses 2D and liner barcodes to build the image and links.

We can mention as one of the first interactive digital artwork the SENSITIVE ROSE (Gabriel, 2008) artwork, which builds an interactive compass rose formed by QRcodes that navigates into people's desires (figure 1). The work is a big projection (3 meters x 3 meters) and all the interactions happen through this projection by scanning the dynamic QRcodes for participating. The work was launched in November of 2008 and has received already more than 800 interactions (May.2009).

Figure 1 – Screenshot of the artwork Sensitive Rose (GABRIEL, 2008)

Another interesting artwork that uses QRcodes is the "Suite 4 Mobile Tags" (Beiguelman, 2009) which proposes an exercise of random and anonymous collective musical composition. By pointing a phone w/ QR-reader to a display, participants play a ringtone. The result is a sudden and temporary suite that plays with hi and low tech, the portability, the confusion between public and private, music and noise.

CONCLUSION

Since the mobile tags are simple tags that can be placed in virtually any physical object or person, added to the fact that the cell phones with camera have become a very inexpensive and pervasive device, the mobile tagging process can be said as one of the easiest and simplest way of creating mixed realities.

The use of mobile tagging can range from expanding the information on packages, bus stop routes, museum objects, to art.

Mobile Tags work like physical links to the web, allowing so that virtually anything can be part of an expanded mixed reality environment.

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THE ELECTRONIC REPRESENTATION OF INFORMATION: NEW RELATIONSHIPS BETWEEN THE VIRTUAL ARCHIVE AND ITS (POSSIBLE) REFERENT

Gabriela Galati

Screenshot: http://www.googleartproject.com/museums/met

The present work focuses on the new relationship generated by electronic information between the virtual archive (the Web in a broad sense, certain specialized archives in particular) and its referent (material reality in general, museums, inter-art practices, and artworks in particular).

What Nam June Paik conceived as a shift from the telecommunications network to a "multilevel digital communication network" is now taking place at a highly accelerated pace with vast unexpected consequences and possibilities for the artistic field. Moreover, it has also a close relationship to what Manuel Castells [1] defined as the "space of flows" or "real virtuality".

"The space of flows" is the abstraction of time and space and their dynamic interactions within digital age society. Castells developed this idea to "re-conceptualize new forms of spatial arrangements under the new technological paradigm"; a new type of space that allows distant synchronous, real-time interaction.

"The space of flows" can be experienced right now, a "multilevel electronic communication network" in which anyone can access from home not just of a website, but also the 3D photographic representation of a certain place, the street view of her/his house, of a friend's house, of a possible place to rent, or of a museum. This access is also making the distance between remote places seem inexistent in a certain way.

This concept opens several questions, for example: how is this representation presented? How is this possibility of accessing a physically distant place in all its details, without actually being physically there, affecting the ways in which this space is perceived?

In this regard, the electronic elaboration of the representation of information suggests following new paths, not only to deal with massive amounts of data, but also to better penetrate the domain of knowledge that every person should possess [2].

Moreover, the forms this representation of information takes are closely related to the ways in which its perception is structured and shaped. As Manovich [3] puts it "by organizing computer data in different ways, the interface provides different visions of the world". Therefore, the relationship between information, its representation and the referent (or in other words, the relation between reality and the conceptual construction of reality) has to be re-thought.

As many theorists advanced, this representation does not need to be-in-the-place-of a 'physically existent' entity, and that is why the referent is only 'possible'. Postman (1985) defines *virtual* as being so in practice though not strictly or in name; and *real* as actually existing, and advances that

"We don't see reality as it is but as our languages are. Our languages are our media. Our media are metaphors. Our metaphors create the content of our culture." "There is no separation between "reality" and symbolic representation. In a way, all reality is virtually perceived." [4]

Virtual or real, this digitalization is changing the status of the digitalized works, at the same time that influences our perception of them. In the same way language and metaphors build our 'reality' or structure our perception of the world, the Net as a text influences our perception of material reality, and the ambiguous nature of language has to be taken into account in this respect.

Thus reality, as experienced, has always been virtual because it is always perceived through symbols that frame practice with some meaning that escapes their strict semantic definition.

"A system that generates real virtuality is a system where reality itself (people's material/symbolic existence) is entirely captured, fully immersed in a virtual image setting […] in which appearances are not just on the screen through which experience is communicated, but they become the experience." [5]

In this sense, a virtual presence is not less real than a material one, so where does the difference reside?

Following Levi-Strauss' [6] statement that the inadequacy between the signifier and the signified is the cause of every mythic and aesthetic invention that were aimed to cover this flaw, or this unfitness; it is possible to think about the inadequacy between the virtual archive and its (possible) referent in these terms. It is necessary to try to understand what is happening with this non-fit, or overspill, and accordingly, what is happening in the gap, in the "inadequacy" between the virtual archive and the physical museum. This overspill can be considered the intrinsic ambiguity of symbolic production. Moreover, the very well known impossibility to 'translate' symbolic productions is what generates the change of the ontological status of digitized work.

In his article "The Archive Without Museums," Hal Foster [7] advances the hypothesis that photographic reproduction allowed a new "dialectics of seeing," represented by the positions of Walter Benjamin: namely, that photographic reproduction strips art of context and aura, and therefore its cult value and exhibition value are lost forever. In contrast, André Malraux claimed that the museum guarantees art as such, and photographic reproduction offers the means to put together "the bits and pieces" into the meta-tradition of "style".

If the museum guarantees the status of art and photographic reproduction permits stylistic affinities, what might a digital reordering encourage?

It is possible then that electronic information and digitalization establish new dialectics in which a museum's legitimating function is replaced by the virtual archive and/or museum/gallery websites.

It could be also said that some artworks are being produced solely to exist for the virtual archive? Moreover, has the time come when on-line documentation of exhibitions that never happened are created and presented?

At the same time, as Bolter and Grusin [8] advanced about the process of *remediation*, the influence goes both directions: from the virtual to the material, in the ways artworks are documented, affecting the processes of legitimization and probably also of production; and from the material to the virtual, when the virtual is anchored to reality in the imitation, or realistic representation of it (specially three-dimensional space).

Without falling into *modernists* positions about 'the intrinsic' possibilities of each medium, could we find a way in which the new archive can deal with art without imitating physical reality in the display? By taking the most profit of the hyperlink logic, and thus of the "overspill" and of ambiguity, can we create a non-linear, more experimental and open archive in which each user could ideally build her/his own path through it? It has been discussed if this 'freedom' of choice provided by the hyperlink logic and the virtual database is only an illusion or an utopist idealization of the medium. Even if not unlimited, this possibility exists and the medium undoubtedly offers a considerable degree of "personalization" in the paths to follow through a certain database or archive.

The shift Foster talks about is from the perception of the world as an image, to the codification of the world, and these images included, that result into pure information.

"[…] the humanism of the world-become-picture may reverse into the inhumanism of the world-become-information. For in the virtuality of the archive […] what is real is not what appears at any moment, but what is conserved in memory […]" [9]

In the same way the object is digitized in the archive, the medium loses its original materiality to be converted into a pure image. By being absorbed and re-generated in the virtual database, its status changes to the one of an "image-text", or of an "info-pixel".

This is the reason why the virtual archive no longer needs a physical referent. It doesn't mean that it has been removed from all physical support, only that the support of the information (memory and database), which constitutes the object's new "materiality", does not coincide with the support that presents it to be seen and apprehended (a screen). Therefore, even if the referential relation is not completely annulated, it becomes weaker and fragmental [10]. The iconic sign, in Peirce's terms, still maintains its relationship of resemblance with the object, but the medium has been converted into an image-text, and info-pixel [11]; its materiality has been 'translated' into information, into a code.

This new database is generating a dematerialization of memory and its record. However, this dematerialization is not the same proposed by the Conceptual Art of the '60, this is a somehow 'new' dematerialization, which does not imply an annihilation of the object, but just a change in its ontological status.

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PARTICIPATING IN PARTICIPATION: POLITICS AND CITIZEN POWER

SEETA PEÑA GANGADHARAN

This paper applies a seminal critique of participatory politics written in the 1960s in relation to modern day experiences of citizen participation. Arnstein's writing on "participating in participation" unmasks the superficiality of online participatory projects and practices.

Participating in participation: Politics and citizen power

In the United States, the past decade been marked by an optimistic discourse about the technologies of political participation in American government. But what power have these tools created? Drawing from earlier criticisms of participatory democracy, this paper provides evidence that citizens are doing little more than participating in participation. Until innovative participatory designs happen alongside commensurate changes among political powerholders, online participation will represent more of democracy's failures than its achievement.

A new wave of optimism

In 2009, the Obama Administration arrived to Washington, D.C., amid a wave of optimism about tools for online participation. Throughout the 2008 election, the Obama campaign developed MyBarackObama.com, a social networking platform designed to engage interested voters and provide them with tools for enlisting volunteers and generating support (Kreiss 2010). In the months before taking office, President Obama and his transition team launched a *Citizen Briefing Book*, a website that invited ordinary citizens to register their hopes and proposals for the Obama Administration and rank individual entries. Shortly after taking office, President Obama declared: "My Administration is committed to creating an unprecedented level of openness in Government." [1]

Illusory involvement

The zeal with which the Obama Administration has embraced online participation is an invitation to reflect on when and whether participatory designs equate with citizen empowerment. As early as the 1960s, observers questioned the gap between participation and influence, suggesting that citizens and communities would remain disempowered if powerholders simply celebrated participation as having happened. Among the most persuasive of these was Sherry Arnstein, a health policy expert involved in community development projects around the country.

In 1969, Arnstein synthesized her experiences into a short critical essay. *A Ladder of Citizen Participation* looks at the palliative effects of participatory projects. According to Arnstein, a significant problem with designs for participation is that they are more concerned with offering participation than taking citizens' concerns seriously. She described that most citizens are invited into policy debates for their appearances rather than for their ideas or to move along debate and influence outcomes. Participants in these scenarios are manipulated by "powerholders... [who] "'educate' or 'cure' the participants" (Arnstein 2003, p. 246) of their problems. As a result, "What citizens achieve in all this activity is that they have 'participated in participation.' And what powerholders achieve is the evidence that they have gone through the required motion of involving 'those people'" (247).

By contrast, Arnstein said that the most laudable form of participation occurs when "have-not citizens obtain the majority of decision-making seats, or full managerial power" (Arnstein, 2003, 247). In other words, successful participation is measured by the extent to which outcomes reflect the concerns, arguments, or proposals of citizens. Arnstein's critique focuses on the substance of citizen participation and the ability for citizen input to move public policy. From her vantage, citizens require a direct means of transforming political outcomes. Failure has scarred "every other means of trying to end the powerlessness" (Arnstein 2003/1969, 246).

When viewed in relation to the routines and demands of American society, Arnstein's push for direct democracy is far from pragmatic. As Young (2006, 2000) argued, the complexity of modern society deters the kind of decision making that Arnstein envisioned. The type of direct democracy implied by Arnstein's critique entails coordination and cooperation of a degree that large, diverse countries like the United States would find nearly impossible. Modern democratic societies demand a system of political representation so that citizen *ideas* and *arguments* have power within political discourse and influence political outcomes. Nevertheless, modifying Arnstein's call for direct democracy does not diminish the persuasiveness of her main argument: participation which is staged for performance, for ticking off a box that indicates participation has happened, does nothing to change structures of power in the political landscape.

Participation's promises and failures

The problem of "participating in participation" unmasks the superficiality of much of the promise of online participation in electronic government. One example of the illusory participation are the "reboot" efforts of the Federal Communications Commission (FCC). The FCC is the premier regulator of media, communication, and information in the U.S. It creates policies related to the management, ownership, and operation of wireless and wireline communication systems.

When Chairman Julius Genachowski was appointed to the head of the FCC, he pledged to fight for consumers and transform the agency into an "21st century agency for the information age" (Genachowski 2009, 3). He focused participatory reforms on creating new online tools to welcome citizens to the virtual front door of the agency. Soon after his appointment, the agency set upon a path to reform of the electronic means for public participation. From live-streamed, captioned video of its public meetings to a redesigned entire website, to staffers' blogs about their work to a YouTube channel and Facebook page, the FCC broadened its online presence. The agency also created mobile apps that users could install in order to test home broadband speeds began tweeting announcements of its most controversial policy proceedings. Improving public access was paramount in agency that had "communications" in its middle name, according FCC managing director Steven VanRoekel (Howard 2010).

The comprehensiveness with which the FCC has gone about implementation of new forms of online participation is impressive on paper. Within two years, the agency has cultivated a set of digital tools to push and receive information to ordinary individuals and communities. It drew accolades from technology-focused blogs and news services, like *O'Reilly's Radar* and *Ars Technica*. On its own blog, the agency boasted of its innovative efforts, stating that the FCC was "[p]utting citizen skin in the game to make FCC.gov work better for users, and holding us accountable to continual improvement." [2]

Apart from accolades, however, the FCC's record on serving citizens and consumers reflects very little of its talk about empowerment of the non-expert, lay participant in communication policymaking. The

most controversial decisions that have come before the agency since 2009, when Chairman Gena-chowski came to power, are an ode to conventional, "inside-the-Beltway" policymaking than transfor-mation of FCC culture. The FCC's *Open Internet Order* (2010) concerned the extent to which telecommu-nications carriers can discriminate in how it manages data traffic over the internet. The decision handed down by the agency excused mobile carriers from anti-discrimination measures, paving the way for price changes in mobile internet access.

The proceeding saw more than 100,000 commenters, many of whom included citizens and their repre-sentatives, such as media reform groups, public interest organizations, and community associations. As Arnstein would have predicted, these commenters were recognized not for the arguments they regis-tered with the agency but for the fact of having happened. The final report and order made little at-tempt to extricate the complexity of the opinions and arguments raised by ordinary opinions. Neither did it seek to answer explicitly to a discourse of concern over industry-friendly internet regulation.

An announcement by Meredith Atwell Baker, one of the commissioners who had voted for lenient inter-net rules, suggests that participatory reform was a weak proxy for citizen power. Four months, Baker left the FCC to become the chief government relations person for NBC-Comcast, a major supporter of le-nient data traffic management rules. Before it had merged with NBC, Comcast led a legal battle to weaken the FCC's ability to institute anti-discrimination rules for internet providers. Baker's move evi-dences the extent to which government and corporate powers mutually support one. The nexus be-tween state and market deters the ideas of ordinary people and their hopes for how democratic society ought to be governed from having a fair chance of being heard and influencing political outcomes.

We participate, they profit

In the original 1969 publication, Arnstein accompanied her critique with an image of a poster taken from the 1968 student uprisings in Paris. Translated into English, the poster read, "I participate, you partici-pate, he participates, they participate, we participate... they profit." In an era where digital tools for par-ticipation abound, government and corporate powers are still profiting from the citizens' involvement in decision making. It legitimates their activities, shows that participation has happened as a matter of pro-cedure, and masks the need to engage with the proposals or demands contained within citizen expres-sions. Until state and market actors transform how they interact with one another and either intention-ally or unintentionally collude to minimize the power of citizen voices, American politics will fail to live up to basic democratic ideals.

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'WOODEN WORLDS' - AESTHETICAL AND TECHNICAL ASPECTS OF A MULTIMEDIA PERFORMANCE USING REAL-TIME INTERACTION

Javier Alejandro Garavaglia & Claudia Robles Angel

Wooden Worlds is an audiovisual, interactive performance by Claudia Robles Angel and Javier A. Garavaglia. The piece, of variable length, is a complex multimedia performance in which viola, video, photography, soundscapes, live-electronics and live processing of pre-recorded sounds interact with each other in real time, all of which intersect in art, science and technology. The paper describes the technical and aesthetical aspects of the work.

Figure 1. Examples of close-up images from tree cortices in 'Wooden Worlds', 2010, Claudia Robles Angel, photographic media, Copyright Claudia Robles Angel.
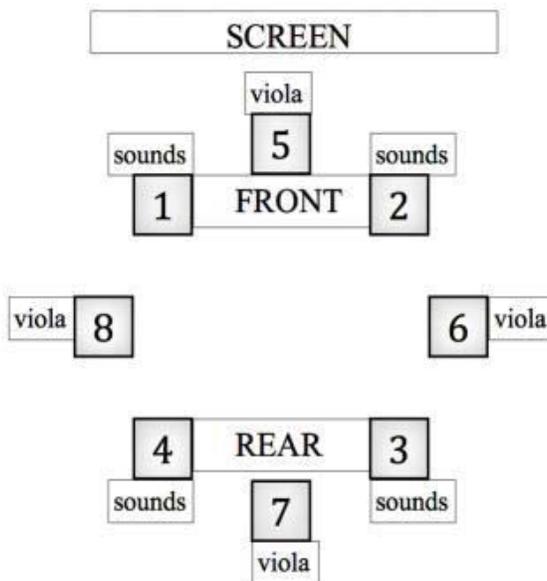
Figure 2. Octophonic sound distribution for 'Wooden Worlds'.

INTRODUCTION–AESTHETICAL ASPECTS

This paper describes the intention, aesthetical principles and technical aspects of 'Wooden Worlds', an interactive audiovisual performance by Claudia Robles Angel and Javier A. Garavaglia. The piece is a multimedia performance developed from several different sound and visual layers, all of which interact with each other in real-time. Together they create an atmospheric constellation. The attention of the audience is challenged by the piece's audiovisual elements, which in most of the cases are not recognizable at first sight. The role of the viola live on stage acts as an element of synergy between the diverse audiovisual elements, with musical composed and improvised passages. The performance requires two computers on stage running both the software package MAX/MSP/Jitter for real-time interaction.

The piece works with a world of sound and image, which is directly or indirectly connected to wood, particularly, in the way wood appears in nature, namely, in the form of trees or of tree cortices. Nevertheless, the idea is not only to show wood in its naked reality, but also to use images and objects of particular forms and characteristics, which, whilst made of wood, cannot immediately be recognised. One of the techniques utilised herewith is that of the 'close-up,' which consists of the shooting of surfaces at an extreme proximity, resulting in pictures showing those surfaces in a meticulously detailed manner. The resulting images, normally called 'close-up photography' or 'macro photography,' are usually shot by zooming or, most likely, by the usage of macro lens. In 'Wooden Worlds', this technique is utilised to show extremely close details of wooden surfaces, which, in many cases, are not recognisable as such at first sight. The intention is to produce a 'haptic' image, in which the observed object can be de-contextualised, allowing a free and open interpretation by members of the audience, who can have the feeling of 'touching' the images with their eyes. The word 'haptic' has its root in the Greek word HAPTOS (ἅπτω), which means to touch or to fasten. This type of visual conception is a fundamental aesthetical position of Claudia Robles Angel, one of the authors herewith, who seeks to transport the tactile sensation to the photographic image, approaching the object as much as possible, thus inviting to use the eyes to feel and not only to see. This usage of the word 'haptic' in visual arts (image and moving image) has its roots in Deleuze: [1]

"Where there is close vision, space is not visual, or rather the eye itself has a 'haptic', non–optical function: no line separates earth from sky, which are of the same substance; there is neither horizon nor background nor perspective nor limit nor outline or form nor center; there is no intermediary distance, or all distance is intermediary."

Following this interpretation by Deleuze, the term 'haptic' is not used in 'Wooden Worlds' in the same sense as in 'haptic interaction', which is the type of interaction produced by touching devices, as defined by Hermann and Hunt. [3] The usage of the term in this performance is implied aesthetically, with no reference whether to the interaction itself, nor to the interfaces used, as no interaction in this piece occurs by the act of touching devices or interfaces. By making possible to 'perceive the imperceptible' through 'haptic images', the audience is immersed in a virtual space of images and surround sound, in which the material 'wood' is constantly alluded to.

The sound components in 'Wooden Worlds' have two sources: (a) pre-recorded concrete sounds and (b) a live viola on the stage, mixing fully composed passages with improvisation. The pre-recorded sounds were obtained during nightly recordings of the rainforest in South America. The richness of this nightly

natural 'soundscape' was paramount to the general sound conception of the piece, as it helps the listener to become part of the immersive virtual environment of the performance. The concept of 'soundscape' is herewith referred to as defined by Truax: [4]

"A soundscape is an environment of sound (or sonic environment) with emphasis on the way it is perceived and understood by the individual, or by a society. It thus depends on the relationship between the individual and any such environment. The term may refer to actual environments, or to abstract constructions such as musical compositions and tape montages, particularly when considered as an artificial environment."

This feeling/sensation of a natural sound-dome inspired the acoustical space in 'Wooden Worlds,' which, while still following the generic description of the term by Truax [4] (quoted above) , creates an immersive environment during the performance by transforming those sounds in real time instead of making 'a musical composition' or a 'tape montage' as in Truax's definition. [4] The soundscape idea in 'Wooden Worlds' is technically aided by the octophonic sound, which surrounds the audience in the complete darkness of the concert venue creating a unique atmosphere between natural and virtual environments.

The form of 'Wooden Worlds' was conceived as an arch, with a climax at its golden mean. The usage of the golden mean creates the impression of a quasi-biological cycle, which begins and ends in complete darkness with the same type of audio material (insect sounds), but which evolves towards a climax, in which all forces interact, fading gradually out to complete darkness in the last third of the piece.

1–INTERACTION ASPECTS

The interaction of the piece was programmed in three dimensions: (a) live-electronics, (b) video interaction with the viola, and (c) interaction via a MIDI controller. The two laptops must connect (both with a different fixed IP address) with each other via Ethernet using the MAX object 'udpsend.' The first computer acts as the master, generating SMPTE Time-code, which is then transmitted to the second computer for synchronisation purposes. The master is in charge of several DSP functions for the viola's live-electronics. The second computer contains pre-recorded rainforest sounds and a library with all of the images; it interacts via a MIDI controller with (a) the pre-recorded sounds (through DSP processes programmed in MAX) and (b) the real time manipulation of the images (via 'Jitter'). Both computers display the SMPTE time from the master computer, to allow for an accurate performance throughout the entire piece.

Full automation of live-electronics processes, as explained in Garavaglia, [2] had to be used up to some extent herewith, mainly because of the extreme complexity of the performance. Full automation is partially used in the video interaction too, mostly in those passages in which both the pre-recorded sounds and the visual part need manipulation via the MIDI controller. It proved extremely difficult to manage the totality of these processes without some degree of automation. However, and given the partially improvised character of some sections, it was decided not to fully automatise the totality of the performance; instead, only those passages requiring a considerable amount of manipulation of the interactivity were automatically programmed.

Pitch and amplitude from the viola were the only parameters selected for the interaction with video. To read them, the first computer uses simultaneously two algorithms: the first performs pitch recognition

of the sounds of the viola, while the other measures their amplitude. The actual values of these parameters proved to be rather inconvenient for the mapping processes needed on the second computer in order to manipulate processes for the video sections of the piece. Hence, pitch values were multiplied by factor 10 while amplitude values were multiplied by factor 10000 before being sent to the second computer and mapped. These big figures allowed for a smooth interpolation of the diverse video parameters, without any noticeable rough changes in the video effects occurring. In this way, the viola's amplitude values were scaled from 500 (a number that proved to be rather efficient in avoiding unnecessary soft amplitude data) to a maximum of 10000. For rotation effects, these figures were mapped to 0.1 – 50.0 in the second computer for the Theta parameter (the rotation angle, measured in radians) of the 'jit.rota' object in 'Jitter'. The frequencies were mapped from 1300 (130Hz) and 50000 (5000 Hz) to 1.0 and 0.0 respectively for the zoom parameter (horizontal and vertical). Another type of interaction viola/video is the mapping and scaling of the amplitude values between 0.45 and 0.1 in order to change the temperature colour in 'Jitter'.

With regard to the live-electronics processes, they are divided in two sets: those in the master computer for the viola and those in the second computer for the pre-recorded sounds. The viola's live-electronics include the following DSP functions: ring modulation of two sources via two *Comb* filters, delays, reverberation, convolution, granular synthesis, live-recorder/player and a 'spatialisator'. Sounds coming from the output of the ring modulator, the delay unit, the convolutor and the sample-player are sent in a circular or localised automatically programmed surround sound (4.1) using the 'spatialisator'. Another set of live-electronics was programmed for the second computer, which works mainly processing insect sounds from the rainforest. This second set includes: spectral extraction, comb filters, pitch shifting, chorus (for pitch or voices transformations) and granular synthesis. This second computer also includes spatialisation in 4.1 with circular movement (increasing or decreasing the speed between changes of loudspeaker during the performance at the will of the performer, with the intention of creating at certain moments an intense feeling of rotation) as well as localised distribution of sound.

2–VISUAL ASPECTS

As explained earlier, the principal technique utilised for the visual conception is that of the close-up, with several of the pictures shot using extreme zooming. The main type of image is that of the cortex of several and different trees, which were collected in the last ten years from many different types of vegetations, mostly Europe and the rainforest in South America. Other pictures stem from complete and isolated trees in nature, shot mostly in diverse regions of Europe.

The main intention of using close-up images of tree-cortices is to resemble surface areas, which seem to be borderless, as, due to the closeness of the shots, there is a complete absence of perspective. Hence, these surfaces become eternal territories in which they lose their attributes, transforming themselves from object to landscape. Through these images, 'Wooden Worlds' invites audiences to immerse themselves in a visual territory created by wooden textures mixed with different types of trees with diverse structures. Figure 1 shows two of the many close-up images used in 'Wooden Worlds'.

As all images used in the piece are included in some kind of interaction, they were all stored in a library in the respective MAX patch; most of them are selected randomly during the performance, with the exception of a few, which were pre-selected. At some moments, these surfaces emerge without any visual effect applied; at some other, however, effects such as, for example, colour and heat changes (programmed in 'Jitter') are introduced.

As an example, in the first six minutes, the performance begins in complete darkness and only with nightly sounds of insects, suggesting a typical new moon night in the rainforest; very gradually, the ambiance light is increased by little grains populating the screen using the 'jit.noise' object, which creates a matrix full of random values in 'Jitter'. After a while these grains are transformed into the 'haptic image' of the tree cortex shown in Fig. 1 (left), creating an abstract landscape made of wood.

Besides these images, there is one video post-produced with the software 'After Effects' from two images: a wood cortex and a tree. It begins with an extremely detailed close-up of the cortex, slowly zooming out and thus, revealing the entire structure, which resembles a woman stretching the arms as if crucified. The video was produced to interact with the viola by modifying the playing speed via the pitch data from the viola, in order to create a tension through the extension of its duration. Controlling the speed with the viola frequencies produces herewith the effect of 'zooming-out' the image according to the music.

Other images were faded with the resulted rotated image with 'Jitter's jit.xfade' object to create a feedback continuously changed by the Theta parameter and by zooming (horizontally and vertically). This feedback effect creates a visual and chaotic multiplicity that is reinforced by the rotation parameter, which can be slow or fast, according to the music played by the viola. Another type of interaction viola/video is the mapping and scaling of the amplitude values between 0.45 and 0.1 in order to change the temperature colour in 'Jitter'.

3–SOUND AND MUSICAL ASPECTS

The sound and musical aspects of 'Wooden Worlds' include two main sources: pre-recorded concrete sounds and a live viola. For the latter, some sections were fully composed whilst other sections were left for improvisation. The pre-recorded sounds, based mainly on sounds produced by insects, were obtained in several nightly recordings in a tropical part in South America, in the town of Girardot (Colombia) and at the Amazon rainforest (Colombian side). As usual in tropical areas, there are plenty of insect sounds during the night, most of which are produced on, inside or close to wood. Temperatures in Girardot are normally around thirty degrees Celsius (average). The constant heat, together with a rather high degree of air humidity (in some parts of the Amazonas, air humidity is around 94%) are ideal climate conditions for a concert of insects' sounds and of other types of lives.

The viola (which is mostly made of wood) has a pivotal function across the entire piece as it interacts with other audiovisual materials of the performance: on the one hand, it interacts with the pre-recorded rainforest sounds and with sounds recorded life during the performance through typical DSP functions in real time programmed in MAX/MSP; on the other hand, it also interacts with the video part, as explained earlier. Sound interaction is included with the intention of either imitating the pre-recorded environmental sounds (mainly based on sounds made by insects) or to be combined with them. Therefore, the music composed for this type of interaction is that of short instrument actions (many of which are of undetermined pitch), that are supported mainly by sounds such as bow scratching the strings, harmonics or sounds obtained by knocking the instrument, to mention just a few. Most of these are of improvisatory nature, reacting live to the insect-sounds.

As the second type of interaction required a much more careful planning, the music for it was fully and carefully composed; here the viola must take control of different video parameters, some of which require a fixed duration and therefore, accuracy by playing. The parameters read from the viola for video–

interaction are pitch and amplitude. A clear example is the 'Elegy', which starts in the score of the piece at 00:12:15:00 (SMPTE time). The image here is the post-produced video introducing the image resembling the form of a crucified woman. The 'Elegy' was composed with this image in mind, with the video starting with a 'haptic image' (a close-up of a tree cortex), which moves slowly forward until the full image of the 'woman-tree' is displayed. This slow revelation was explained in section 2 above.

In the last section of the performance, the amplitude and pitch of the viola control other video parameters, namely a feedback of the original image combined with a zoom (via the viola's pitches), which is added to a rotation effect (controlled by the viola's amplitudes), creating a repetition and multiplication illusion of the image within the screen with a tense and chaotic visual result. During this section music, sound and image are improvised by both performers within a fixed and planned length.

With regard to the audio output of the piece, each computer is connected via Firewire to an audio interface, with a quadrophonic output each. This division allows for a clear and separated space for each of the sound sources (the pre-recorded natural sounds with their DSP processing and those from the viola, with its own DSP live-electronics). The octophonic settings are described in figure 2.

The piece was world premiered during the Kölner Musiknacht 2010 in Cologne, Germany (Kunst Station Sankt Peter, 25.9.10).

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SOUNDWWWALKS

Bernhard Garnicnig

Computer networks and cities both are social spaces that have emerged as material spaces where lives are lead and work gets done. While extensive studies on the Soundscape have been undertaken in the past, the sonic properties of network spaces have been left unconsidered and thought to be without sonic properties. The panel is an investigation towards an Acoustic Ecology of Networks and the WWW as interface and material for live performance.

Soundwwwalks are an emerging genre of live browser-based performances using <EMBED> improvisation, plugin sound-collage and multitab mixing, shamelessly blending the traditions of pro-surfing, Soundwalk composition and laptop music.

The performances take the audience on a sonic Detour through the World Wide Web. A Soundwwwalk considers the act of surfing the World Wide Web as form of sonic action.

The artists either perform their Soundwwwalks themselves on stage or transmit their notation, sometimes in real time, to a local interpreter operating the browser.

All performances follow the Soundwwwalk One-Line-Manifesto: "All sound sources must be played in a browser, must not be self-produced and must be publicly accessible."

The above description was part of the invitation I've sent to selected artists in the past, along with details about the date and other circumstances of the performance. So far Constant Dullaart, Joel Holmberg, Peter Moosgaard, Julian Palacz, Jamie Allen, Will Schrimshaw and Ceci Moss have performed the format at various events throughout Europe. [1]

Soundwwwalks were the beginning of an investigation towards the possibility of browser based sound performances. As an artist interested in internet art, sound collage, soundscape theory and improv performances, I started to understand that the World Wide Web has become the largest possible library of sonic artefacts and recordings, considering any sound and video file uploaded to the web any given day as material for sonic ideas and actions. I wanted to explore a way of working with this resource the same way I've used turntables for improv sound collage performances with Albert Allgaier in the past, or I've seen other artists using various objects, tools and instruments. But I wasn't interested in just sampling, ripping, downloading and then mashing with those materials as sound files in standard digital sound workstation environments, detached from their original ressource, as mere material outside the context of its source medium. I've found it to be much more interesting to work with the specific qualities, characteristics and phenomena related to the world wide web as a sound source, the network as intermediate space with quasi-acoustic properties and the desktop browser as the interface.

We developed different approaches to Soundwwwalk performances, especially because the invited artists often couldn't physically be at the site of the performance. While the performer would usually come on stage and perform the Soundwwwalk using a standard computer connected to the PA system and a projector, this can also be done through real time communication from anywhere else. A local performer will then execute instructions sent by the "composer" in real time. These come in the form of

hyperlinks and instructions regarding for example volume settings or particular timing requirements. What follows is an excerpt of a performance composed by Constant Dullaart, transmitted via text chat and interpreted by Bernhard Garnicnig live on stage at a Soundwwwalk performance at the interactive Media Art Laboratory Brussels in November 2010. [2]

[12.11.10 22:23:38] constant dullaart: New TAB: http://www2.research.att.com/~ttsweb/tts/demo.php
[12.11.10 22:23:55] bgarnicnig: k
[12.11.10 22:24:00] constant dullaart: dont press speak
[12.11.10 22:24:11] constant dullaart: new tab COPY 3rd LADY GAGA ASCII FROMhttp://hotascii.com/terminal/ascii_lady_gaga
[12.11.10 22:24:27] constant dullaart: Back to 2nd tab: PASTE! DO NOT CHANGE VOICE, JUST PRESS SPEAK
[12.11.10 22:24:42] constant dullaart: paste in the att one
[12.11.10 22:24:52] bgarnicnig: running
[12.11.10 22:25:10] bgarnicnig: 2nd loop
[12.11.10 22:25:18] constant dullaart: Open New TAB http://sounddogs.com/previews/25/mp3/222978_SOUNDDOGS__ba.mp3
[12.11.10 22:25:32] bgarnicnig: running
[12.11.10 22:25:50] bgarnicnig: -00:20
[12.11.10 22:26:10] constant dullaart: open new tab: http://www.planetofnoise.com/midi/morse2mid.php
[12.11.10 22:26:24] bgarnicnig: k
[12.11.10 22:26:29] constant dullaart: COPY PASTE THE FOLLOWING IN THE TEXT FIELD: ANY MEDIUM AT ALL CREATES A NEW PATTERN, A NEW ATMOSPHERE, A NEW ENVIRONMENT OF HUMAN PERCEP-TION
SELECT QUICKTIME! and press "make midi file"
[12.11.10 22:26:52] bgarnicnig: running
[12.11.10 22:26:59] bgarnicnig: still loop lady gaga btw?

The sound ressources on the World Wide Web are ephemeral, much like the sounds exist in our habitat and environment. Briefly appearing signals and notes, their existence on the archive-in-motion is flit-ative for various reasons: YouTube takedowns enforced by copyright owners, users correcting their rep-resented identities and editing their archives, servers failing, connections dropping, geographical access restrictions etc. Like a train passing and chatting couples passing by on the sidewalk, they appear and disappear. The Acoustic Ecology and the Soundscape Project have studied exactly the specific phenom-ena, histories and properties of sound found in our habitats. Yet so far, this type of research has not been expanded into the field that is now also a de-facto space where our lives are led, work gets done and social structures emerge: Although the spatial metaphors have been used for networks since a while (think about the volume of a MySpace, the length of a YouTube or the diameter of a CyWorld). The space of computer networks has been regarded as being a space without acoustic properties and sonic phenomena.

Since the 1970s, the World Soundscape Project used the practice of Soundwalk [3] and the term Sound-scape [4] as analytcial tools for their research of the sonic environment of the human habitat. These terms and methods since then have become independent and widely used artistic practices, Janet Cardiff & George Bures Miller Soundwalk projects [5] and Luc Ferraris Soundscape compositions ("Presque Rien ou le lever du Jour au Bord de la Mer" [6] being popular examples. Through a process of reverse engineering, the Soundwwwalk project is an initial effort towards establishing an analytical

framework for an Acoustic Ecology of Networks, starting with an artistic practice. The experiences and discussions this yields will contribute to a more elaborate jargon and finer differentiations to the field of network acoustics and the browser as potential platform for sonic expression.

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Special thanks to Jamie Allen for the discussions and contributions, which resulted in a collaborative workshop on Net Acoustics at Mullae Art Space Seoul, Korea in June 2011.

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OMNISCIENCE, SURVEILLANCE, DISCIPLINE: THE TRIUMPH OF THE VIRTUAL PANOPTICON

GREG GARVEY

Virtual worlds like Second Life and games privilege a single point-of-view and permit a change of identity thought to be desirable, liberating and fun. Users/players agree to Terms of Service (TOS) – a new feudal regime of 'soft' surveillance. Foucault's analysis of Bentham's Panopticon applies equally to typical Terms of Service. The mummified Jeremy Bentham, locked in perpetuity in a box, remains omnipresent and omniscient.

The eyes of the Lord are in every place. _Proverbs 15:3

POV

Artists, authors, filmmakers, game design and creators of virtual worlds have at their command a variety of devices to represent the point-of-view (POV) of the observer, character, playable character or avatar. In the long history of visual representation in western, non-western art along with the rise of modernism, contemporary arts but also in technical disciplines geometric perspective is but one of many different approaches. Although it actually distorts depictions of objects it retains the authority of truth. Technical drawing techniques such a isometric projections (or God's Eye view) and even surrealism have explored alternative modes of representation of perspective.

The Privileged Gaze

Virtual worlds such as Second Life privilege a single point-of-view, i.e. the user. When logged into Second Life a user sees the virtual world from a default viewpoint, which is from slightly above and behind the user's avatar (the user's alter ego 'in-world'). This point-of-view is as if the user were viewing his or her avatar using a (monocular) camera floating a few feet behind it. The user can also choose to see this virtual world from "inside the head" of one's avatar as if seeing through the eye(s) of the avatar. In effect the user can easily shift from a first person, to third person (their avatar is seen as an other). Using the technique called Mouse Look users can even move that camera completely independent of his/her avatar and become an incorporeal all seeing-eye freed from the bondage of a body.

Scopophilia

This privileging of a single point-of-view matches Mulvey's notion of scopophilia "a primordial desire for pleasure in seeing." There is a sense of discovery, freedom and liberation as a result of un-tethering one's point-of-view from the location of one's avatar. In Second Life user's avatars can also fly–long a dream of human kind. Flying affords a bird's eye perspective on the virtual world. In addition teleportation permits avatars to instantly move (within technical limitations – laggy rezzing) from one location (another sim or simulation) on the grid in Second Life. For Second Life "newbies" this experience is liberating and even ecstatic.

We all live in a Gray Submarine

Jaron Lanier suggests that we tend to think of the brain as a computer and our point-of-view as seen through our eyes as a simple camera:

"The head is a spy submarine sent on a mission to perform a multitude of little experiments to learn more about its environment. These micro-experiments are often carried out by constant, subtle changes of the position of the head. By continually moving our head around in order to scan the scene, we simulate the effect of having far better eyes than we actually do, and in a far wider variety of placements. …If you immobilize your head in a vise, you will see far less well. If you also stop the motion of your eyeballs, you will soon cease to see at all. The world seems to vanish into gray."

Escape

Second Life also tempts the user with the lure of transformation and perfection. In Second Life the user's avatar is that body electric that triumphs over the human condition and promises a consumer's paradise of fulfillment. A promotional video on the Second Life web site answers the question of "What is Second Life?" with:

A place to be…

Be different

Be yourself

Free yourself

Free your Mind

Change your Mind

Our Second Selves

In her book Life on the Screen Sherry Turkle (1995) documents the hopes, fears, expectations of some of early denizens of the then emerging social phenomena of the Internet. She argues that these technologies bring "postmodernism down to earth," "refuses modernist resolutions and requires an openness to multiple viewpoints." In an article for Wired magazine she spoke of the virtual: "The anonymity of MUDs gives people the chance to express multiple and often unexplored aspects of the self, to play with their identity and to try out new ones."

But easily changing point-of-view has ramifications. The practice of using multiple avatars requires a transformation of identity and personality. When a user 'enacts' the identity of a particular avatar, their 'real' personality is masked by the assumed personality. In real life such change can lead to psychological distress. In virtual worlds and games a change in identity or point-of-view is thought to be desirable, liberating and fun.

Two Heads are Better Than One

I have argued that virtual worlds like Second Life may induce a feeling of dissociation in users/players. Users may experience "derealization" (where objects appear unreal) and "depersonalization" (where people read avatar's appear unreal or robotic) as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). If dissociation is experienced in real life it can be very debilitating and disruptive of normal life.

Reality Testing Is Intact

The clinical diagnosis of either of depersonalization or derealization indicates that "reality testing is intact" which applies to Second Life Residents and gamers. By changing gender, bodily features, proportions and clothing a Second Life resident "enacts" a different personality. With a different personality, especially in the case of gender comes a different perspective on the experience of being "in world." It is possible residents of Second Life or gamers experience something akin to Dissociative Identity Disorder (DID) which according to the DMS refers to the "presence of two or more distinct identities or personality states" that "recurrently take control" of the user's behavior. Could the user/player experience some form of cognitive dissonance if there is a struggle to integrate the different personality attributes and gender differences?

Various studies show that avatar selection can have a profound impact on behavior and self-perception both 'in world' and in the real life. VR researcher Nick Yee found that research subjects who adopted a taller avatar would out-negotiate those who selected shorter avatars. Commenting on Yee's work, Jim Blascovich and Jeremy Bailenson conclude, "changes in avatar height changed their (study participants) behavior," and that the "critical finding is that participants' self-perceptions changed their behavior."

Separation of Church and State

Extropia DaSilva considers the question how to manage the separation between one's real self and a digital person:

"To what extent is a digital person separate from the person who is role-playing them? Many consider it impossible to create and sustain a personality that is substantially different from the RL persona. Others argue that current virtual reality is too crude to enable deep immersion into an alternate identity. As online worlds grow in sophistication, it should enable increasingly complex explorations of alternate identities."

Liberation Theology

The prophets of the singularity see only the upside of multiple selves. With his proposal for the Law of Accelerating Returns Ray Kurzweil has prophesized the advent of the Singularity. We will be able to upload our minds to the cloud based on what Randal Koene terms "advancing substrate independent minds" (ASIM): "Mind uploading is the process of transfer, a process by which that which constitutes a specific mind is transferred from one substrate (e.g. the biological brain) to another (e.g. a silicon brain)." Will we retain our unique minds with different perspectives?

The Problem Concerning Technology

In the Winter 1993 issue of Whole Earth Review, Vinor Vinge raises many of the key issues surrounding the significance and impact of the Singularity:

"The notion of ego and self-awareness has been the bedrock of the hardheaded rationalism of the last few centuries."

"What happens when pieces of ego can be copied and merged, when the size of a self-awareness can grow or shrink to fit the nature of the problems under consideration?"

Know Thy Selves

Extropia DaSilva provides a compelling vision of the coming future of multiple viewpoints:

"By the time mind uploading is generally available, perhaps people will have forgotten a time when a singular self was "normal." They will be used to multiple viewpoints, their brains processing information coming not only from their local surroundings, but also from the remote sensors and cyberspaces they are simultaneously linked to."

Exodus

In Exodus to the Virtual World, Edward Castronova sees "a hurricane coming" - the fun revolution, which he calls 'practical virtual reality.' Castronova points to basic economic theory of time allocation. All things being equal e.g. cost people "will pursue as long as possible activities that please them." Castronova argues that the domain of synthetic worlds and the domain of the real world are in competition. "Time and attention are migrating from the real world into the virtual world. The exodus will strengthen, I believe. Improvements in technology will make virtual worlds into veritable dreamlands. They will be more fun, for more people. Simple economic theory predicts that in this competition, the real world is going to lose."

Code is Law

While MMORPGs, virtual worlds and electronic games seek to provide a fun experience, all require that the users/players agree to Terms of Service (TOS). TERMS OF SERVICE according to Castronova fall into two categories: "One set of rules are proscriptions the designers hope players will follow more or less based on their own incentives. …designers hope that a role-playing community will evolve that will enforce in-character behavior through its own norms." The other class of rules "are ones that cannot be placed in code but about which the designers are dead serious….. The designers will execute any character that violates such rules, banning the associated account. E.g. harassment of other players on ethnic grounds."

Lawrence Lessig famously wrote that "Code is law" and what is coded serves to ensure discipline and compliance. Castronova points out that "The cost of law enforcement, and of governance in general, is high now, higher than it has ever been in human history." "To sustain good government, we either have to pay for people to do it, or figure out …to automate it. …The result of automated law in virtual worlds often feels like anarchy. You don't ever see government—no police, no civil service workers, no mayors, only the occasional "game-master," who has to come adjudicate problematic disputes. While gover-

nance is not apparent, governing is going on–in the code." "We already have cameras that capture traffic violations and send tickets. Eventually the traffic light could speak directly to my car and simply prevent it from moving forward when the light is red." Automated Real-world law is cheap! "Cheapness is a very powerful feature."

The New Softcore Feudal Order

Rather than liberating TOS is a regime of 'soft' surveillance. Most include provisions that content created by users cannot infringe on the intellectual property rights of a third party; users agree to indemnify the owner of the virtual world from liability; all content created by users becomes the property of the virtual world owner and the owner retains the right to cancel a user's account anytime for any reason. According to Greg Lastowka submission to the TOC is equivalent to a new feudal order: "Like peasants tilling fields around a medieval castle, users will lend their copyright labor and creativity in ways that will build the value of the virtual world platform, often paying for the privilege of doing so." The end user licenses and terms of use regulate behavior.

Keeping Score

To enforce TOC and to make us feel part of something epic means tracking gamers and gameplay in order to provide feedback and recognition. This sense of the collective, being part of something larger is laudable, perhaps as McGonigal claims truly inspires awe, reverence and even humility. But we are reminded here of Blascovich and Bailenson's rather innocuous sounding observation detailing the wonders of tracking systems: "The take-home message here is that people's behaviors in virtual reality (Halo is indeed a virtual world-mine) are tracked, and therefore can be stored, analyzed, and used–for good, bad, or whatever the person collecting the information wants."

The Ocean of Noise

On August 2, 2002 at the DARPATech 2002 Conference in Anaheim, California, Admiral John Poindexter (of the Iran-Contra scandal) rolled out the Total Information Awareness Program, sponsored by the Defense Advanced Research Projects Administration (DARPA). The vision for TIA was vast in scope and comprehensive and continues to this day under different through separate and parallel governmental, corporate and private initiatives.

"The most serious asymmetric threat facing the United States is terrorism, a threat characterized by collections of people loosely organized in shadowy networks that are difficult to identify and define and whose goals are the destruction of our way of life. The intelligence collection targets are thousands of people whose identities and whereabouts we do not always know. It is somewhat analogous to the anti-submarine warfare problem of finding submarines in an ocean of noise - we must find the terrorists in a world of noise, understand what they are planning, and develop options for preventing their attacks."

In order for TIA to work effectively it must collect in its data mining operation the profiles of non-threats in order to distinguish the threats from the non-treats. Today we now know that the National Security Agency beginning in 2001, with the cooperation of the major domestic telecommunication providers intercepted Americans' phone calls and Internet communications in violation of privacy safeguards established by Congress and the U.S. Constitution.

LOCATION BASED SERVICES

Today in the United States Apple and Google have launched their own data mining and tracking sub-mersibles into the consumer info ocean of noise. With the spread of location-based advertising, market-ing, or other applications both Apple and Google have been tracking the location of smart-phone and computer users. Apple surreptitiously logged the locations of cell phone towers and wifi hotspots adja-cent iPhone and iPad users. CNET reported that while Google's Street View cars shot images for Google Earth, the vehicles also "collected the locations of millions of laptops, cell phones, and other Wi-Fi de-vices around the world."

Mr. Know it all

Google ex-CEO Eric Schmidt declared: "We know where you are. We know where you've been. We can more or less know what you're thinking about." In many ways Eric Schmidt echoes Psalm 139 of the Christian Bible:

LORD, when you look at me you know all about me.

You know when I sit down.

And you know when I get up.

You understand what I am thinking about? (even when you are) far away.

The Police

With the 1983 hit "Every Breath you Take" by the Police, Sting takes us from the sacred to the profanity of stalking. Like the omniscience of God, Sting is letting the object of his affection know that "I'll be watching you."

An ounce of prevention is worth a pound of cure

During an interview in December of 2009 Google Chairman Eric Schmidt served users of the internet no-tice: "If you have something that you don't want anyone to know maybe you shouldn't be doing it in the first place." This statement perfectly captures late eighteenth century English Philosopher Jeremy Ben-tham's idea of The Inspection Principle outlined in his proposal for the Panopticon – his "plan for a peni-tentiary inspection-house." The architecture is the physical realization of the Inspection Principle made possible by "the centrality of the inspector's situation, combined with the well-known and most effec-tual contrivances for seeing without being seen" made possible by a strategic placement of windows and partitions.

While it would be ideal to have each and every prisoners under "inspection" all the time Bentham ac-knowledges that is impossible (given limitations of staffing), so "the next thing to be wished for is, that, at every instant, seeing reason to believe as much, and not being able to satisfy himself to the contrary, he should conceive himself to be so." Fear of detection ensures prevention is the essence of Bentham's inspection principle. This operational principle of the Panopticon induces "a new mode of obtaining

power of mind over mind, in a quantity hitherto without example." In his analysis of Bentham's Panopticon Foucault describes the inspection principle this way "to induce in the inmate (user) a state of conscious and permanent visibility that assures the automatic functioning of power."

Here, there and everywhere

Now a trope of popular culture (the reality TV show Big Brother, Cheaters, MTV) the most visible manifestation of the virtual panopticon is ubiquity of security cameras. The London Evening Standard reported in an article entitled George Orwell, Big Brother is watching your house that as of 2007:

"Use of spy cameras in modern-day Britain is now a chilling mirror image of Orwell's fictional world, created in the post-war Forties in a fourth-floor flat overlooking Canonbury Square in Islington, North London. On the wall outside his former residence - flat number 27B - where Orwell lived until his death in 1950, an historical plaque commemorates the anti-authoritarian author. And within 200 yards of the flat, there are 32 CCTV cameras, scanning every move."

Dummy cameras provide the omnipresent threat of omniscience that ensures the internalization of compliance.

Smile We Are All On Candid Camera

Facebook adds over 100 million names each day, which rivals any database that the government might build. Google is not far behind. David Petrou an engineer at Google says that Google facial recognition software can identify the face of someone with a minimum of 17 online photos. With 50 or more Google can determine the person's name in most cases. Consumers willingly opt in this facial recognition software without concern. However, last year, a facial recognition system picked out more than 1,000 cases that resulted in State Police investigations, officials say. And some of those people are guilty of nothing more than looking like someone else.

It All in Your Head

The Brain Electrical Oscillations Signature test, or BEOS, was developed by Champadi Raman Mukundan, was used to win a criminal conviction. Using the scanning system, the accused murderer said nothing. But incriminating regions of the accused's brain where memories are stored lit up when the crime was recounted, …The judge endorsed [the prosecutors's] assertion that the scans were proof of "experiential knowledge" of having committed the murder, rather than just having heard about it. The implication of such invasive techniques is also on uncertain ethical and legal ground.

Theory of the Future: The PANOPTICON

Invasive scanning techniques and brain implants were once the province of dystopian science fiction. Big Brother was a nightmare scenario of a fictional world that seems improbable in liberal open societies. The natural desire to see, to watch, to record, to remember is being harnessed through social media. The job of surveillance is being done by the consumer and it is fun. Users accept Terms of Service without reading and thereby agree to a regime of enforcement and compliance. Discipline is enforced because users know they might be watched and might suffer the ultimate penalty: denial of service.

The mummified Jeremy Bentham remains omnipresent at University College London. His frozen gaze suggests omniscience. He leaves us with this warning:

"…whether the liberal spirit and energy of a free citizen would not be exchanged for the mechanical discipline of a soldier, or the austerity of a monk? - and whether the result of this high-wrought contrivance might not be constructing a set of machines under the similitude of men?"

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CURATORIAL CULTURES – CONSIDERING DYNAMIC CURATORIAL PRACTICE

Karen Gaskill

This paper will look at how responsive methods and approaches are called for when curating media-art-works, and how they shift the curatorial role to that of an active practitioner.

It will discuss exhibition strategies employed by the author, and how dynamic curatorial approaches can be integrated into mainstream curatorial roles, and how these can subsequently evolve thinking on the presentation and display of contemporary art.

Fig.1. Player Printer, 2006, Simon Blackmore, mixed media. Installation shot. Copyright Karen Gaskill.

Fig.2. Fast and Slow Networks, 2006, Exhibition view. Copyright Karen Gaskill.

"What", I want to ask, "would it mean to think of art practice as the search for collaborators rather than as the search for an audience?" [1]

The practice of curating is live and temporal. It has shifted dramatically from its anonymous backstage origin within dusty museums to a role at the forefront of modern art, and is responsible for conjuring both a synergy and a dynamic that operates across a multitude of levels. Curation is a rapidly growing practice and discourse that is fundamentally shifting the ways in which we view and receive art.

This paper considers the curatorial role as that of an active practitioner, positioning it at a point of perspective. An excerpt from a recent PhD, this text presents a synopsis of a much longer articulation of the currency of the curatorial role in presenting and contextualising socially-engaged art practices.

Joan Gibbons, in her introductory narrative to the curatorial section of Hothaus Papers, reveals how the etymology of the word curate (as in 'curate' as a noun) goes back to the Latin word for care, 'cura', and through the religious art of the middle ages evolved into 'curatus', in reference to the care of the soul. [2] This is a particularly evocative description of the actions of the contemporary curator, as one that cares for our cultural products and their critical significance. Contemporary curators are summarised with a range of descriptive words such as caretaker, facilitator, mediator, catalyst, context provider, collaborator and negotiator. These have come to rise through the continuing prominence of the curator within exhibitions.

Traditionally the curatorial role was to collect, archive and preserve works of art, and was seen as separate from its variable display. Ramirez situates the curator as an internationally recognised expert of the artworld establishment, I quote: "in this elite context, curators have traditionally functioned as arbiters of taste and quality. The authority of this arbiter role derived from an absolute - ultimately ideological - set of criteria grounded in the restrictive parameters of the canon on western Modernism/Post Modernism." O'Neill, in Rugg and Sedgewick, [3] discusses the ascendancy of curatorial criticism since the 1960s, describing the critical shift away from the object of art, to a critique of the space of exhibition. More relevantly, he references the ascendancy of the curatorial gesture in the 1990s and how this 'began to establish curating as a potential nexus for discussion, critique and debate'. The rise of the curator can therefore be tracked through critical requirement. The role has adapted according to paradigm shifts, movements, cultural perspectives, and through the requirements of the work it chooses to curate.

The activity of the curator draws analogy to the Cabinets of Curiosity in sixteenth and seventeenth century Europe. The Cabinet of Curiosity, in its collection and display of often foreign and unseen objects, presented a tightly coordinated and rich tapestry of contexts and histories. Suggested as an early precursor to moving image culture (the notion of an audience roaming through a narrated space) the cabinet provided a specific audience with a metaphorical lens through which to view and understand alternative genealogies.

Such groupings of objects began the notion of storytelling and narrative within displays, and the provision of context and representation. Tony Bennett [4] writes of such museological cultures, 'the space of representation constituted in the relations between the disciplinary knowledges deployed within the exhibitionary complex thus permitted the construction of a temporally organised order of things and peoples'. Thus this aspect of the contemporary curator's role is not new, but through the lack of documentation of our curatorial history, many connections are still to be made.

The focus of the curatorial role has evolved from being that of a "behind-the-scenes aesthetic arbiter to a centralised position on a broader stage, with a creative, political and active part to play in the produc-

tion, mediation and dissemination of art itself." [5] The practice of collection within museums and galleries still remains the same, with a continual need for the assimilation of art collections and their preservation and display. This 'time storage' as it has been labelled, is still massively important in cataloguing and preserving works. A perfect example is media art, where the necessity to archive digital and often ephemeral works is completely reliant on the survival of particular software and hardware. Therefore, to preserve the work, the associative technology must also be collected and conserved by the museum or gallery. The practice of archiving contemporary artworks has broadened relatively with the expansion of practices, and the responsibility of ensuring the future presentation of many works is thus massively reliant on the preservation of increasingly obsolete technical platforms.

Curatorial practice has come to embody one of the most dynamic forms of cultural agency available today. The challenges represented by this role and its ability to affect a series of interdependent areas inaccessible through other, more restricted, modes of cultural practices requires a fluid and multidimensional approach. [6] In the shift from the curator as master planner, Obrist [7] articulates how exhibitions have shifted from a historical approach of order and stability, to a place of flux and instability: the unpredictable. In thinking about the curator's role at the helm of such uncertainty, it becomes much clearer how the position has evolved and its contemporary requirements shaped. This is also made clearer by the consideration of the types of work curated in contemporary exhibitions in relation to those being curated a century ago. The span of practices is growing rapidly, with new understandings and forms of hybrid practices being established all the time.

Therefore the position in which the contemporary curator sits is one of emergence and flux. I argue that the curator should be continually responsive to the type of work they are curating, if necessary changing their approach and looking sideways are what tactics of display best represent the work in question. The relationship between media art practices and traditional galleries is a recently formed one, with a history of littered with contextual and presentational misunderstandings. The main issue being that historically curation and its contextual knowledge has been developed and orientated around that of the art object. There has been no presentational challenge in displaying the works of painters and sculptors, obviously this is done with great knowledge and experience, but rather the challenge occurs when works come into being that are process-based as opposed to object-based.

As a contextualiser, the curator is often perceived as an "expert on art's mediation by the sites of its display"; the area of curatorial expertise sits markedly between the "private sphere of the production of art, on the one hand, and the public sphere of consumption, on the other." [8] However with this expertise comes a responsibility to the artist and their work in parallel to the audience. With experts drawing on their past knowledge of curation has meant that with the proliferation of more dynamic practices coming to the forefront of contemporary art, that this experience is not always relevant. It is difficult to curate work that is process-led with an approach that deals with art objects. So the question for many was how does one go about curating a process that involves audience members to make it manifest and in many cases realise the work. This issue was obvious in many of the early gallery shows, especially those which were not dedicated to media or participative practices entirely, or were solo shows, but were a selected mix of mediums. For me it felt that media works in many such shows were being curated on their physical presentation mediums as opposed to their relational attributes.

At this early point, the display monitor or computer was perceived as the work, it was a physical object, thus it was placed alongside other objects in the show accordingly. I use this as a broad example to iterate a point, and to reveal the difference between the curation of an object for display, where the curator takes into account the space required for viewing and exhibition sightlines, etc, to the curation of a

process. In this, where the physical presentation method is often purely a method of display, and where the essence of the work is revealed by the interaction of a user, viewer, participant, or otherwise, the curator needs to respond and work with the requirements of the piece, effectively curating the social, dialogical and reciprocal characteristics of a work.

The curator's relationship with site and space is ever evolving. Again I cite media arts as a prime example of how such practices have existed away from the formal agendas and white walls of the traditional gallery space. Such practices have always sought alternative spaces, primarily for the space requirements and that the significance of the gallery space is not entirely relevant to the dialogues they present. There have come to be more 'off-site' (non-gallery based) projects in recent years as exhibitions shift away from the white cube's signified emptiness [9] and critically acknowledge the role of site as part of the exhibition's context. I quote Brian O'Doherty [10] here, in order to contextualise Nick Kaye's description above, in his description of an ideal gallery, extracted from his book, Inside the White Cube. 'The ideal gallery subtracts from the artwork all cues that interfere with the fact that it is "art". The work is isolated from everything that would detract from its own evaluation of itself. This gives the space a presence possessed by other spaces where conventions are preserved through the repetition of a closed system of values'.

This merging of two critical directions; the white cube space of the object and the site-specific context of spatial works, has seen a new dialogue regarding the aesthetics of the relationship between artwork, place and audience develop. Exhibition spaces now exist 'off the map', and in the world, citing real life as their critical horizon and conceptualising the relationships and processes that occur within this context. (See fig.1).

I consider curation as being about establishing and contextualising a site of exchange: a space where artwork, site and audience converge. The 'exhibition space' exists where these conditions are met, and with Media Practices in particular focuses on the process of this convergence itself. This coming together of social, spatial and critical contexts generates a political space that exists within a wider cultural sphere.

There is no one set example of how media art practices function within a confined space, each performs differently, exerting different pressures on the conditional aspects that both determine and limit their relational capacities. Most works that function well in such spaces are often produced or commissioned to work within such parameters, and therefore are perhaps more site-specific in the traditional sense as they are intrinsically embedded within the site of production. However, such locations differ from their traditional predecessors in that the curatorial process also takes into account the relationship between site and artwork, and therefore is much more reliant on the audience to acknowledge and legitimise the connections made between the two.

This raw space provides a blank canvas for both the curator and artist that can be worked with accordingly to capture the characteristic of what the exhibition seeks overall to explore. Away from the agendas set by gallery spaces and the critical expectations of gallery audiences, alternative spaces reveal a space of potential, a space where anything can happen. This is very much a live space working with the conditions of subjectivity and presence, and dependent on an engagement across all elements. It is in this 'conditional' space that socially engaged and media practices projects sit, where contexts are formed and experience is lived. As an example, Allan Kaprow's Happenings are critically positioned by the artist, realised by the audience, influenced by the site, and politicised by the multiple perspectives

and opinions of the participants. This condition of immediacy where a conflux of ideas, perspectives, conditions and experience meet mimics in Kaprow's eyes the grit and texture of everyday life.

Such conditions of immediacy are also opened up through interactive media works and emphasised or furthered by the opportunities afforded by the chosen exhibition site. As suggested, alternative exhibition spaces remove the audience's 'authenticity', permitting them to function in a more natural role. These circumstances allow a public authoring of the exhibition itself, with the public's interaction with artwork and site both contextualising and realising the exhibition as a space of engagement. (See fig.2).

I want to touch on some examples of curatorial strategies that I have been implementing, and how these experiences have informed my knowledge as a curator. From 2005-2009 I directed and curated a small arts organisation called Interval. Based in Manchester, UK, it aimed to support artists using technology in their work through regular exhibition opportunities and networking events. Through Interval I attempted to approach the exhibitions I planned and curated from the perspective of curating the process of the selected artworks. This involved much more consideration of the appropriateness of space and site, and instead of thinking how the physical attributes of the show would be presented, I considered how the social space of each work would function, how they would work in relation to one another, and the potential for dialogue and exchange.

This curation of spaces for interaction and exchange very much shifted my perspective on the potential of exhibitions, and even working in gallery contexts with participative or socially-engaged artworks of all kinds, has reiterated the engagement that the curator needs to make with the 'exhibition space'.

So to conclude; 'Curator' is a term in the constant state of 'becoming' writes O'Neill, [11] 'as long as "curating in practice" is continuously willing a flexible "common discourse" into being'. It can therefore be said that curating is no longer about being somebody else, e.g. curator as negotiator or facilitator, it is about being a 'curator' as understood in discourse. The actions of curating mean different things to different curators, who again work in different contexts and situations, locations and sites. It is very much a cultural commentation role, experimental and discursive, necessarily responsive to socio-political and artistic shifts in a fluid culture. Our evolving curatorial dialogue seeks to embody movement and continuation in its descriptive qualities, and make visible and transparent the links and networks between meanings.

Curating is 'becoming discourse' where curators are willing themselves to be the key subject and producer of this discourse." I consider how Niklas Luhmann's writings on art as a social system, and in particular his articulation of a reflective practice, could be applied to curatorial practice. I suggest that this would compare the action of 'exhibition making' or curatorial practice as being the equivalent of making an artwork. Luhmann understands art as an autopoietic system that is self-referential and recursive. [12] I view curation as a similar thing. Curation enables the space of exhibition to open up new possibilities for dialogue and exchange, with these new perspectives feeding back into the way in which the exhibition is perceived and reflected upon. The 'artwork' or 'practice' of the curator is the exhibition and all of its associated processes, thus again coming back to Luhmann's notion of practice as not being solely concerned with agency but rather the work's understanding of itself and how this reveals possibility for an exhibition to raise questions about itself and its environment.

This becomes relevant when thinking about the broader social, cultural and political remit of curation and its practice. In its responsibility for the collaborative creation of context - that includes the artist/s; the artwork; the concept of the work and its representation; the facilitation of an exhibitions content;

orienting the body of work, and finally the space of engagement with an audience - curatorial practice is very much the actions of a bricoleur. In reflecting the messiness and complexity of everyday contexts and building a knowledge formulated by experiences and relationships, the curator is a responsive practitioner; a collaborator in art's social relations.

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CYBISM AND DECODING THE LETTER: BUILDING AFRO-FUTURIST STYLED GAME LAYERS ON TOP OF THE WORLD

Nettrice Gaskins

The realm of street art is now a thriving knowledge culture that merges specialized forms of representation: alphabets, drawings, paintings, films/videos, choreographic notations based on programming languages, hardware, software, etc. This paper examines these guideposts that provide a basis for user-generated, performative, virtual and physical site-specific content that cross multiple disciplines and dimensions on emergent game platforms.

Fig. 1. Museum of Contemporary Art Los Angeles, Battle Station, 2011, studio installation, Photo credit: N. Gaskins (author).

Fig. 2. Alternate Futures: Afrofuturist Multiverses & Beyond, 2010, virtual 3D Gothic Futurism simulation, Copyright N. Gaskins (author).
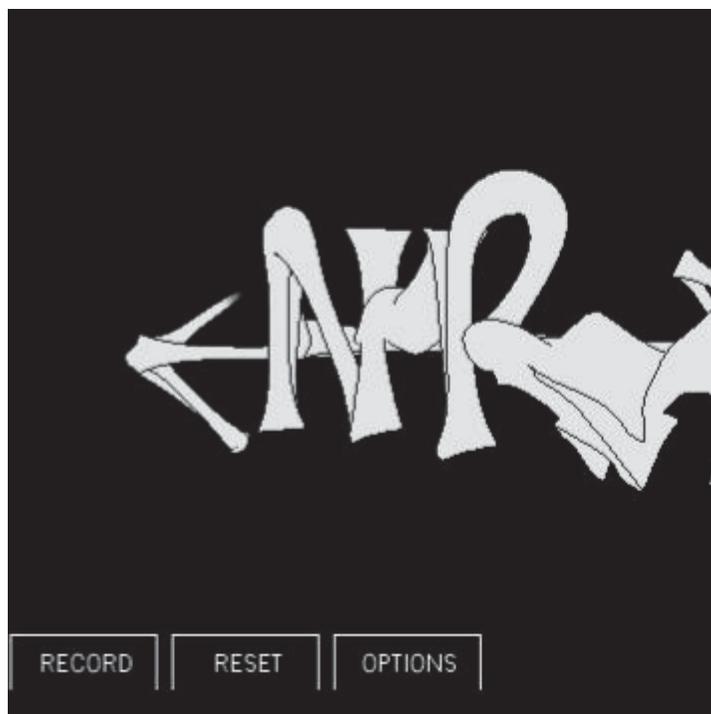
Fig. 3. Graffiti Analysis, 2011, personal tag, Copyright N. Gaskins (author).

"*Every new technology disrupts the previous rhythms of consciousness.*" – Joseph Nechvatal [1]

To walk into the *Art in the Streets* exhibition at Geffen Contemporary in Los Angeles' Little Tokyo neighborhood is to enter the realm of pure unadulterated street art. It is also to experience what is now a thriving knowledge culture that merges specialized forms of representation: alphabets, graffiti, films/videos, choreographic notations based on symbolic, linguistic and scientific formulations, programming languages, hardware (robotics, handheld devices), software, and so on. [2] This work emerged from a culture that has grown through the through the creation and application of forms that reflect the imaginings of urban futurism-inspired, hip-hop-styled texts that are rich in imagery and metaphor. These artists use the urban environment as their canvas that provides a basic framework to contextualize and evaluate street art production. This article expands upon art and media-related discourse of a kind of ontology, or metaphysics of presence to describe what takes place with the body, itself, not just the body that is embedded in public spaces but also how bodies are coded by society. A code is a rule for converting a piece of information (letter, word, phrase, or gesture) into another form or representation (one sign into another sign), not necessarily of the same type. This article aims to present a deeper, multi-layered translation of afro-futuristic, "wildstyle" graffiti and performance decoded through embodied new media, virtual 3D and augmented reality environments.

Modern graffiti and street art pioneers, many whose works are featured in *Art in the Streets* and elsewhere have provided artistic guideposts fueled by the increasing ubiquity of digital media that offer opportunities for its users to deviate from canonical practices of art and represent a complex syntheses of scientific and technological extensions of the body embedded in material and virtual spaces. RAMMEL-LZEE was an artist and theorist who lived for twenty years in a Tribeca studio loft he nicknamed the *Battle Station*. [Fig. 1] Museum curators transported his studio to the Geffen Contemporary for public viewing. *Battle Station* contains rarely seen video, sculpture, images and sound. It is part of what the artist

called "gothic futurism," his urban, afro-futurist manifesto that embeds history, science (quantum physics), philosophy, science fiction, mathematics and technology. [3] The centerpiece of this production is "Gasholeer," an upright, freestanding urban warrior figure covered in armor worn by RAMMEL-LZEE during live performances. "Gasholeer" represents this graffiti artist in his futuristic, urban realm – merging urban bricolage and detritus, mass media and street culture. The artist, embodied as an avatar, is surrounded by customized instruments and systems called "letter racers," "monster models," and "garbage gods" – objects designed to decode information into specialized forms of representation and invite visitors to become immersed in material and metaphysical space endlessly open to transformation and change. [4]

Modern graffiti comes from anywhere and takes whatever is needed from the environment. This practice relies on sign relations that consist of specialized art forms (tags, burners, etc.) that also describe aspects of presence, objects of reference and mental representations of spatial perception. RAMMEL-LZEE's artworks consist of formulations on the juncture between black and Western sign systems (afro-futurism). [5] He realized that concepts are tools – technologies that could be crafted outside of the canon to make palpable specialized forms of knowledge that push the means of artistic production into the hands of outsider artists. His "panzerized" art forms, as cultural texts, are a basis for a symbolic and semiotic structure that relies on social interstices that mark or inscribe upon the body specific signs generated by society. RAMMELLZEE was part of a movement to create a space in which to untangle lines that cut across the past, present and future to establish an empirical framework. This framework is semiotic insofar as its structure depends on the process of perception and experience. Such development has largely been unexplored in scholarly discourse and is open for interrogation and debate. In her analysis Andrea Mubi Brighenty asserts that the common denominator that runs through graffiti, as an interstitial practice, is the materiality of the practice itself. [6] This article proposes a new form of analysis and interpretation based on the creation of new and alternative media content.

RAMMELLZEE appropriated and decoded letters of the Greek alphabet to create distinctly new art objects, transforming classic signature visual motifs into mechanical (letter racer) systems. Second Life (SL), an online, virtual 3D world, offers tools to re-appropriate and re-mix similar artistic constructions. As part of a Second Life art exhibition sponsored by the IBM Center for Social Media, I simulated portions of *Battle Station* and, through the use of in-world tools, constructed objects that were textured and assembled to simulate modern graffiti semiotics. [Fig. 2] Built into the SL software is a three-dimensional modeling tool based around simple geometric shapes that allows artists to build virtual objects. There is also a procedural scripting language, Linden Scripting Language, which can be used to add interactivity to objects. Users/avatars navigated this wildstyle-inspired, perceptually immersive 3D graffiti by virtually walking on, through, or around the objects, some of which were scripted to provide information such as links to external web sites and note cards with text that could be stored in an inventory. Extruding two-dimensional graffiti and incorporating interactive elements reveals new ways to decode specialized forms of representation that break set rules and establish new practices that extend viewer/user participation.

Imagine how much richer and multi-layered the experience of being in *Battle Station* could have been – exploring wildstyle graffiti and street art forms – using augmented reality (AR) tools on mobile devices. Visitors would have experienced a different *Art in the Streets* exhibition (at MOCA LA) if, while using their iPhones or Android smartphones to capture images, they had access to AR content that translated RAMMELLZEE's complex vernacular. This multi-layered scenario is what makes virtual 3D and augmented reality environments promising for contemporary art. Graffiti artists, as part of a production process, encode, or take information from subcultural experiences, living in urban spaces and converting

this psychogeography into specialized symbols (graffiti tags, dance poses). Virtual 3D and AR tools can decode these symbols, as part of a generative and reverse artistic process, converting various symbols into information understandable by others. Emerging technologies create layers of information that explore the far-reaching implications of evolving epistemology and empiricism based on the body as a site for communication, represented in material and virtual domains and by highly stylized structures and code.

Along with the development of perceptually immersive, virtual 3D worlds like Second Life, augmented reality (AR) is becoming more accessible and new uses continue to emerge as tools for creating and customizing applications become easier to use. The layering of information over 3D space produces new ways to experience the world, as blended reality, that is fueling the broader migration of computing from the desktop to the mobile device, bringing with it opportunities for broader viewer/user dynamic engagement with social, digital, and mobile media. Contemporary artists are being encouraged to view their mobile phones, cameras, iPods and tablet computers as tools for production and display. These tools can be used to simulate real world issues and explore complex concepts in ways that are more 'user led' and increasingly participatory and collaborative. Graffiti psychogeography reveals creative practices that twist, interlock, converge and diverge media texts in a type of rhizomaniac, capitalistic and cultural schizophrenia. [7] Wildstyle, which in graffiti describes a complicated piece constructed with interlocking letters, also characterizes the development of experimental art forms, computer-controlled assemblages, and augmented, virtual reality tools. [8]

Evan Roth's *Graffiti Analysis* is one of several virtual graffiti applications that utilize motion and marker tracking, computer vision technology and programming to record and analyze graffiti art. The artists' gestures are captured, processed and used to generate projections and overlays that appear on the surfaces of structures in physical spaces. [Fig. 3] Here, complex graffiti vernacular is represented in the language of information analysis, offering a system for greater understanding of a highly coded form of creative expression. [9] This development is further explicated by "cybism," a term that describes a "system dynamics with a hybrid blending (cybridization) of the computational supplied virtual with the analog." [10] As defined and coined by artist-theorist Joseph Nechvatal, cybism is a "new sensibility emerging in art respecting the integration of certain aspects of science, technology and consciousness – a consciousness struggling to attend to the prevailing current spirit of our age." [11] Nechvatal claims that cybism can be used to characterize our understanding of where cultural space is developing today. His notion blends the virtual and augmented with the analog to be used as a theoretical basis for newly imagined realities that merge in cybism.

This development merely scratches the surface of what is possible with new and alternative media technologies and further expands the scope of experimental critical media theory. Performance and motion capture, blended reality, and wildstyle abstraction reflects an evolving knowledge culture (graffiti, breakdancing, b-boying) that employs verbal, written, artistic, or performative representations of media in the body. Doze Green's paintings translate complex metaphysical concepts that resonate with urban futurism, such as the "possible manipulation of energy and matter to create a timeless space." [12] Bodies in motion effortlessly translate into symbolic, linguistic and spatial formulations. The performative language of graffiti – windup, tilt, float and freeze – generates dance poses and letters that are manipulated into recognizable forms. Graffiti is represented in the language of information analysis. "King of Style" Kase 2 enabled a whole generation of artists to break from traditional forms into a more modern complex lettering system based on computer technology. Artists and writers who copied and amended each other's designs devised a variety of methods. Freelance hacker Josh Nimoy designed a Kase 2-inspired brush style for Graffiti Research Lab's L.A.S.E.R. tag system.

Futura (formerly Futura 2000) was one of the first graffiti artists to translate the wildstyle aesthetic into other art forms as a synthetic purification and intensification of certain ideas and visual elements. In the nineties he gravitated to the World Wide Web to create an archive of original work and to communicate with users on multi-dimensional levels. Cultural catalysts and practitioners have charted the development of modern graffiti, from the subway system to new media systems. Futura writes, "To keep in step with the fast pace of communication and information sharing ... what had started out as playing in subway tunnels had progressed into midnight forays deep in the interiors of the system." [13] Futura is describing the emergence of a "cybistic zeitgeist" that seeks to capture specific aspects of graffiti and street art in order to formulate new inscriptions and representations (layers) that can be built upon and worked with to expand creative expression and innovation, through the use of game and mobile technologies. The acquisition of this work is epistemically advantageous and can facilitate a broader understanding that extends to electronic art and emerging, experimental game technologies.

The Modern Museum of Art (MoMA) interviewed artist Lee Quinones who discusses the development of the graffiti artist's signature (tag). [14] Quinones demonstrates on paper RAMMELLZEE's complex process of abstracting letterforms and transforming them into systems that have influenced contemporary graffiti artists such as SEEN, TWIST, AMAZE, KETONE, JONONE and KATSU who have had their tags captured and saved as Graffiti Markup Language (GML) files, a digital standard used by *Graffiti Analysis* and other applications. *Tagged in Motion* synchronizes gestural movement with an augmented layer of laser graffiti tags. This augmented reality performance combines graffiti art and its virtual 3D representation. Equipped with a handheld augmented reality tool, artist DAIM sprays graffiti into empty space. Three motion-capture cameras record his position and the movements he executes with a virtual spray can. The resulting data is shown to him in real time through a pair of video glasses – as free-floating three-dimensional graffiti in space. [15] *TagDis* is an iPhone app that lets its users design graffiti and street art using Augmented Reality technology. [16] Players see their tags – and those of other players – in the real world. This development will continue to converge on emergent game platforms, some of which will continue to expand the potentiality of new media to solve real problems, map specialized art forms and bring together disparate communities that share an interest in these systems, whether found in code, museums, or on the street.

A case study for real world problem solving is the *Graffiti Grapher* application created by Rensselaer Polytechnic Institute (RPI). [17] Ethno-mathematician Ron Eglash and his computing team developed this web-based applet that uses graffiti artifacts and artistic practices as a means to engage learners in STEM (science, technology, engineering and math) concepts. *Culturally Situated Game-Based Learning* is an innovative planning project (launching in fall 2011) that merges successful and proven models of game-based learning with culturally situated digital media strategies to help bridge the gap in STEM learning among under-represented minority students and non-traditional learners. This will be achieved using *Graffiti Grapher* and other existing "culturally situated design tools" and applying them to existing virtual 3D and augmented reality toolkits created at the Georgia Institute of Technology's Experimental Game Lab and by the GVU Center's Augmented Environments Lab (AEL). [18]

Experimental, emergent game-related technologies are the next layer of development and require careful investigation. This presentation reveals resonances of a thriving knowledge culture on emerging, experimental game technologies. It is a multi-faceted attempt to position this production in a broader cultural, historical and theoretical purviews of which audiences that are familiar with certain aspects are already cognizant. This move ultimately aspires to inscribe, or even imagine a potential place for urban, street art in the next phase of conceptual and technological innovation to inform a more meaningful

critical theory of epistemic culture that is responsive to empiricism and constituted by models of recognition and reflection.

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BRINGING THE IMAGINARY BACK INTO PLAY

ALISON GAZZARD

The term 'ludic' can be linked to many aspects of play and games, but what does it mean to be playful? Using examples of various augmented reality game, this paper will examine the role of mimicry in play as a way of understanding the ubiquity of ludic interfaces in light of our real world explorations. It will also highlight the importance of exploration and discovery in how we perceive, perform and create spaces of playful interaction.

"*If there is one significant contribution of digital technology to gaming, it is to have reconciled competition and make-believe...*" (Ryan 2007)

The term 'ludic' can be linked to many aspects of play and games, but what does it mean to be playful and where and how does this play occur? It can be seen that instead of being fixed experiences, digital games instead act as platforms for various experiences. Mobile phones, in particular the rise of what are commonly described as 'smartphones', have allowed for an increase in 'app' culture. Games are available for free through the various app stores (such as the Android market place or Apple's 'App Store') or for reasonably small amounts of money. Although handheld gaming has been around for decades, most notably through the various incarnations of Nintendo's Gameboy system, the ease of downloads and increasing integration of games with mobile phone devices has allowed these games to reach greater audiences without the need for separate, dedicated hardware.

In terms of hardware, smartphones also contain other inbuilt systems such as gps receivers, digital compasses, gyrometers, cameras, data connections and so on, once again allowing the game experience to change in different ways. Writing about non-digital games in the 1950s Roger Caillois distinguishes between 'ludus' or what is often seen as purely ruled play and the act of exploration, discovery and the pleasure of 'paidia', the notion of "…wild, free-from improvisational play…" It is not to say that these categories remain as fixed, binary oppositions, but instead work as a sliding scale of playfulness across a range of game playing experiences. Alongside his categories of "ludus" and "paidia", Caillois (1958) distinguishes between "agon, alea, mimicry and ilinx", equating to competition, chance, make-believe and vertigo. Although it is possible to understand these categories in light of non-digital games, what happens when real and the virtual start to combine, as in the case of augmented reality gaming? The growth and development of augmented reality (AR) applications through both videogames and smartphones now allows for the player's real world landscape, whether that be indoors or outdoors, to be transformed at the touch of a button. AR technology combines the world viewed through the camera screen with a layer of fictional objects allowing this technology to enhance and create different acts of play.

As it stands, augmented reality currently offers two main modes of delivery, either through markers, or through using location. The game *ARBasketball* released on the iPhone is one such example of using a marker-based system. Although it is played on a portable phone device, the user is required to print out a marker from the creators website before they can start playing. The marker then transforms into a basketball hoop once positioned in front of the camera (with the *ARBasketball* application running). Here, both the paper marker and the resultant image on screen link together as props to create the fictional and imaginary world, the notion of "mimcry" as discussed by Caillois. Wherever the real life

marker based prop is moved to, so to is the fictional basketball hoop, bridging the gap between the two realities and creating a portable game experience.

As Kendall Walton (1990) notes, "Props are generators of fictional truths, things which, by virtue of their nature or existence, make propositions fictional". In discussing the scenario of children playing a game of make-believe where tree stumps in the forest turn into imaginary bears, Walton discusses the underlying agreement of all players that stumps are part of the imaginary fictional world. In this instance we can see the applications of augmented reality acting as a toolbox of props that can be used to create different play experiences. Instead of having to imagine the world of stumps as bears, it is now possible for the technology to turn this into a displayed (virtual) reality. Although props can be present in other digital games, augmented reality is allowing for a layering of a prop, transforming a real world space into an extended playground of possibilities. The recently released *Ball Invasion* iPad2 game is an example of this. The game relies on the difference in patterns within the real world space to layer an augmented gamespace over the top. In calibrating the application, players are then able to play various shooting games, bouncing virtual balls at different targets within different depth layers. The balls also interact with the surrounding real world landscape, animated to seemingly bounce off the walls of the real world space when the virtual targets are not hit. The world created is pure mimicry, an imaginary world created through the combination of technologies. In doing so this standard game of chance is combined with a space of imagination, a combination of categories seen to be 'forbidden' by Caillois, stating "simulation and chance are no more susceptible to mixing" (p. 73). This is true of any digital game, where the simulation is created by the technology as a platform for a different kind of playful experience as once imagined by Caillois. The same can be said of 'ilinx' or vertigo, and its forbidden relationship with competition and rules. The portable nature of the mobile phone combined with the locative aspects of augmented reality can see player's moving through periods of vertigo, spinning round playfully trying to find new fictional spaces to explore.

Applications such as *Layar* (an augmented reality browser) allow for the creation of these playful experiences, often recreating our childhood memories of fictional worlds, imaginary places and ideas surrounding new possibilities of play. Instead of relying on markers, *Layar* allows different augmented reality games to be played through using location-based data and the digital compass for direction. An example of this is the Layar titled *ScanvengAR Hunt*. Much the same as a normal treasure hunt, players have to find the objects displayed on screen as they explore the area around them. Objects are marked such as octopuses and swords, creating a world full of props for our imaginations. These props can be used as the starting point for new play experiences as the portable playground of the mobile screen extends the world around them. Although the props may remain the same, the location of play changes, creating new meanings and experiences. The game functions in much the same way as the real world experience but can be updated with every re-load of the application refreshing what objects are shown and where they may be found. The turbulence or 'ilinx' combined with the mimicry of play return to these games with these various layers. Player's can now stand up, spin around and furiously attempt to shot the virtual spaceships appearing on screen, found all around the player. However, this play can be competitive, both between players and by individual players competing with themselves, allowing for the categories of ilinx and competitive ruled play to emerge through the possibilities of the platform.

This is the key distinction of playful digital media; it is now possible for players to use these applications as platforms. Players can create their own play experiences through extended layers of their own imaginary and much of this play comes through the initial exploration of each application's use. Augmented reality, in particular, allows for an exploration of both the real and virtual world spaces to see what they can offer on each play. AR creates the possibility of two layers of fiction intertwined with the real world,

that of the virtual depicted fiction and the extra fiction created by the player's own imagination. Together these allow for various types of play experiences to evolve out of the props on offer within the interface and the simplistic nature of many of their designs allow for different types of game and play scenario to emerge. As has been briefly outlined above, the platform(s) of play are now accessed through the mobile interface, the "space of possibility" (Salen and Zimmerman 2004) continues to be opened up to players as they to seek to bring the imaginary back into play.

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LOCATING THE LOCAL/MAPPING THE NETWORK

ALISON GAZZARD

The project seeks to understand the changing landscape of local areas through location-based applications. The changing nature of the map is captured at different points in time as a way of analysing the ephemeral landscape of data depicting the opinions, locations and imagery left as digital memories or tokens by those within the area. The narrative of place is re-examined in light of this user-generated content.
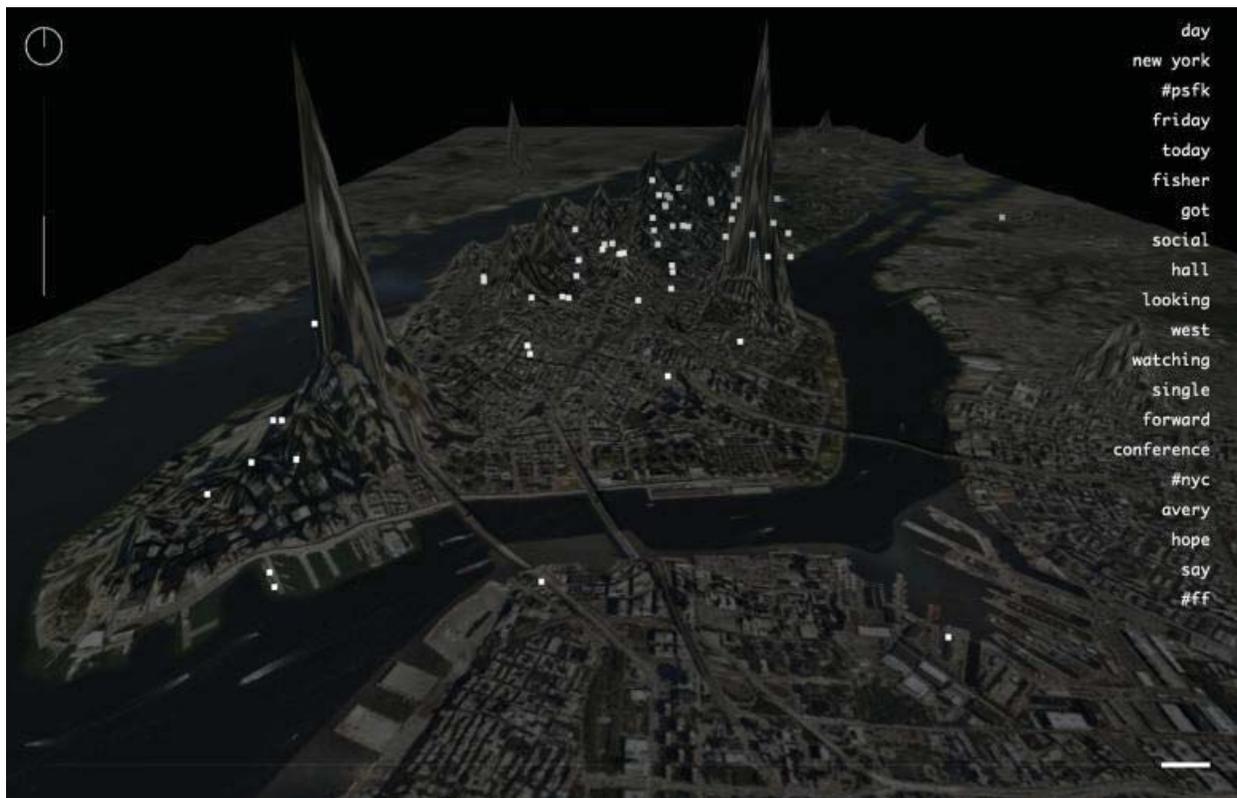
Figure 1. Invisible Cities data captured 13th May 2011. Copyright 2010-11 Christian Marc Schmidt & Liangjie Xia.
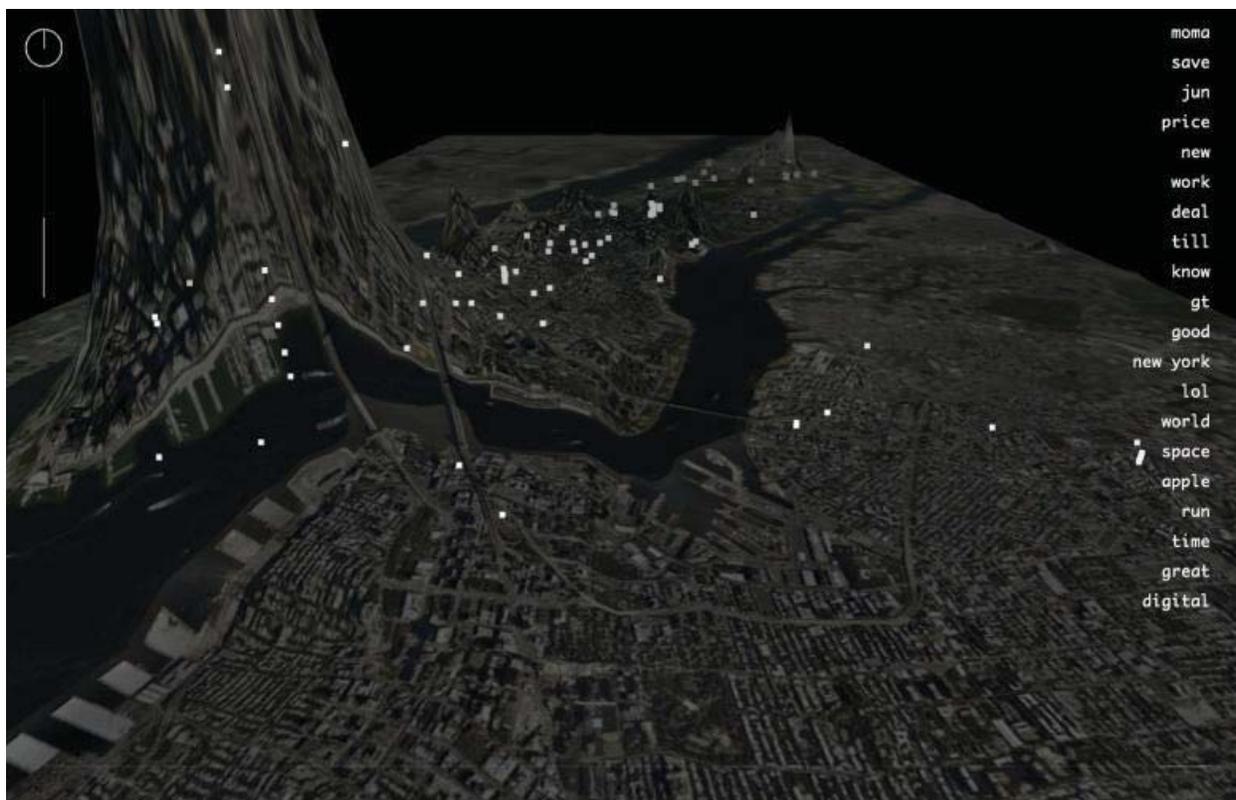
*Figure 2. Invisible Cities data captured 1st June 2011. Copyright 2010-11 Christian Marc Schmidt &
Liangjie Xia.*

"*Cities are comprised of complex social networks. In addition to the physical architecture these networks
define our experience of the urban environment.*" _Schmidt & Xia 2011

As many have written, to walk the streets of the city or town is now to walk the streets whilst being
connected. The ubiquity of the mobile phone, and the increasing use of smartphones in particular are
seemingly 'always on', connecting to data networks often combined with GPS and allowing for locations
to be tracked and defined. But what happens to this location data and how are users shaping various
landscapes through the use of geo-located information such as tweets, check-ins and embedded pho-
tography?

Eric Gordon writes of "n*etwork locality*" defined as "the experience of interacting with located data
within the perceived infinity of global access" (Gordon 2009, p. 22). It is through these networks that
we, as users, are frequently able to locate ourselves, our actions, our places and our thoughts through a
variety of media applications and technologies. The smartphone, alongside the ease and open access
nature of digital mapping systems such as Google Maps and Open Street Maps, has seen an increase in
how and when people now choose to locate their activities. Photographs can be geo-located, capturing
places frozen in time. We can check-in to virtual equivalents of shops, work buildings, or our own homes
with applications such as *FourSquare* and *Gowalla*. Each of these instances is only possible through an

underlying network of global connections. However, it is through this 'global access' that we are now also changing the mapped narrative of many local areas.

The map is more than a means of seeking directions, but allows for a visualisation of data in various formats. Each time people log in to *Foursquare*, *Gowalla* or *Facebook Places* they are locating themselves on a map, they are providing a representation as to the area they are in. Although users cannot see the extended map of data whilst using the application, various mash-ups have been created integrating different APIs with Google Maps as a way of visualising each check-in location in relation to one another. This project will focus on mapped data collected from areas local to the GPS co-ordinates of each data collection. *FourSquare* places, ephemeral geo-located tweets and geotagged photographs will be visualised against a background of a local map. Each area will be defined in terms of a community or town, and will be viewed as an isolated snapshot, depicted as a miniature mapped landscape in amongst the surrounding area.

The project seeks to understand the changing landscape of each local area by analysing what John Pickles (2004) defines as "socio-spatial identities" that he sees to be the basis of many contemporary maps as "digital mapping has begun to influence many more domains of social life" (p. 10). Whereas many location-based applications seek to define the user's position in amongst a global network, this project examines the changing narratives of the local area through numerous check-ins, tweets and images. The changing nature of the map is captured at different points in time as a way of analysing the ephemeral landscape of data depicting the opinions, locations and imagery left as digital memories or tokens by those within the area. The narrative of place takes precedence over the identity of the user as places and spaces are re-examined in light of this user-generated content. It is through looking at these maps that we can start to see how local areas are being shaped by this data.

One such project providing a representation of geo-located Twitter feeds and Twitter trending topics is Christian Marc Schmidt and Liangjie Xia's (2010) project titled *Invisible Cities*[1]. As stated on their website, "Invisible Cities maps information from one realm – online social networks – to another: an immersive, three-dimensional space. In doing so, the piece creates a parallel experience to the physical urban environment" (Schmidt 2010). On loading *Invisible Cities*, the user is presented with a three-dimensional mapping of New York. The underlying map is familiar to those having ever viewed the data from Google Maps or Google Earth, and landmarks such as the Hudson River are viewable as well as the various sections of the city including lower Manhattan and Central Park. Each real-time piece of geo-located data from *Twitter* and *Flickr*changes how the city is represented and viewed. Imaginary spiked hills are constructed, distorting the mapped view of the city, creating a new imaginary space of digital data. As the density of location data changes, so do areas around the city. One day the city may be viewed as in Figure 1, the next day the city is shaped as in Figure 2. This view of the city is now re-arranged through the new layer of location information. As de Souza e Silva states, the city has become a "hybrid space", a "mobile space, created by the constant movement of users who carry portable devices continuously connected to the Internet and to other users" (de Souze e Silva 2006, p. 263). As de Souza e Silva notes, hybrid spaces are not purely augmented spaces, and this is especially true of *Invisible Cities*. There are various layers and combinations of actions taking place in order to create the piece. There is the layer of data provided by users geo-locating the information in the New York area. There is the two-dimensional mapped layer showing areas familiar to both locals and those having viewed New York on various maps and satellite views. Then there is the layer of the map and the data combined to form the resultant viewpoint, manipulating the local view in real time to provide yet another perspective. An augmentation would see these spaces as separate, leaving the map in tact and adding an extra layer of data on top. However, in this instance the map becomes a hybrid of user and place shaping the city and creating

rhythms of movement over a period of time. The user cannot see these distortions as they themselves walk the city streets, but it is through their actions that others can view the landscape in a different way. Here the narrative of the city exists in peaks and flows through the changing visualisation. As Christian Marc Schmidt and Liangjie Xia (2011) note in discussing *Invisible Cities*, the work depicts a "new kind of geography in which the urban landscape is reframed through narrative (a sequence of events in space and time)." Maps are no longer static and fixed. The growing trend of geo-location constantly seeks to change the map creating temporal-spatial narratives that change depending on the moment they are viewed. It is these narratives of place that I wish to explore further through mash-ups such as *Fourwhere*.

 In examining my local area I can access *Foursquare* check-ins of nearby shops, takeaways and conveniences as well as view the tweets of strangers around me. These views differ to my own relationship with the area, the shops that I visit frequently in person, the people I may or may not see. A five minute walk from my home there is a parade of shops. They exist in a line, one next to the other. However, the view on *Fourwhere* is quite different. *Fourwhere* is a mash-up of *Foursquare* data plotted on Google Maps. You can search any area and find foursquare locations that are mapped around that immediate area. As with any Google Map you can zoom in and out to make the search area broad or narrow, but the application generally works more effectively on a local level. When zooming into the street by street level of my local area I am able to locate the shops. Not every shop is added on Foursquare therefore only shows a snapshot of what local people and businesses decide are relevant to the area. Much like Invisible Cities, Fourwhere provides a layer into the geo-located world of users in the local vicinity. The density of shops in the local area have not been replicated within *Foursquare*. Instead, only a handful of shops are displayed when trying to check-in on the application. Most notable are the supermarkets and takeaways that appear, potentially hoping for users to get 'specials' (such as discounts for the mayor, etc). Smaller stores such as the optometrists and travel agent are not found as check-ins (as of the 19th May 2011). This may be due to the fact that these two stores take up the same amount of street space as one full sized store, and/or are less frequented by users of the application.

 This is where the user becomes noticeable within the mapping of data. It is only through companies or individuals adding themselves to the *Foursquare* database that they then appear as check-ins. If local users/businesses do not feel the need to create these places they are then left off the mapped database. In terms of viewing the spatiality of the *Fourwhere* map, these places no longer exist within the layer of my locality. Certain places take preference within this new map of my area. The map can be added to and grow over time as more check-ins are established but it acts as a separate representation, a local area frequented by those connecting online. This layer of check-ins can change the identity of the area when viewed against other representations of the local area. Place names can be misspelt, such as one local bakery being named a 'balery' (as shown in Figure 3). This adds a layer of almost fiction to the area. The misspelling changes the place into something new that only exists within the layer of the geo-located machine data. I can access the 'balery' online but in real life if will be known by its correct name. It is through the creation of the user's own places that there are multiple 'homes' in my local area. Places are created and called 'home', yet this is a place name that only means something to the creator. They are not my home (although I can virtually visit and check-in to it) and one of the homes is not the same as the other home created by another user. The geo-located network allows for multiple identities and in doing so the layer also allows for multiple entries creating numerous overlappings of different (or sometimes even the same) real life places. It is through this ability to create places that we can also see the opposite trend occurring in local areas. Although places have networked access and data streams, it does not mean that it will be inundated with Foursquare check-ins and geo-located twitter feeds.

As de Souza e Silva (2006) writes, it is "not possible to define a worldwide cell phone culture, because cell phone use differs substantially from place to place depending on cultural and socioeconomic factors." Therefore, some places end up existing free from this layer of digital locative urban commentary. On a recent trip to the Sierra Nevada mountains in Spain I found limited foursquare check-ins. I stayed in the town of Bérchules with access to a free wi-fi network in the apartment and generally good access to a mobile phone data connection. However, the people of Bérchules (even though they are connected, and some have smartphone access) choose not to check-in to their daily activities. Location is based around adding hotels and bars that tourists may want to visit on their travels. Location is also very much often limited to whole places rather than separating those places into various shops, cafes, etc. When logging in to *Fousquare*, the town itself was a place and existed as one mapped area (until I decided to add the place I was staying in). In many ways the layer of check-ins within this vicinity switches to a purely tourist view of the area and everyday usage fades away. Yi Fu Tuan's notion of "place" becomes "space" as the familiarity of these locations is not always known in detail to passers-by. Tuan notes that "when space feels thoroughly familiar to us, it has become place" (1977 p. 73). Therefore, tourists may not frequent the local shops on a daily basis, and the locals that do, do not see the need to leave a digital trace of their everyday occurrences. People passing through may often leave their own mark such as the restaurants or hotels they have been to in amongst the places they visit, but these now exist as mementos of an experience, rather than a constantly viewed place linked to everyday life within that space. There is no need for every building to be 'placed' and instead the whole village becomes placed in amongst the wider area, not succumbing to the finer detail of dozens of check-ins within the local vicinity.

Unlike the hustle and bustle of a large city such as New York, this absence of geo-located data reveals a slower pace of life, as the rhythms of the city are found within the quotidian streets and not through mash-ups of location-based data. The layer of location within the local area does not change as frequently, producing a different type of spatial-temporal narrative played out in a new way. As this project has shown, geo-location is more than locating objects, tweets and places. It is a way of creating various layers of information about an area. Mash-ups, maps and applications all reveal piece of a place, sometimes joining to show the ever-changing nature of how that place is experienced. Yet for those only able to experience the digitally mapped representation, this data offers a window into a partial place, revealed only to/by those choosing to leave their mark and create another layer to be viewed by others accessing the network.

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MATERIAL MATTERS: MACHINE AGENCY AND PERFORMATIVITY

Petra Gemeinboeck & Rob Saunders

This paper explores new forms of entanglement between human and nonhuman agents. In considering the performative potential of intelligent machine agents, we are interested in shifting the focus from representational issues to questions of agency and materiality. The investigation revolves around the authors' robotic installation "Zwischenräume".

Fig.1. Zwischenräume, robotic installation, robococo (Petra Gemeinboeck & Rob Saunders) © robococo
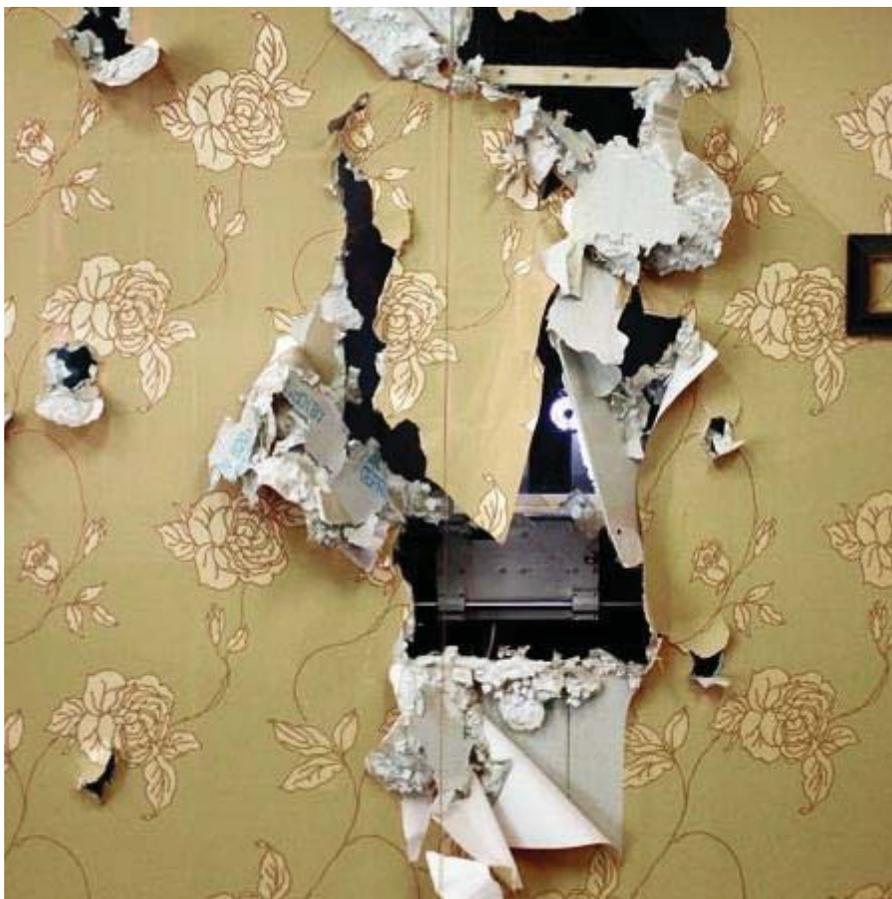
Fig. 2. Zwischenräume, robococo: two weeks into the exhibition © robococo

In early Artificial Intelligence approaches, robots sensed their environment, built complete internal models using the sensed data, constructed plans based on those models, and acted to execute their plans. Even though they acted in the world, the world they 'conceived' and acted upon was a separate, disembodied reality. Contemporary approaches, in contrast, aim for intelligence that emerges from interacting with the world, thus emphasizing situatedness and embodiment (Brooks 1991, Harvey 2000). The agencies performed by these 'intelligent' machines evolve based on the dynamics of their material context. It is only when robotic agents are coupled with an environment, that, according to Beers, their potential to act is realized through the agent's behaviour in that environment (1995). This is a starting point for considering ecologies that entangle human and nonhuman agents through embodied experience of a shared environment. From a posthuman point of view, embodiment is always contextual and specific; agency is materially enacted and distributed across bodies, rather than located within (see Hayles 1999, Barad 2003, Bennett 2010). Without disregarding their differences, both human and nonhuman agents adapt and know not by observing from the outside, but because they act as part of the world (Barad 2003).

This paper explores new forms of entanglement between agents, human and nonhuman, and probes into their performative potential. Our investigation seeks to set up a conversation between disciplines by looking at the potential of machine agency through the lens of materialist performativity. The notion of the performative here refers to the productive and, at the same time, destabilizing enactment of agency as agents engage with their environment. In considering the performative potential of intelligent

machine agents, we are interested in shifting the focus from representational issues to questions of agency and materiality. First, we will discuss embodiment and agency as they are applied in the Dynamical Systems approach to robotics and conceptualized in feminist materialism. The investigation of how, together, these two can open up a third lens through which to look at the performative potential of machine agency will revolve around the authors' interdisciplinary robotic practice and their work Zwischenräume: a machine-augmented performance environment, which embeds a group of autonomous robots into the architectural fabric of our environment.

The Dynamical Systems view of agency is based on the observation that "animals are endowed with nervous systems whose dynamics are such that, when coupled with the dynamics of their bodies and environments, these animals can engage in the patterns of behavior necessary for their survival" (Beer & Gallagher 1992). Artificial Intelligence inspired by this view degrades intelligence "in favour of the concept of adaptive behaviour" (Harvey 2000). The lived phenomenal experience of knowing-how outplays the information processing of knowing-that. "Treating an agent —creature, human or robot —as a dynamical system coupled with its environment through sensors and motors, inputs and outputs, leads to a metaphor of agents being perturbed in their dynamics through this coupling". This contrasts the traditional AI approach, according to which agents are "computing appropriate outputs from their inputs" (Harvey 2000). The metaphor resonates with Varela's co-evolution between a system and its environment or another system: both evolve through mutual perturbations, setting off a trajectory of mutual adaptations to compensate for the external perturbances. The two structurally coupled systems "have an interlocked history of structural transformations, selecting each other's trajectories" (Varela, 1979).

As a general formalism the Dynamical Systems' perspective can be applied to computational systems as well as non-cognitive and non-computational physical systems. Its potential to straddle the Cartesian boundaries between mind, body, and the environment (Clark 1998) opens up a path into thinking across human and nonhuman agential capacities.

Looked at from a posthumanist point of view, embodiment "always is contextual, enmeshed within the specifics of place, time, physiology and culture, which together compose enactment" (Hayles 1999). It aligns with Varela's biologist view, where experience comes from having a body that always is embedded in an extensive biological, psychological and cultural context (Varela et al: 1991). Agency is a product of this process of enactment, or 'enaction', rather than a 'virtue' that can be possessed or programmed. In Karen Barad's performative account, agency is "a matter of intra-acting; it is an enactment, not something that someone or some thing has" (2003). The becoming of agencies and bodies (matter) is mutually entangled—agency is enacted through the dynamic encounter of bodies, while, at the same time, bodies are produced and transformed in this "congealing of agency" (Barad 2003). Similar to the Dynamical Systems view, these material enactments may involve humans or nonhumans, however the materialist feminist perspective challenges not only Cartesian objectivity but unsettles a range of ontological boundaries, deeply ingrained in the Cartesian tradition of modern epistemology, such as human–nonhuman, culture–nature and social–scientific.

"The separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse. Onto-epistem-ology – the study of practices of knowing in being – is probably a better way to think about the kind of understandings that are needed to come to terms with how specific intra-actions matter" (Barad 2003).

Our installation work Zwischenräume (Interstitial Spaces) is concerned with the intimate complicities that connect us with the machinic ecologies we create. It develops an unusual concoction of walls, curious robotic agents and surveillance technology to explore the performative potential of the unfolding material pluralogue. The charged terrain of the wall becomes the site for this unusual material encounter, playing out the co-dependant agential relationship between humans, machines and their environment. The installation couples curious robotic agents with our built environment by embedding robots into the architectural skin, sandwiched between the existing wall and a temporary wall that resembles it. Each machine agent is equipped with a motorised hammer, a surveillance camera, and a microphone to interact with its environment and network with the other machines. The hammer is not only used by the robots to pierce holes for the camera eye to see what's going on outside but also for communicating amongst the collective. The walls' and the machines' anatomy intertwine, turning the wall into the machine's brittle skin, and the machine into the wall's kinetic organs. The wall-body is the milieu through which the machines intervene and develop and express their desires through knocking, chipping, and punching holes, and adapting.

The machine-augmented environment embodies the agents in the terrain they survey; they are programmed to be curious and are thus intrinsically motivated to explore and transform their environment. The means of marking and exploring have been adopted from two military references, that of urban combat and visual intelligence. Movements, colours and faces are processed to create an adaptive model of the surrounds that allows the robotic agents to expect learned behaviours and proactively intervene. To these curious machines, learning and adapting are not goal driven but evolve based on what they discover and interpret as 'interesting'. The intrinsic desire to learn about the world directs both the system's gaze and its actions, resulting in a feedback process that increases the complexity of the environment relative to the perceptual abilities of the agent. Literally carving a trace of their curiosity into the wall, their desire to look is acted out in the open and manifests materially. They also communicate their state of arousal physically by re-sculpting their environment, rather than using an electronic network. Equipped with contact microphones to listen into the wall and sense the knocking of other robots, they use different knocking signals to rhythmically express excitement (high levels of sustained interest) or frustration (low levels of interest for a certain period of time). The embodied agents act and adapt through their intra-actions with their surrounds; shaping what they 'desire' to create or perform. At the same time, they become and are stimulated by what they shape.

When shown for the first time (figure 1 and 2), the gallery space was bound by glass walls, requiring us to not only stage the intervention but also the environment to be intervened with. The transparent space was turned inside out to present a private, cosy, living room scene oriented towards the public space outside the gallery. The machinery attached to the temporary walls inside the gallery transformed the living room scene into a capricious voyeur that drastically transformed the space over the course of three weeks. While the implicit theme of surveillance and voyeurism is not the focus of this paper, it is worth noting that the enactment and embodiment of the power of the machinic gaze was at the heart of Zwischenräume's conceptual development. Yet while the voyeurism enacted by Zwischenräume's robotic actors relies on visual intelligence, the work defies military logic of suspicious behaviour and rather promotes the machines' capability to seek difference for the sake of being different (Gemeinboeck & Saunders 2011). The machines' motivation to seek difference for the sake of difference, rather than for the purpose of othering that which is different, sets the tone for an alternative investigation into the politics of surveillance and its material affect. It isn't as simple as incriminating or trivialising the machine. The mingling of agencies and materialities in our installation and the way in which the audience is implicitly implicated, rather than invited to control the course of events, intimates the heterogeneous nature of surveillance. Thus, it is not the spectacle of the intervening machinery that we are interested

in, but rather the spectacle of the mutual processes this intervention unfolds as it foregrounds the material ecology of this machine augmented environment and its ongoing becoming.

The structural coupling of machinic agents and our built environment politicizes the matter of material agency and aims to foreground the performative potential of Dynamical Systems. Looked at from an expanded, ecological perspective, the work enacts what Jane Bennett describes as "an encounter between ontologically diverse agents, some human, some not, though all are thoroughly material" (2010). Zwischenräume's drama features the encounter of two nonhuman agents, both human-made artefacts, one imbued with (artificial) intelligence and an ability to be proactive and the other designed to be inert and deprived of any vital qualities. We were interested in the co-dependent nature of this assemblage of forces, and the affective relationship through which it evolves. The structural coupling of machine and environment sets in motion their path of material becoming; both evolve through continual adaptations to compensate for the mutual perturbations. The process opens up the transversality of assemblages that owe their agential forces to the vitality of the materialities and dynamic spatio-temporal relations that constitute them (Bennett 2010). It's a performance that always unfolds in the present, without the comfort of rehearsal. Rather, as Matthew Fuller argues, "the process of becoming that is machinic heterogenesis has no plot, as in story or territory, only a "middle," an ongoingness: It cannot be turned into a standard object, it must be done" (2005).

The new assemblage not only challenges the structural integrity of the wall but also intervenes into the socio-politics of our third skin, laying open its vulnerabilities to continuous perforation. While perhaps the machine-wall couple seems purely destructive at first, together they unsettle the politics of the wall and turn it into a negotiable playground. Looked at as actors, they have much in common: both are as much technological as they are cultural; each models nature. The dynamical system underlying the first is inspired by the observation of the animal, while the latter renders the cave efficient, mobile, and mass producible. Both are ambiguous with regards to their acting: the machine empowers some and deprives others; the wall includes some and excludes others. Both extend the human: the machine is an extension of both, mind and body, while the wall is our extended skin. And yet, the dynamic agential forces of the machine are much closer to the human. We are more empathetic to, and at the same time, threatened by them. We (Westerners) cannot perceive the vital qualities of the wall, whereas the embedded machines can render it alive. The performativity of the machinic wall is further complicated by the machines' autonomy; the self-motivated act of destructing the wall, the self-motivated act of looking. This is where it gets uncanny. It's ok if the machines act on our behalf, and we control the machine that deconstructs the wall or if human governance drives the machine's eye. Yet intrinsically motivated agents exhibit a higher degree of autonomy than agents motivated by an external human agent. The meaning of agency changes drastically, once the human actor can no longer control the human-machine-environment coupling. The discomfort of this shift, of course, reaffirms the segregation and hierarchisation of these actors. Neither the machines nor the wall exist outside the realm of human culture, and the autonomy of the machine is simply stretching its capacity to extend the human further: its intrinsic motivation, even if artificial and perhaps alien, is still modeled by a human agent, as is the design of its material embodiment.

This stretching quality was exactly what we aimed for with Zwischenräume, allowing us to stretch into the environment, to intra-act, not as the isolated and superior human but as part of a bigger assemblage. Coupling autonomously performing agents with our built environment opens up a space for Barad's 'congealing of agency' (2003) where the different agential forces not only co-evolve but potentially conspire and perform together. All actors involved are vital players, entangled in a complicated

web of connections and specificities. While non-anthropomorphic, the material embodiment of the machines' cognitive processes and desires places them in a realm, where we (humans) can share and bodily experience them. The unfolding relationship between audience, machines and other matter, materialises a slice of our machinic ecology and makes tangible our position within.

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DIGITAL ETHOS: TRANSFORMATIONS IN CONTEMPORARY PHOTOGRAPHY AESTHETICS SUBSEQUENT TO COMPUTATIONAL ART

MURAT GERMEN

Digital photography allows artists to think in a more daring and free way. This freedom influences the content, visual aesthetics of artworks in contemporary photography, which is influenced extensively by digital creativity. This paper will focus on the significance of digital technologies in changing aesthetics, planning, vision, fiction, realization of photography and avant-garde photography forms nourished by digital culture

Fig 1. ©Murat Germen, Muta-morphosis #3, Cairo, 2010.

Fig 2. ©Murat Germen, Muta-morphosis #79, Istanbul, 2011.

Fig 3. ©Murat Germen, Muta-morphosis #20, Istanbul, 2010.

INTRODUCTION

Photography is one of the creative fields at which technological advances influence artistic expression the most. The ease of manipulation brought by software and extra features available in cameras made artists using photography reconsider their visions, themes, narration, syntax and ways of sharing their artwork. Sharing sites like Flickr, which expedite encounters of various individuals from different cultures, help in changing the perception of the much vital notion of time and enable artists to get faster feedback, revelation, exposure and layering of information to be conveyed.

While some photographers, who are deeply obsessed with analog processes, deny digital technology; it is quite obvious that artists, who are aware of the complexity and particular advantages that this technology brings, indeed end up with a novel aesthetics of photography. In addition to the regular montage and collage methods remaining from the old analog days, digital imaging techniques allow artists to work with notions like augmented perception, chronophotography, surrealism, pictorialism, superimposition, simplification, creation of new worlds, appropriation...

AUGMENTED PERCEPTION

"Without perception there is no art. A work of art is an organized array of sensory stimuli if, therefore, the senses are not stimulated, then the true work of art does not exist for the observer." (Wise 19) Though there are studies on exceeding human sensory capabilities, our visual perception still takes 'what the eyes see' as the basis of apprehension. In this case, artists who intend to go beyond what one can see with the naked eye, take advantage of software. These digital means enable artists to assemble and convey information in a holistic manner that is otherwise not possible to record in a single photographical documentation act. The resulting totality leads to a particular aesthetic form which turns out to be the synthesis of individual forms, in other words a 'sui generis' situation. One can interpret this as a cubist approach.

If we consider the present digital platforms we use, various tools of social media on the other hand; "literacy, TV, computer games, the Internet—all play a role in shaping how we think. Technology is never innocent—we develop it and use it, and in turn it shapes us. [...] Technology allows one to have experiences far beyond what are supported by the normal human physiology. Sternberg and Preiss examine the implications of technology on cognition. When technology is broadly conceptualized as 'the building of artifacts or procedures-tools-to help people accomplish their goals,' then the influence of technology on human development is as old as humanity. [...] At the very least, it is becoming increasingly obvious that technology is altering mental functions (Sternberg & Preiss, 2005)." (Gackenbach 346)

This alteration takes us to the notion of cyberception which is, after Roy Ascott, "the emergent human faculty of technologically augmented cognition and perception." Cyberception carries the potential of laying a firm basis for the development of higher states of consciousness, i.e. augmented perception. This is why the congruence between computational and human behavior appeals to the artist and helps in augmenting his/her intuitive gift to generate aesthetic form. Andreas Gursky, one of the leading photographers of the much respected Düsseldorf photography school of Bernd & Hilla Becher, Chris Jordan of USA and French photographer Jean-François Rauzier take advantage of digital imaging and post-processing in order to take his work to a level that cannot be realized otherwise.

PICTORIALIST TENDENCIES

There is a never-ending relationship between photography and painting. When photography was invented, it took painting's function of recording history and was more trusted as a documentary tool since it witnessed experiences more realistically than paintings, which are actually constructs from scratch. Later photography proved its independence and stopped being seen as pure evidence. This is when it found the opportunity to act like painting and be taken as an apparatus of fiction. This new relationship gave birth to 'pictorial' photos that emulated optical qualities of paintings, which in turn paved the path to hyper-realistic paintings that are easily mistaken for photos.

If we look at the early stages of this relationship; "by the last quarter of the 19th century, photographers around the world had supplied ample proof of the camera's unique ability to record people and places. At the same time, there were others who were taking pictures for a different purpose. Convinced that the camera could be used to go beyond simply recording what was in front of the lens, these photographers, both amateur and professional, were determined to produce images of artistic merit. [...] Their aim was to convince art critics, other photographers, and the general public that photography should be regarded as a legitimate form of art. [...] At the time, people regarded the world's great paintings as the highest form of visual art. It was only natural that artistic photographers began by trying to produce the same kinds of images as those created by the greatest artists. They chose the same types of themes, settings, and compositions. Like painters, they emphasized the contrasts between dark and light tones (called chiaroscuro). [...] Perhaps the most distinguishing characteristic of this early artistic movement was the way in which many photographers manipulated their images." (Sandler 57) Henry Peach Robinson's book 'Pictorial Effect in Photography,' published in 1869; referred to this movement, influenced by the 'photography-as-art' approach, as pictorialism.

The intimate connection between painting and photography is still so strong that many contemporary photographers like Helena Blomqvist (Swedish), Désirée Dolron, Jasper de Beijer (Dutch), Christian Noirfalise (Belgian), Yao Lu, Lu Jun (Chinese), Nazif Topçuoğlu (Turkish), Alessandro Bavari (Italian) are taking advantage of the digital imaging technologies in order to create photos that resemble paintings. "Peter Bunnell, in his work titled 'A Photographic Vision: Pictorial Photography 1889-1923' (1980), associates the antiphotographic art photography known as 'pictorialism' with a reaction against 'the dehumanizing effects of science and applied technology.' Pictorialism, he adds, placed 'its greatest emphasis on the individuality of the artist as witnessed in the work of art and idiosyncrasies of its production.' " (Sternberger 37)

PALIMPSEST-LIKE SUPERIMPOSITION: LAYERING TRANSPARENCIES

A palimpsest (Greek "palin," again; "psëstos," scraped) is a re-used papyrus or parchment manuscript in which the original text has been washed or scraped off and a new one substituted. The modern version of this archaic surface of knowledge which allows accumulation of information is the Photoshop canvas, where you can completely cover a layer behind yet still make some details emerge from beneath. This possibility of layering various data from different sources one on plane is a more complex form of the good old analog collaging & montaging methods and enables artists to reach a richer expression through superimposed pluralities.

German artists Elger Esser, Kay Kaul and Michael Najjar, Turkish artists Murat Durusoy and Zeynep Kayan are among numerous photographers who benefit from superimposition, in which various images become interwoven into a reassembled complex fictive entity as a collage that brings memories and places together in one plane.

INCLUSION OF TIME AS A NARRATIVE TOOL

Period(s) included in single photographs are usually and naturally much shorter than periods documented in video works. Yet, when it comes to combining photos taken at different times on one photographical surface, it becomes possible to see remnants of longer periods of time. Performing time lapse photography and compositing images as a durational pattern of many traces left by different moments,

lead to the positive notion of timelessness (lack of time dependence) due to the plural presences of time at once. Substance becomes multi-layered and hierarchy disappears: All elements are relatively equal parts to the whole.

An accumulated photographical rendering of one place with various lights, movements, figures, facets, objects and subjects coming from discrete slices of time, allows a richer visual definition of the particular milieu that can be a more faithful description of the observer's personal experiences. The resulting images after such accumulations are usually visual experiences impossible to the naked eye.

Ahmet Elhan of Turkey, Pablo Zuleta Zahr of Chile and Thomas Weinberger of Germany are some artists who manipulate the perception of time by incorporating distinct phases of moments purposefully selected from the chronological continuum.

SIMPLIFICATION AS AN ELUCIDATION TOOL

Even though the presence of the traces from different times can help artists to improve their expression, it is also possible to take a completely opposite direction and take information out from a single layer of time. This subtractive approach limits duration to an even smaller fraction of time, to the degree it does not exist. The lack of detail is not meant to hide information from the audience, but rather to enlighten artistic expression and make viewers focus on a particular content more easily. Following Mies van Der Rohe's famous quote; "[sometimes] less is more..."

Above mentioned simplification can be obtained by erasing the signs of specificity and turning it into anonymity, potentially pointing to the banality of our homogenized environments. An alternative way is to remove the traces of typical presence in order to create a disturbing sense of absence where existence and attendance are normally expected. These exclusions of native details from recorded reality that may lead to floating components that are isolated from their contexts, challenges our view of the reliability of photography and our concept of the space represented by it. Jesper Rasmussen (Danish), Josef Schulz (German), Matt Siber (American) are artists who use simplification in order to clarify what they want to convey through their photographs.

THE ANTI-REAL: SURREALISM IN PHOTOGRAPHY

Photography for some, is reflection of reality. Yet, the illusion of a single reality, is criticized by W. Flusser: "The [observer] trusts [technical images] as he trusts his own eyes. If he criticizes them at all, he does so not as a critique of image, but as a critique of vision; his critique is not concerned with their production, but with the world 'as seen through' them. Such a lack of critical attitude towards technical images is dangerous in a situation where these images are about to displace texts. [It] is dangerous because the 'objectivity' of the technical image is a delusion. They are, in truth, images, and as such, they are symbolical..." (Flusser 2000) Some artists take this critical attitude to an extreme to defy Reality and create a new synthetic reality.

Quoting the Wikipedia definition, "surrealist works feature the element of surprise, unexpected juxtapositions. [...] Surrealism would advocate the idea that ordinary and depictive expressions are vital and important, but that the sense of their arrangement must be open to the full range of imagination. [...]

Freud's work with free association, dream analysis and the hidden unconscious was of the utmost importance to the Surrealists in developing methods to liberate imagination." Artists using digital techniques to take photography from realism to surrealism, aim to free people from false rationality, restrictive customs / structures and prejudice.

Ryuta Amae (Japanese), Michael Najjar, Loretta Lux (German), AES+F (Russian), Anthony Goicolea (American), Ruud van Empel (Dutch) are among artists who produce startling, otherworldly surreal images which involve composite elements culled from different settings, figures, cultures, individuals and combine them into new topographies, characters and scenarios.

APPROPRIATION

The complex notion of appropriation is straightforwardly defined by Mikhail Bakhtin: "The word in language is half someone else's. It becomes one's own only when the speaker populates it with his own intention, his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention. Prior to this moment of appropriation, the word does not exist in a neutral and impersonal language, but rather exists in other people's mouths, in other people's contexts, serving other people's intentions: it is from there that one must take the word, and make it one's own." (Bakhtin 1981:294)

Art is such a field that one can easily borrow an idea, artwork, approach and use it/them in his/her work, with the condition of quoting the reference in ideal conditions. Very famous works like "Las Meninas" by Diego Velázquez have been reinterpreted in the form of "hommage à …" by very famous artists like Pablo Picasso and Joel Peter Witkin. In photography, people like Thomas Ruff buy the copyrights of old photos taken by another photographer and retouch them in Photoshop, color them partially and finally transform them into their own artworks. In a recent series called 'JPEGs' (2004-9) Ruff uses readymade JPEGs by exploiting the lossy compression of visual data into spoiled artifacts. Ruff blows low quality low-res files up in order to reveal how much information is lost already before images are served to people and become iconic in world history. These images, blurred due to extreme up-scaling, are somewhere between legibility - illegibility and point to the skepticism that people should adopt against images that are supposed to convey actualities of world news.

CONCLUSION: CREATION OF A NEW WORLD

Mark Kingwell asserts that "photographs are not multiple depictions of some single reality, waiting out there to be cornered and cropped, and somehow regulating, even in the cornering and cropping, how / what the image means. Rather, photographs offer multiple meanings. The presented image is not a reflection, or even an interpretation, of singular reality. It is, instead, the creation of a world." (Kingwell 2006)

Truth with the capital T is not taken as the departure point in this paper; on the contrary, personal delineations of temporary yet experienced smaller realities is suggested. Digital tools available for photography allow the artists in the field to think in a more daring and free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Photography is probably one of the visual art platforms that is influenced the most

by digital production and creativity. Fortunately, it seems it will continue to be so in the future and digital means will strengthen photography's position in the art world as one of the most progressive expression platforms.

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DIGITAL PHOTOGRAPHY: EXPANDED CREATIVITY AND TECHNOLOGY

Murat Germen

Digital tools available for photography allow artists to think in a more daring, free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Digital means/processes are already and will in the future, strengthen photography's position in the art scene as one of the most progressive artistic expression and visual language platforms.

Photography is one of the creative fields in which technological advances influence artistic expression the most. The ease of manipulation brought by software and extra features available in cameras made artists (using photography as an articulation tool) reconsider their visions, themes, narration, syntax and ways of sharing their artwork. Sharing sites like Flickr, which expedite encounters of various individuals from different cultures, help in changing the perception of the vital notion of time and enable artists to get faster feedback.

Digital tools allow photographically based artists to think in a more daring and free way. In addition to the regular montage and collage methods remaining from the analog days, digital imaging techniques allow artists to work with notions of augmented perception, chronophotography, subreal encounters, pictorialism, palimpsest-like superimposition, interlacing, simplification / minimization, creation of new worlds, delusion, synthetic realism / artificiality, appropriation.

Following textual content are excerpts from the concept statements of various artwork series in which computational procedures were essential in their creation.

Aesthetics of serendipity: Muta-morphosis

The different traces left by various people and slices of time co-exist as layers in cities that have a particular past. The global trends and economical conditions strain this multi-layered traditional urban structure. An architecture with a language that cannot be considered as local anymore but universal, attacks the old texture of cities during the urban growth. This intervention usually implemented through gentrification supported by big capital, causes the urban tissue and its components to face mutation and even

beyond this, undergo metamorphosis. Following this interaction and consecutive natural selection, some constituents disappear and some survive after being transformed.

The concept of "muta-morphosis", a combination of the notions of mutation and metamorphosis, and the connected artwork series was obtained by reducing panoramic images on one axis. The image compression on the horizontal level points to the dynamics between the urban components that can persist and the ones that give up, vanish in the various historical, residential and business urban districts. The visual urban result obtained after this contraction process points to the much discussed notion of evolution, where stronger components of existence survive the others after a natural selection process and change the course of life. The lack of a single perspectival structure due to multiplicity of perspectives after panoramic imaging, can be linked to Ottoman miniatures, which in turn, connects the global contemporary representation to its local traditional counterpart.

Contemporary aesthetics is a subject under construction due to the rich variety of fresh expressive means supported by the computational creativity, nourished by artistic spontaneity and improvisation. The series 'Muta-morphosis' could only be created within the digital realm, and it indirectly points to the mutation and metamorphosis in aesthetics in general.

Photography as a tool of Alienation: 'Aura' series

Regular photographical imaging record volumetric planes with smooth surfaces. The reason is the camera's deficiency in perceiving and documenting the visual richness of "persuasive" details in life. HDR imaging methods used in creating this artwork series titled "Aura" helped making invisible organism-like textures emerge and point to the notions of decay and symbiosis.

The 'Aura' series consists of photo-composites obtained with the combination of Photoshop and Photomatix Pro in order to perform HDR imaging. Four or more photos from the same angle are used for each of the plates from the series. All multiple-photo groups, recorded inanimate objects still, yet animate subjects in different positions / movements due to passage of time and slow shutter speeds. Superimposition of four photos resulted with the particular aesthetics of the constant appearance of immobile objects and the dynamic intricacy as a consequence of layered mobile subjects. The aim in multiplying the photographical renderings of these mobile subjects, is to reach a similar complicated result to the above mentioned notion of merging reflective analogue visual data with its reflexive digital one.

This series of artworks, focusing on the difference between the intrinsic soul and extrinsic perception subsidiary to conditions; was created in galleries, museums and market places in Paris, Bologna, Hong Kong, London and Istanbul in year 2009. The work is conceived as a reminder and critique of the ever-present but recently much-peaked "market economy" climate and approach, concealed with various awareness arguments in artists' statements. In the presence of commercial art milieu, it seems there has not remained much difference between art venues and shopping malls. Aura series can be taken as a study created after the desire of having artworks independent of peripheral conditions and gaining their inherent value...

Inadvertent Art - Ars Accidentalis

Even though art is the product of an intentional act of fabrication, the serendipitous spill of an ink or paint, the unforeseen slip of a pen or brush, sudden shake of a camera in the analog realm have the potential of generating an unconscious lead in the planned course of action. The consequential shift in direction may completely change the aesthetics and content of an artwork. An artist should always be open to such 'accidental' dimension which will help him / her to take the original idea out of its initial framework and recontextualize it for a new conception.

The outcomes of software 'failures' in digital technology made a similar type of aesthetics emerge: Glitch aesthetics. The 'dirty' and sometimes 'chaotic' nature of glitches made things look much more organic and human, as opposed to mechanically computerized. This unrefined aesthetics has recently become so popular among designers that some of them have made specific websites as tributes to the process.

Though the accidental dimension in art looks more compatible with analog practices, there are various instances it finds its niche in the digital world as well. Mystifying benefits like freedom from preconceptions, momentary skepticism about planned course of action, avoiding mechanical thinking / prejudices, reaching a more natural / authentic result, discovering unusual and unique aesthetical domains, etc. will always make 'ars accidentalis' an indispensable part of art practice.

Conclusion

Digital tools available for photography allow the artists in the field to think in a more daring and free way. This freedom influences the content and also the visual aesthetics of the recently created artworks in the universal practice of contemporary photography. Photography is probably one of the visual art platforms that is influenced the most by digital production and creativity. Digital means/processes are already and will in the future, strengthen photography's position in the art scene as one of the most progressive artistic expression and visual language platforms.

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PERIPATO TELEMATIKOS

Greg Giannis

Peripato Telematikos explores walking performances as a means to (re)present our environs, challenging what we know about the places/spaces we inhabit and our relationship with them, and provides a means by which audiences can engage with these performances in real time.

All texts are available online at http://www.peripato.net I have included the cartography text for this paper.

Cartography

New technologies have the ability to create highly accurate representations of our physical surroundings but they also present us with the opportunity to express location outside of standardised forms and re-instill subjective articulations of space. Harvey quoted in (Ota 2008)

This project creates subjective mappings through collective and individual staged walks. The mappings are generated in real-time and consist entirely of media that the walker submits through their mobile recording device. As the intent is to create mappings, I was interested to know the cartographic discipline's current thinking on mapping and it seemed remiss to not take this into consideration. The research revealed a crisis in this discipline. The open access to satellite imagery merged with electronic databases is superseding conventional maps.

 In his recent chronicle, The Mapmakers, John Noble Wilford notes that digital technology has brought about a revolution in the way maps are created and used that is without precedent since the Renaissance. [… M]apping technology has split the interface from the database, a split comparable to the liberating effect photography had on the development of painting. Before the advent of aerial photography, satellite tracking and computerized data-gathering, a map was expected to represent its territory with comprehensive accuracy. Freed of that responsibility, cartographers can manipulate their data into any number of visual representations - an act so potent it has attracted the attention of other disciplines. As Harley remarked, 'Maps are too important to be left to cartographers alone' (Abrams and Hall 2006) p 12.

Mapping has attracted the attention of the art world, which has been a fertile ground for experimentation with maps, and this has come to the attention of the cartographic discipline. There is so much activity in this area that Woods has remarked:

 [T]here is a cresting wave, and it awaits skilled surfers (Cosgrove 2006)

This is a quote from a 2006 special issues of Cartographic Perspectives (the journal of the North American Cartographic Information Society) on art and maps. The special issue gives a good summary of the current intersections of art and maps and notes its prevalence, but itself also signifies the importance of the work being conducted in these intersecting fields. At the end of this section, I provide examples of artists working with maps.

The art world's response addresses some of the contemporary concerns surrounding maps and their use. The cartographic community itself, as mentioned previously, is leading a call for experimentation in the visual forms of maps, given that it is now freed of the responsibility to represent space with accuracy. Furthermore, the cartographic community is acknowledging the inherent subjectivity of maps and, given that accurate representation of space is now accomplished by satellite imagery, is looking to rein-still subjective articulations of space. Historically maps purported to be objective, but their subjectivity is now well understood, and they have served to support imperialist expansion and other forms of control.

As an instance of the 'microphysics of power', the imposition of rational order upon space is 'the minus-cule and ubiquitously reproduced move of 'gridding' (quadriller) a visible space in such a way as to make its occupants available for observation and 'information' de Certeau quoted in (Stott 2005)

In response to this controlling view of the world from above, mappings are being constructed from the perspective of the person on the street. This raises the possibility of mappings that are created by many, from a multiplicity of viewpoints, and not by a single, overarching authority. This controlling view from above has been facilitated by the striation of the earth's surface using a grid of lines of longitude and lat-itude, an inseparable component of maps. This grid is encapsulated in the contemporary world by the GPS system, referred to by some commentators as the 'Imperial grid' (Holmes 2004). In Parables for the Virtual, Massumi argues that if one reduces the systems of meaning to positions on a grid, one denies the very variation and transition inherent to those systems of meaning. The GPS system is one of many technologies that have radically changed contemporary western society, allowing anyone to pin point their position, or the position of others, on the earth's surface with considerable accuracy. But modern technologies raise other issues for mapmakers. We live in a world characterised by 'speed, fluidity and ephemerality of contemporary means of transport, communication and media technologies' (Stott 2005). How are these factors to be accounted for in maps of the contemporary world? How can a map incorporate time? How can we free ourselves from the imperial grid?

CONCERNS OF CARTOGRAPHIC DISCIPLINE.

As mentioned previously, the cartographic discipline is in crisis. Its role in providing accurate maps has been superseded by satellite imagery combined with online databases. Their response has been to en-courage a subjective, socially inclusive cartography, to bring to the fore that which has thus far been omitted from maps, to encourage experimentation with map forms given their emancipation from hav-ing to provide accurate representations, and to explore possibilities for mapping to represent a fluid, ephemeral, dynamic world; what static representations are unable to do. As noted by Lippard, this re-sponse is not entirely new, and perhaps those that led this call in the sixties, did so in anticipation of the current problems with cartography.

The mapmaking process can also bring together disparate elements in a community. In the sixties, geog-rapher William Bunge proposed a 'Society for Human Exploration' that would map from different human viewpoints, including children's. [...] Local people would lead expeditions to create 'oughtness maps,' whose goals were to change rather than merely map the world. (Lippard 1997) p79

This opens the way for maps to articulate a subjectivity missing from maps from the:

time of the Renaissance as new objectivity and functionality began to enter map making techniques leading to the standard of map we have today — 'maps stripped of all elements of fantasy and religious

belief, as well as any sign of the experiences involved in their production had become abstract and strictly functional systems for the factual ordering of phenomena in space.' (Ota 2008) p361-362

In contrast to the maps we have today, this project's mappings are totally constructed of the experiences involved in their production (i.e. staged walks), and make no attempt to factually order space. I proposed a subverting of the map, by creating a (re)presentation from the view point of ground level; a montage of media fragments. This builds on de Certeau's proposal that place is defined by urban planning but transformed into a space through the act of walking:

space is composed of intersections of mobile elements. It is in a sense actuated by the ensemble of movements deployed within it. [...] In short, space is a practised place. (de Certeau 1984) p117

The mappings are constructed totally by media that the walker submits through their mobile recording device. Not the 'voyeur' who is 'at a distance' and thus 'a solar Eye, looking down like a god' who 'must disentangle himself from the murky intertwining of daily behaviours and make himself alien to them'. (de Certeau 1984) p92-93 The walker makes no pretence to mapping a totality, objectivity, or ordering space. Her intervention is one that is very localised and amongst the 'murky intertwining of daily behaviours.' This raises the possibility for mappings to articulate knowledge that isn't solely about ordering space, but a multiplicity of concerns. For example:

MILK [a project by Ieva Auzina and Esther Polak traced the path of milk from its origins in the udder of a cow in rural Latvia to a cheese vendor in the Netherlands] suggests a powerful vision of how locative technologies could allow one to more fully understand how products are commodified and distributed through the actions of global trade, thereby making visible the networked society. ... [W]hen tied to a materialist vision, the recent turn to maps is among the strongest critiques of globalization available to us. Recognizing this, philosopher Alain Badiou referred to the maps of power drawn by artist Mark Lombardi as 'the creation of a new possibility of art and a new vision of the world. (Tuters and Varnelis 2006).

Here we have two very divergent manifestations of mapping. MILK provides a glimpse of the networked society through tracing the path of a basic food product, whilst the maps drawn by Lombardi visualise the networks of power, corporations and the military.

Perhaps the biggest of all challenges is to map '[t]he complexities of the contemporary world – those of financial markets, information networks, social relations, etc. – [that] are said to be 'unfigurable', opaque and unrepresentable.' The map 'must account for the speed, fluidity and ephemerality of contemporary means of transport, communication and media technologies.' (Stott 2005) How can a map be dynamic? Any representation that is static is fixed in time, and represents a snapshot of its subject at a particular point in time. In order to incorporate time, the medium itself must have this faculty. Paper is out of the question (for the moment at least) whereas networked media such as the Internet is the most suitable candidate.

The mappings produced for this project are accessed on the Internet. The constituent components are stored in an online database, and are extracted from the database and presented in ZUI, whenever a mapping is viewed. As is the case with satellite maps, the interface is split from the database. The interface serves all mappings, each differentiated by the constituent components that together comprise that mapping. The constituent components are added to the database over time, and can continue to be

so indefinitely. Unlike static representations these mapping can change over time, opening up the possibility to represent the 'unrepresentable' complexities of the contemporary world.

As mentioned previously, this project's mappings are implemented in such a way as to allow unrestricted manipulation of the constituent components so that the mappings are mutable. All uploaded elements are available for further manipulation. Their position (x, y and z-planes) in the interface is variable. Visitors to the site are able to move these elements and create associations between elements and group others. As a result, the mappings are not fixed in time or spatially. All the constituent components can be added over time and subsequently moved in relation to one another, further complicating the idea of a 'map', but coming closer to the Deleuzian notion of a map:

Make a map, not a tracing.... What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. The map does not reproduce... it constructs.... The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by an individual, group, or social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation. (Deleuze and Guattari [1980] 1987) p12

The tracing that Deleuze refers to is what we have come to know as the base map. It represents extant knowledge and therefore proposes nothing new, simply a reiteration of existing ideas. The base map has also been dispensed with in this project's mappings. If we are to accept that current mappings represent a Cartesian and static notion of space (Sant 2006) p 99 then to simply take an existing map and overlay it with subjective content only reinforces this. We are still dealing with the same base map, with all its inherent problems, the only difference being that it is now annotated with subjective information:

Current collaborative mapping projects using locative media technologies have often overlooked the conventions of the base map as a site for reinvention. Although these projects are ambitious in their aim to propose alternative organizations of urban space through the way it is digitally mapped, they remain bounded by datasets that reinforce a Cartesian and static notion of urban space.

[...]

Although many collaborative mapping projects undermine their own base maps by layering them with collectively defined concepts of space; including participants' emotions, itineraries and memories, these annotations are inextricably linked to the predefined foundations of the map they overlay. (Sant 2006) p 99-100

In some instances, the mappings serve to embed media into place. Subsequent visitors to these sites, with the correct equipment, are then able to retrieve the media left by the mappers:

Geograffiti (CN/UK) and GeoNotes (SE) ... seek not to document or interpret the environment but to embellish it with digital graffiti or virtual tagging as expressive mark. (Hemment 2004)

This has obvious applications for audio-guided tours, which is already widespread. Outside of the media art world, artists work with maps in ways that are less reliant on the base map, many dispensing with it altogether. Casey's Earth Mapping gives many examples.

Aside from reinforcing a Cartesian and static notion of space, the base map, with its reliance on the grid, can be seen to be reinforcing a static notion of thought:

When we think of space as 'extensive,' as being measurable, divisible, and composed of points plotting possible positions that objects may occupy, we are stopping the world in thought. We are thinking away its dynamic unity, the continuity of its movements. We are looking at only one dimension of reality. (Massumi 2002) p 6

For Massumi, this reliance on the grid represents a far greater problem as it stifles the potential for change and looks at the world in a way that restricts possibilities.

ART AND MAPPING

Artists are harking back to the premodern, subjective map that 'concentrated on geographical meanings' and offered 'as full an impression as possible of the lived texture of the local landscape'. (Lippard 1997) p 81

Jameson concludes that 'the political form of postmodernism, if there is any, will have as its vocation the invention and projection of a global cognitive mapping, on a social as well as a spatial scale.'

[...]

There would be virtually no end to a list of every artist, literary critic, critical theorist, art historian, sociologist, or philosopher who globally or locally 'maps out' the contemporary cultural landscape. (Bosteels 1996, p 110)

- Earth Mapping (Casey 2005)
- Guillermo Gomez-Peña - placed South America at the top of a map (Lippard 1997) p 80
- Peter Fend - worked with Petersen projection (Lippard 1997) p 80
- Peter Dykhuis - exhibition of 'world views' during G7 summit in Halifax, world maps published by each of the G7 countries placed side-by-side. 'Seeing them all side-by-side, the differences between maps are striking. Aspects of their design and choice of colour seem to embody national stereotypes - the Japanese map looking understated, with light, cool colours, while the Italian map is bold and funky, with wildly curvaceous lettering. Each of these superpowers locates itself towards the centre of the world, and relegates the rest of the world more or less to the margins.' (Lippard 1997) p 80
- 'Florence Ladd asked a group of urban African American youths in California to draw maps of their neighborhood and received widely diverse interpretations.' (Lippard 1997) p 80
- 'Stanley ("this way") Brouwn - exhibited scribbled pencil maps made by people in Amsterdam from whom he asked directions to a well-known landmark.' (Lippard 1997) p 80.
- 'Working with only a biro and a camera, and with no knowledge of the area, Hugh Davies representing Analogue Art Map spent the 2006 Conflux Festival seeking hand drawn maps from locals in the Brooklyn NY area. These maps gave directions to sources of food, water and rest as well as to possible points of

interest. As each map begins where the last ended, the maps link together to form a linear journey or narrative told by multiple authors.' (Davies 2006)
- 'Six Contemporary Artists Who Use Maps in Their Work' (www.artjunction.org 2009)
- Uncharted Territory: Subjective Mapping by Artists and Cartographers (www.saulgallery.com 2004)
- *'Gnomon* was an eight-foot-high, two-thousand-pound self-propelled sculpture that used GPS to identify the location where it was supposed to be.' (Wilson 2008) p 292 As the GPS location information is not stable this sculpture continuously moved about the gallery space, bumping into walls as it tried to fix its location.
- Catalogue of 218 Map artists (Cosgrove 2006) p61-67

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SIMULATING SYNAESTHESIA IN REAL-TIME PERFORMANCE: USING SUBJECTIVE USER-INTERACTION MODELS IN 3D SPATIAL ENVIRONMENTS

STEVE GIBSON

In this paper the author will describe and show examples of his live audio-visual work for 3D spatial environments. These projects use motion tracking technology to enable users to interact with sound, light and video using their body movements in 3D space, simulating the effect of synaesthesia.

Figure 1: Virtual DJ, 2005. Steve Gibson, Live at Stealth Attack Nottingham, Incubation 2005 Conference. Photo by Jonathan Griffiths.

Figure 2 - Virtual VJ, 2011. Steve Gibson and Stefan Müller Arisona. Performed by Steve Gibson & Maria Lantin. Culture Lab CHI 2011 party, Emily Carr University of Art and Design, Vancouver, BC. Photo by Atau Tanaka.

Technical Introduction

Using the tracking capabilities of the *Gesture and Media System* - invented by APR of Edmonton, Canada - two or more users can use space as an audio and video remix or performance tool. The *Gesture and Media System* allows artists to "map" an interactive space with sound, light and images, and to have user-movement dynamically control these elements via small 3D trackers.

In the author's spatial projects audience members can interact with sound, light and video in real-time by simply moving around in space with a tracker in hand. Changes in sound, light and real-time visual effects can be synchronized with changes in sound and or light (i.e. music volume = light brightness = video opacity). These changes can be dynamically mapped in real-time to allow the user to consolidate the roles of DJ, VJ and light designer in one interface. This interaction model simulates the effect of synaesthesia, in which certain people experience light or colour in response to musical tones.

Synaesthesia

Synaesthesia is a condition is which a person experiences sensations from one sense in a second different sense. The likely most common occurrence is a description of colour related to musical tones. "How does it feel to hear music in color, or to see someone's name in color? These are examples of synesthesia, a neurological phenomenon that occurs when a stimulus in one sense modality immediately evokes a sensation in another sense modality. Literally, "synesthesia" means to perceive (*esthesia*) together (*syn*)." [1]

VIRTUAL DJ Concept

The original concept of *Virtual DJ* was to create a virtual room in which the audience could interact with sound and light by simply moving around with a tracker in hand. With an acknowledgement to the obvious connections with the earlier work of David Rokeby, [2] *Virtual DJ* is designed as a comparatively populist project, one in which the audience can interact in a very physical, almost aerobic manner to dance-oriented electronic music.

Virtual DJ uses two motion-trackers, one controlling drum and bass, and the second controlling melodies and samples. Certain motions have been standardised to create specific sound effects: raising the hand in the melody tracker usually results in a rising melody, raising the drum and bass tracker results in a change of drum patterns. Similarly lights are used to give the users a physical sense of the sound zones in the room: when users move within sound zones lights dynamically change in synch with their movements. This interaction model simulates the effect of synaesthesia, in which certain people experience light or colour in response to musical tones.

In *Virtual DJ* the 3D space has been mapped meticulously to allow users to have a satisfying interactive experience regardless of the style of their interaction. The spatial mapping was reworked based on the results from beta tests of hundreds of users over a two-three year period. These tests were both formal (i.e measured beta tests in a controlled studio environment in which I wrote down user reactions and responses) and informal (i.e. resulting from a performance after which I arranged a follow up studio session with users).

Virtual DJ uses robotic lights to simulate the behaviour of humans and to represent human agency. The environment of *Virtual DJ* exists as a living, sounding space that behaves in a predictable manner in

relation to the user. To the casual observer it seems as if the space is alive; to the performer the precise matching of sound and light gives the air an almost tactile quality.

VIRTUAL VJ Concept

Virtual VJ takes the concept of *Virtual DJ* one step further and unites the role of the DJ and VJ into one interface: 3D space. The concept of *Virtual VJ* is to allow two users to control different aspects of the sound and video environment with their movements. One tracker is set to trigger sound and video and the other is set to manipulate the sound and video initiated by the first tracker.

The key conceptual idea that is explored is the idea of cooperation and the sense of personal space in ephemeral, virtual systems. This is achieved by programming the trackers so that dramatic events will happen when the two trackers are close together or at a distance. For example the environment has been programmed so that the trackers apply dramatic effects such as distortion to the audio when they are proximate to each other or reverb when they are distant from each other. This results in a game of cat and mouse in which the users determine whether they will chose to closely follow the movements of the other participant or pursue a more individual experience.

Enabling Subjective User Interaction In 3D Spatial Environments

Both *Virtual DJ* and *Virtual VJ* are based on the basic interface design strategy of using redundancy to enhance immediate user interaction. In common usage redundancy is often thought of a negative term, but in computer-controlled environments the use of redundant information in an interface design can often lead to greater user clarity, particularly when the information between mediums is sufficiently obvious.

In *Virtual DJ* lights and sound are matched very precisely. When a user perceives a change in sound due to a movement, the lights will change in a similar manner. This redundant information over the two mediums allows users to experience a more tactile sense of space and to more easily infer how their interactions are affecting the audio-visual environment. In *Virtual VJ* the redundant information is passed between the audio and video realms in a similar manner to *Virtual DJ.*

Similarly both environments have been mapped in a way that allows them to at all times produce a predictable result (i.e in *Virtual VJ* raising the hands will usually produce a rise in volume and an increase in image opacity). At the same time users are free to roam wherever they wish, to combine audio and visuals in whatever manner they chose.

This predictability is in fact an asset in that it allows users to lose their self-consciousness when interacting: they do not fear playing "wrong notes". This is in opposition to many similar environments in which users are often mystified by the interaction model due to a lack of spatial planning or an over-complex interaction model. On the other hand the spatial mapping in *Virtual DJ* is quite complex; in many areas of the room several parameters are changed simultaneously by different motions; however, because the changes are logically mapped to movements and the results are predictable and repeatable, users gain a sense of control that they would not otherwise have in more "randomly" mapped spatial environments.

Conclusion

Using a combination of motion-tracking with matched live video, sound and light, the artist can create the illusion of synaesthesia for participants and viewers. Uses can intuit spatial interaction interfaces more effectively with redundant information programmed between the different mediums. This assists both users and viewers with interactivity in the unfamiliar medium of 3D spatial environments and helps establish formal and aesthetic meaning, and avoiding the pitfalls of random and over-complex interface design and programming.

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ADVANCED MEDIA CONTROL THROUGH DRAWING: USING A GRAPHICS TABLET TO CONTROL COMPLEX AUDIO AND VIDEO DATA IN A LIVE CONTEXT

Steve Gibson & Justin Love

This paper demonstrates the results of the authors' Wacom tablet MIDI user interface. This application enables users' drawing actions on a graphics tablet to control audio and video parameters in real-time. The programming affords five degrees (x, y, pressure, x tilt, y tilt) of concurrent control for use in any audio or video software capable of receiving and processing MIDI data.
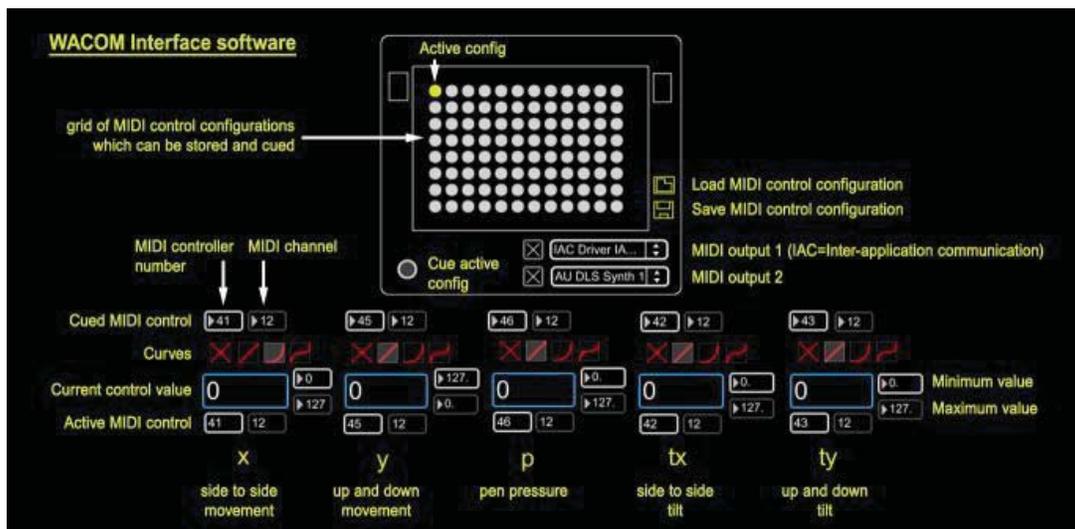
Fig. 1 - Wacom Interface with explanation, Justin Love and Steve Gibson, 2008-09.
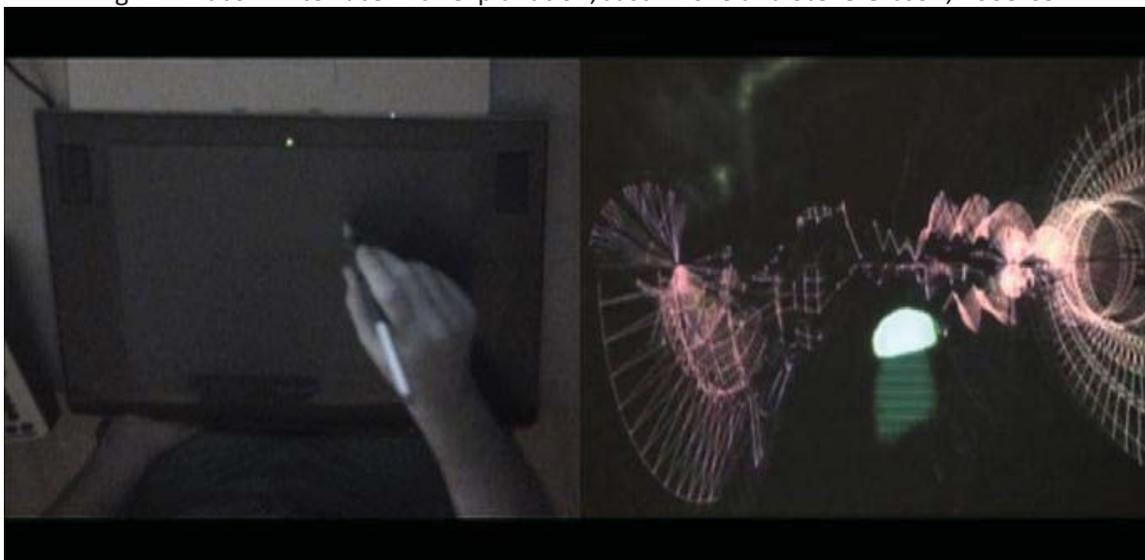
Fig. 2 – Wacom Tablet MIDI Demo. Live performance by Steve Gibson, January 2010. Video by Steve Gibson, 2010.

Introduction

The paper considers the connection between drawing technique and media control both generally and specifically, postulating that dynamic drawing in a live context creates a performance mode not dissimilar to performing on a musical instrument or conducting with a baton. The use of a dynamic and physical real-time media interface re-inserts body actions into live media performance in a compelling manner. Performers can learn to "draw/play" the graphics tablet as a musical and visual "instrument", creating a new and uniquely idiomatic form of electronic drawing.

Electronic drawing is generally (though not exclusively) limited to pictorial or representational drawing with a pen and graphics tablet in order to produce still images or frames for animations in software such as Adobe Flash. Given the authors' background in media art, physical computing and transmedia applications, we were more interested in the idea of repurposing the graphics tablet as media control device. We were particularly interested in the act of electronic drawing as a means of manipulating sound and video rather than as an output to an actual drawing, whether on-screen or for print.

Other 3D "tablet-like" devices have been used for manipulating sound, including the popular Kaoss Pad from Korg. [1] These devices are generally very limited in size: the Kaoss Mini KP has the following dimensions: 4.17 in (W) x 5.08 in (D). In the context of live performance this size does not allow for dramatic gesture.

The notion of the dramatic gesture was very important for us since we wanted to use a tablet as the only visible performance element. It was imperative that the audience be able to identify performer gesture with perceptible results in the media used (live sound and video in our case). To achieve this aim a larger area for drawing would be required. Finally, another limitation of other 3D controllers such as the KAOSS pad is that they are 'only' 3D. In order to achieve complex control of the media elements through our drawing actions, we wanted to be able to use more than three parameters at a time.

For the above reasons we decided to use a graphics tablet as a control device for gestural performance, and in particular we selected the Intuos 3 from Wacom (now superseded by the Intuos 4. [2] The Intuos 3 is 9 inches x 12 inches in dimension and has five degrees of control. This large surface combined with five possible control parameters made it an ideal choice. Also the fact that one uses a pen with a graphics tablet makes it more useful as a performance instrument, since the pen is a visible object that audience members can identify in much the same way as they would a conductor's baton (though the audio-visual results we aspired to were quite different from those of an orchestra).

Background: Live music performance as a visual medium

Our interest in repurposing a device such as a graphics tablet for media control stems from the authors' dissatisfaction with certain modes of electronic music performance. Live music has traditionally been experienced as a partially visual medium, with the visible actions of the performer holding the attention of the listener: "Making music involves not only the communication of musical sounds but is also characterized by a continuously changing and meaningful use of facial expressions, body movements, and hand gestures. Until the late nineteenth century, music performances were almost always experienced as audio-visually integrated activities." [3]

With the advent of electro-acoustic "tape-based" music in academic electronic music and laptop performance in popular electronic music, the visual reference of the performer became "un-stuck" from the resulting sound produced in a live performance scenario. The relatively long history of tape-based electro-acoustic music has attempted to deal with the lack of performance spectacle by ever-increasing complex "diffusions" of the sound in space. This often involves ever-increasing numbers of speakers placed strategically throughout the room. For example, the BEAST "diffusion" system at Birmingham University has "over 100 discrete channels" of sound available. [4]

When used effectively this can create a sort of architectural soundscape, in which the listener follows the sound around the speakers and thereby intuits an image of sound as an object in space, albeit virtually. For the most part though, it is hard to avoid the conclusion that the use of ever-increasing numbers of speakers is a rather desperate ploy to obfuscate the fact that the audience does not easily respond to music in the absence of the visual spectacle of the performer. In short, in the majority of cases, the tape-music concert is one that generally does not satisfy the audience need for performance complexity. The genuinely live performance event has possibilities for variation, expression, errors, and communication with the listeners/viewers that are lacking in purely tape-based performances.

Similarly, pure laptop-based popular electronic music faces a similar crisis. When the performer is hidden behind the screen, it is simply impossible to recognize or even infer what he or she might be doing. As with tape-based music, the visual aspect in laptop performance is reduced to a virtually-inferred spectacle at best. (It should be said that in laptop performance there is at least the presence of an actual performer, and though it may be difficult to ascertain his or her actions, at least he or she is generally doing 'something' live).

The introduction of physically expressive performance aspects into electronic music has increased in the past ten to fifteen years. With improvements in computer speeds and the growing number of gesturally expressive media control devices available, electronic music has become increasingly engaging within a genuine performance context. The laptop is still employed live in most cases, but at least it is being controlled by a performer with some other device that the audience can relate to as an instrument. In this regard the live electronic performance medium (with a physically present and "active" performer) bears some resemblance to the drawing medium, in that deliberate and unconscious gestures in time form a basis for the artist input in both mediums. In both drawing and live performance errors are allowed (or are, at the least, quite inevitable). Meandering, testing, chance, and happy accidents in improvisational or semi-improvisational mediums such as live electronic music or DJing, are quite relatable to doodling, dreaming and sketching in the field of drawing.

Background: The VJ as live performer

It is worth noting that the VJ faces a similar problem to that of the laptop performer: how do his or her actions relate to the music and visual performance and how does the audience perceive those actions as in any way corresponding to the audio-visual results? VJing generally relies heavily on digital signal processing (DSP), in which the VJ software detects aspects of the incoming audio (e.g. hard attack beats coming from a kick drum) and consequently applies effects, cross-fades, or clip edits based on that information. This normally creates an obvious connection between the audio performance and the resulting visual world, at least on the rhythmic level.

While these DSP tools provide a solid automatic connection between the audio and video in a VJ performance, there remains the presence of the VJ performer: as with laptop music performance, in the absence of any noticeable interface beside the laptop, the performer's actions are somewhat mystifying to the audience.

For the above reasons we decided that the graphics tablet served as a potent tool for uniting the DJ (or electronic musician) and the VJ under a single interface. In addition by using the large surface of the tablet as an interaction device we created a dynamic performance instrument that the audience could relate to in a very physical manner.

Initial research

Our initial research into programming options for using MIDI with a Wacom tablet uncovered some premade applications, but in general we were unsatisfied with the both the usability and "look and feel" of these solutions. For example, one such application that we considered was the "Tablet 2 MIDI" interface developed by Livelab in Denmark. [5] This program allows complex mapping of MIDI data to multiple parts of the graphics tablet. The essential problem with this model is that it uses a complex menu-driven user-interface that is not intuitive. In addition the application is Windows-only, and given the fact that the authors (and much of the digital media community) are Mac users, we determined that this "off-the-shelf" solution was not ultimately viable. If we wanted a solution that would meet our needs and the needs of a more general digital media community, it would be necessary to develop our own alternative application.

For this reason we decided to look at creating our own interface using Max from Cycling 74. [6] Max has an application programming interface (API) that allows users to create their own external objects. The extensibility and modularity of Max has resulted in a large community of developers that create and share their custom Max external objects. To implement our interface we incorporated a Max external object designed by Olaf Matthes that outputs data produced by the Wacom Tablet. [7] In the Max patch, the data from the Wacom tablet is routed and mapped to a series of user-definable MIDI messages that can then be used to produce audio and video manipulations and transformations.

Interface design

It was essential that the interface that we created be entirely contained in one window, with no need for submenus or even normal file menus. Fig. 1 illustrates our basic interface design. Side-to-side (x), up-and-down (y), pressure (p), tilt x (tx), and tilt y (ty) can each be mapped to any of 127 possible MIDI control change parameters on 16 different MIDI channels. In addition, control curves can be applied to each parameter. For example, a linear control curve produces a consistent rate of change for a given parameter, whereas an exponential control curve causes a parameter to change slowly at first and then increase rapidly towards the end. The MIDI output can be routed to two different MIDI ports simultaneously. The grid at the top allows the user to save up to 96 different MIDI control change setups in one file.

Connecting with audio and video

To connect our application with other MIDI software, we used Interapplication MIDI. This allowed us to instantly map tablet actions to an effect or parameter in the audio or video software. Naturally only five

tablet parameters can be used to control video or audio data at the same time, but it is possible to route the same MIDI control data to multiple functions in the video or audio applications. With the grid of 96 storable configurations, once the user gets tired of the same configuration a new one can be loaded instantaneously. It is possible to cue a configuration (similar to how a DJ would cue a new track) and press one button to immediately activate the new setup.

The applications we use with our tablet audio-visual interaction are Ableton Live (for audio) and Modul8 (for video). Both of these programs are ideal for live audio-visual performance as they have extensive MIDI support and are built for non-linear performance situations in which the user may want to change, modify or apply effects to audio-visual materials instantaneously.

The tablet as a live performance device

With the possibility of seemingly endless mappings of tablet data to corresponding audio and video effects we were acutely aware that some sort of logical mapping structure would have to be established in order to allow the interface to be used effectively in a performance situation. This harkens back to the concern that we had at the outset: we wanted to be sure that tablet actions had observable results so that audience members would be able to clearly identify the relationship between the live drawing and the performed audio-visual elements.

In the past Steve Gibson has worked on several projects which explore 3D interfaces and the connections between audio and video mappings and 3D control. The most important of these projects was *Virtual DJ,* in which the user is given control over an audio environment and lighting effects by moving in 3D space. [8] In short this project used standard control configurations between user actions and results in the audio-visual system. For example, raising the hands would generally play an upwards melody and with each new note a light would change colour. This allowed the user to identify that their motions were having observable and repeatable effects in both the audio and visual realms. In essence this simulated the effects of synaesthesia, a condition in which persons can often see colours in response to particular sounds, tones or musical notes: "Synesthesia is an involuntary joining in which the real information of one sense is accompanied by a perception in another sense." [9]

For our tablet interactions we thought of the tablet interface as a miniaturised version of the multi-dimensional spatial interface used in *Virtual DJ*. Thus logical interactions could be inferred by testing user actions with system results. For instance, drawing on the y-plane on the tablet (up-down) could logically map to audio volume or low-pass filter (which would have a similar effect to volume, without completely removing the sound at the bottom of the tablet) and image opacity. Therefore we built a limited series of controls to be employed by the user on the tablet and held to these controls throughout our performance. The videos at the following two links show how three of the tablet parameters (x, y and p) were mapped to audio effects:
http://www.telebody.ws/TRACEY/Tablet_demo1.mov

http://www.telebody.ws/TRACEY/Tablet_demo2.mov

Conclusions

In summation we have found that the Wacom graphics tablet is a powerful device for controlling live audio and video in a performance situation. The act of live drawing, though here removed from its traditional reference to a produced "drawing" (either on-screen or in print), is one that allows for dramatic gesture in a way that pressing keys on a computer keyboard or moving a mouse could never hope to achieve. In addition the fact that the graphics tablet can unite five degrees of control over live audio and video makes it an ideal tool to consolidate the roles of the DJ and the VJ under one control interface. Finally we present a live example of the tablet used in a performance situation with one of the authors controlling live audio and video with his drawing actions (Fig. 2): http://www.telebody.ws/TRACEY/Tablet_Demo_Split.mov.

The Wacom MIDI software can be downloaded at: http://www.roguescience.org/files/wacom2MIDI.zip.

Learn how to setup the Wacom MIDI software to use with your Wacom tablet: http://www.telebody.ws/TRACEY/Wacom_MIDI_Setup_Demo.mov.

Note

A longer version of this paper was originally published by TRACEY as part of their Drawing and Technology issue: http://www.lboro.ac.uk/departments/sota/tracey/dat/gibson-love.html

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DIGITAL PUBLICS: PROMISES AND PROBLEMS OF A CYBER-REVOLUTION

Philip Glahn

Reconsidering the historical avant-garde's engagement with the "mechanization of experience," organizations like Mikro.fm seek social innovation through digital technology, facilitating a redistribution of the ownership of the means of knowledge production. Looking to Brecht's radio theory, the Berlin-based group engages in a heterotopia of pragmatic collectivism, wary of making the bourgeois public sphere's empty gestures of participation.

Reconsidering Sergei Eisenstein's unfinished *Capital* project, German filmmaker Alexander Kluge recently contemplated the abiding potential of cooperative production: "A constellation of corresponding works. That's how Eisenstein's spherical dramaturgy is to be understood. Not a utopia but a heterotopia: right next door something is possible." [1] What sounds vaguely like a nostalgic, rhizomic relativism is in fact a strategic demand for the fulfillment of the historical avant-garde project. Kluge's own films, including his 2008 *Nachrichten aus der ideologischen Antike: Marx – Eisenstein – Das Kapital*, promote "relationality": the notion of the cultural arena as a site of struggle over meaning and visibility, the means of making sense and spreading it around by establishing connections, or "striking sparks," between positions. Emphasizing the use-value of artistic labor and the functionality of its products, Kluge's Eisenstein project aims to make the relationships of production tangible – between the real and the ideal, history and myth, experience and fantasy – to, in Eisenstein's own words, "teach the worker to think dialectically." [2]

For Kluge, the procedures and proceedings of 1920s and '30s radical art imply the very pragmatic possibility of implementing substantial contemporary socio-cultural transformation through art nearly a century later. Indeed, conditions central to the historical avant-garde project no longer seem as antiquated as they did during and even immediately following the Cold War. New networks of information dissemination and economic dependencies, the political and social struggles in the East and Middle East, and the recent crisis of global capitalism have shaken traditional ways of governing people, properties, and worlds to their foundation, giving questions of socialism, technological progress, and class a renewed validity and urgency. New media art and activism in particular has for well over a decade acknowledged, considered, and elaborated on the changes in our socio-technical landscape. As digital forms of information exchange and knowledge-labor blur traditional boundaries of community and identity, "tele-" and "cyber-communism" declare the dawn of a new sociopolitical era that in many ways harks back to that of the historical avant-garde.

New media art and activist organizations sound a strikingly Productivist and Brechtian tone in their avowals to employ digital technology to turn consumers into producers, availing mass participation for social innovation. These groups reprogram GPS devices to map new ways to navigate urban environments, devise open-source software for redrawing eco-political landscapes, and organize festivals and workshops for the collaborative production and broad dissemination of information and technological know-how. As such practices seek to reconstruct the public sphere, the question remains whether the access to information and the technological means of its production actually redistribute ownership of

knowledge, labor, and experience, fomenting real action and agency, or whether such projects further institutionalize an ideal bourgeois public sphere by creating a mere semblance of cultural participation.

The Berlin-based collective mikro.fm provides an example of a contemporary practice seeking to combine and maximize the potential of both old and new media to form evolving and strategically contingent constellations. Like many other new media communications initiatives, mikro.fm provides free, non-commercial public access to online and airwave studios as well as the know-how necessary to fabricate and use portable transmitters. Steeped in the traditional conflict of communicative technologies (the radio apparatus as much as the Web) between the material promise of unregulated, democratic exchange on the one hand and its populist and private appropriation on the other, mikro.fm holds workshops and gives presentations, circulating ideas and instructions via airwaves and the Internet advocating the portable transmitters as a way to produce, receive, and pass on stories and news, fantasies and perspectives excluded from or marginalized in the mainstream media.

If indeed, as some have observed, today's socio-economic and psychological climate recalls that of the Weimar Republic and its "experience of mechanization," a critical look at the medium of radio at its moment of original popularity, at the historic crossroads between barbaric instrumentalization and emancipatory utility, proves instructive in contemporary debates about the revolutionary function of new media art and activism. Regarding its own heterotopia of direct, proximate usefulness through the active everyday production and dissemination of broadcast programs, mikro.fm has looked to Bertolt Brecht's "Radiotheorie." [3] Like culture in general and theater and film in particular, to Brecht the radio has no value in and of itself but is defined entirely by its use. In the hands of the bourgeoisie, according to Brecht, the radio is anything but a "mass medium": delivering "Viennese waltzes and cooking recipes," pseudo-debates and purely commercial art, it has, in a reversal of the potential function of the broadcast apparatus, an individualizing and inactivating effect on its audience. [4] In this case a new medium is used paradoxically to reproduce old contents, habits, and relations.

In his 1932 essay "The Radio as an Apparatus of Communication," Brecht famously remarked that "the radio is one-sided where it should be two," advocating the ability to literally talk back, to discuss via the apparatus of transmission. [5] Perhaps more importantly, Brecht's call for material as well as ideological innovation through the transformation of the radio demands that what is being communicated must have relevance to the audience and engage the listener as a speaker. The objective is to turn the audience "not only into pupils but into teachers." [6] Accordingly, "re-transmission" is as important to mikro. fm as the distribution of original content. Listeners are encouraged to engage with themes like nuclear power and the census, anti-Semitism and "medial creativity," navigating and contending with a multiplicity of official narratives, alternative concepts, and personal experiences. Topics are discussed in contexts ranging from the general to the local, the historical to the present-day. The soldering workshops connect technical labor with the anticipated intellectual and social labor of using the apparatus as a communicative device, fostering an awareness of the way in which the skill of "making" functions on several levels. It furthermore imparts a sense of sober functionality over techno-euphoric spectacle. The utility of the self-made transmitters, as well as the collective's recent "editorial" work with the Berlin station "PI Radio" (the PI standing for "pilots" or "pioneer"), is part of their effort to counter "anonymous media consumption" by producing and promoting online networks and "radio clouds," echoing Brecht's idea of the radio as "a network of pipes" that "turns listeners into suppliers." [7] True innovation means to go beyond participation as a gesture and turn it into an action of agency.

As with the Eisensteinian constellation, the relationality afforded by mikro.fm's projects is not restricted to the technological dimension of accessibility. To strike sparks between positions does not suggest to

merely plug into the apparatus, but rather to establish an exchange between different modes of production – of experiences, ideas, identities – to acknowledge the public sphere as an arena where one's position as spectator and producer stands in critical proximity to the institutions of information distribution and their discursive regulations. The redistribution of ownership demands that for cooperative production to be truly cooperative, it needs to impart the ability to participate in an evolving project of knowledge production (rather than reproduction), to articulate existing dependencies, limits, and possibilities. New media establishes proletarian public spheres where, as Brecht observed, the material and technical abilities to say anything to anybody are used to transform rather than maintain the existing social order, by "putting the listener into relation rather than isolating him." [8]

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SYNTHETIC PHYSICS: IDEAS FOR NEW WORLDS

STEFAN GLASAUER

While the physical laws of our real universe cannot be modified, in virtual computer-generated worlds arbitrary physical laws can be implemented. However, critical constraints of synthesizing such physical laws are given by our sensorimotor system and by the consistency of the resulting virtual world. It is proposed that synthetic physics has an enormous potential not only for education but also for creating art using physical laws as medium.
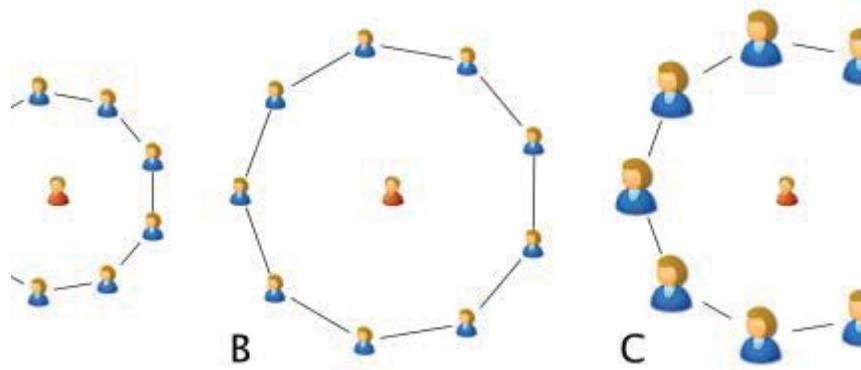
Figure 1: Example for the violation of consistency. A: initial situation: persons at a constant distance form a circle around the viewer. B: each person steps back so that their interpersonal distance increases and they can no longer touch each other. C: for the viewer in the center, the visual angle increases due to the Turtur-effect (see text), which means that the apparent distance between the persons seems to decrease: touching each other seems possible, while physically it is not.
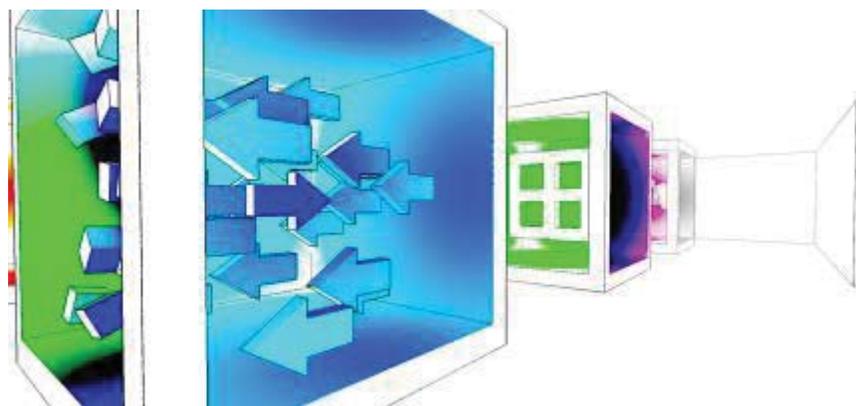
Figure 2: The computer game Antichamber [11], which claims to abandon Euclidean geometry (screenshot courtesy Alexander Bruce).

Introduction

When we enter one of the many virtual worlds available nowadays, be it a simple flat world represented in a browser game or a sophisticated three-dimensional world in a high-end computer game, we usually expect that most of the basic rules of every-day physics and geometry in the real world are implemented also in the virtual counterpart. The geometry is Euclidean, objects look smaller when farther away, there's an up and down, and if things fall, they fall down. Sometimes we can fly in a virtual world, sometimes things do not cast shadows, but in principle all the rules are a simplification of the real-world physical laws. But is that really necessary? Can't we go "beyond physics"? [1]

In the following, these rules or laws will for simplicity be called 'synthetic physics' – denoting not only the basic underlying rules of how objects and agents should physically interact with each other and the simulations performed by the so-called physics engine in game engineering, but also more generally all rules concerned with physics such as the topology of the simulated space or the laws of synthetic optics. So far, the designers of multi-user virtual worlds seem to have adopted the simplistic approach of taking the physical laws of reality, simplify, and use the result as blueprint for synthetic physics. But already in the mid-90s Michael Benedikt suggested that the space of possibilities allows for more. [2] After providing examples of 'impossible' physics - most of which are actually dealing with spatial topology rather than physics in the real-world sense - he proposed several principles meant to serve as guidelines for the successful design of cyberspace.

Real physics

Before discussing these design principles, we need to take a closer look on the real physical laws and the simplifications made by metaverse designers. Take any physics textbook, and you will immediately realize that not all physical laws are relevant for our experience of the world. Special relativity does not have any impact on our daily life, and we need not be aware of quantum physics to catch a ball. In fact, we do not even need to know about Newtonian physics; mankind did well without explicitly knowing about it for most of its history. However, when trying to design a considerably convincing replica of the real world, it becomes important to consider which physical laws should be implemented. To date, the sensorimotor constraints in interacting with a virtual world are provided by the interface technology. The main sensory input supplied by multi-user virtual worlds is vision and audition, the latter often playing a subordinate role. Consequently, the main effort in implementing real-world physics goes into providing a decent graphics engine, realistic sound sources, and rigid body dynamics. Other aspects of real-life physics such as fluid dynamics are usually omitted. Evidently, some omissions affect the amount of realism, whereas others do not, such as restricting the simulation of electromagnetic radiation to the visible spectrum rather than implementing, e.g., radio wavelengths. The simplifications lead to unreal – or hyper-real – [3] physical environments, which can provide an unexpected educational potential: virtual physics invite to experiment with physical laws rather than just simulating real physics. [3]

Psychophysics

Nonetheless, with the user being the central element of any virtual world, the implementation of physical rules needs to be adapted to the capabilities of the users. Here it is where psychophysics come into play: neuroscience, rapidly advancing during the past decades, and experimental psychology, building on

the psychophysical foundations laid out in the past century, tells us how perception works, how experiences are generated, how we react to changes in the world, and how we interact with the world and its objects. One of the most important insights is that we do not directly sense the physical properties of objects, but estimate them based on multisensory input and prior experience, which may be innate or acquired over time by learning. Our perception is thus an indirect estimation process rather than an accurate measurement of object properties. Besides relying on sensory information, the perceptual estimation processes are based on general assumptions about the world. Perhaps the most important one is the assumption of constancy (color constancy, size constancy, etc.). These constancy constraints or invariances, reflecting the statistics of the environment in which we live, are assumed by many researchers to be the basis for our perception. Our actions are shaped by knowledge about the statistical properties of the world and thus we implicitly assume that the statistics of the world do not change rapidly. We thus may formulate, following Benedikt, [2] a 'Principle of Constancy' for the design of virtual physics to meet the abilities of our human perceptual and motor systems.

But which of the properties of the real world need to be preserved in a virtual world for humans to be able to interact with it? In our opinion, some of the a-priori assumptions of everyday sensorimotor processing, such as the existence of gravity, need not to be implemented and can be ignored without significantly affecting action and perception within virtual environments. But we seem to be able to deal with much more drastic alterations: a recent study claims convincingly that humans, given extensive training, are able to efficiently navigate a four-dimensional maze-world. [4] Thus, we apparently can adapt to properties of a virtual environment that most of us consider as being completely unimaginable. Another study investigated how humans behave in physically impossible environments and whether they consciously notice the violations of Euclidean metrics or planar topology. [5] The surprising and conceptually far-reaching finding is: you do not realize it. And you behave just like in a normal virtual environment that mirrors the metrical and topological properties of the real world. Thus, in contrast to Kantian ideas, a-priori properties of space such as Euclidean geometry do not seem to be required for spatial behavior.

Alternative physics

Can we thus conceive of alternative physics, which, nonetheless, allow for interaction with content, be it user-created or supplied by the virtual world, and with other users? We think that it is possible to create virtual worlds with such alternative physics without completely disorienting the users. It could even be possible to have different physics within a single virtual world, allowing the user to change certain physical parameters, properties, or even rules within a given, carefully selected set of meta-rules. This set of meta-rules needs yet to be defined, and an interdisciplinary approach of physics, mathematics, and cognitive science will be required to do so. Creativity paired with analytical capabilities and profound knowledge is asked for to design such a rule set with its most important ingredient being consistency.

Let us take an example from fiction to illustrate what consistency means. Michael Ende describes in his novel for children "Jim Button and Luke the Engine Driver" a character called Mr. Turtur. [6] Mr. Turtur is a pseudo-giant: he appears to be a giant when viewed from far away, but when you approach him, he seems to shrink and finally is just as tall as any other human being. This character works well within the novel, but would not be consistent as alternative physical possibility, since, for example, a normal person standing next to him and holding his hand would become inconsistent: either the arm of Mr. Turtur or that of the person holding it would need to be distorted to not appear to loose contact. One possible

solution seems to be that everything should grow in apparent size with increasing distance. But this solution would again violate consistency: imagine looking at a circle of people holding each other's hand around you. The circle is quite close to you (Figure 1A). If each person steps back a certain distance, they loose each other's hands, because the circle grows (Figure 1B) and the interpersonal distance increases. But for you it would *look* as if they could still hold their hands, since their apparent size grows (Figure 1C). Your view and the physical facts are thus no longer consistent, not to speak of how persons in the circle would appear to each other.

Note, however, that the notion of consistency does not contradict the finding that Euclidean geometry is not important to solve spatial tasks. [5] Even though it may seem as if a triangle with three 90° angles is inconsistent, it is, in fact, not inconsistent in itself but just with Euclidean geometry. Thus, in a different geometry, which is not physically possible in our world, the triangle can have three right angles.

The potentially beneficial use of breaking specific real-world assumptions for the design of interaction techniques has been investigated by Pierce & Pausch. [7] In their example, landmarks such as towers used to navigate over intermediate distances do not completely vanish with distance but remain at a minimum size. While this proposal, which clearly reminds of Mr. Turtur, breaks the continuity of space (the landmarks 'grow' relative to their surrounds), it can help users to navigate in an environment by serving as virtual beacon.

As Benedikt [2] points out, art and fiction have described many possible alternative worlds and the boundaries for the fantastic seem to be stretched as far as possible. We need not even go as far as theoretical physics, where exploring alternative worlds based on different laws is a serious branch of cosmology. Thought experiments of alternate worlds also have a long tradition in philosophy, e.g., Hilary Putnam's famous Twin Earth. However, these thought experiments or the many fantastical scenarios in fiction and art never left the stage of verbal description or depiction. Now the time is ripe to implement them in virtual worlds to be able to experience what it would mean to inhabit such a world and act within. The most recent examples giving us a clue of what might be possible are science-fiction movies such as "Inception" (written and directed by Christopher Nolan, 2010), in which 'virtual' worlds are created in order to serve as backdrop for dreams.

However, so far only very few developers of virtual worlds seem to go as far as abandoning Euclidean geometry: apart from the authors of the scientific study mentioned above, [5] Alexander Bruce is one of them. He is the developer of the yet to be released computer game Antichamber [8] that, according to his website, aims to be a "Philosophical First Person Single Player Exploration Puzzle Art Game" (Figure 2).

Physics as concept

From an artist's point of view, the whole story is completely different. Just as the potential of virtual worlds for scientific research has been emphasized repeatedly, there is an equally large potential for artistic discourse. But just as any other artwork, art using virtual worlds does not need to respect any boundaries, principles, or rules, and may even be more potent when those boundaries are violated. There are many examples in art history, specifically in the last century, where breaking the boundaries was an inherent element to successful artwork. To avoid misunderstandings: artists have, probably with few exceptions, never respected the laws of physics in their work. But that is not the point. Rather,

artists so far could hardly use physics, and here we mean the physical laws and constants, as a *changeable medium* of their work, because they did not have the possibility to modify anything about it. Even though artists such as the sculptor Richard Serra or the installation artist James Turrell may count as an exception in their explicit treatment of physical topics such as gravity, balance, and light, it only is now that an artist could design a new system of physics, be it consistent or not, and have visitors come and feel what it means to be inside such a world. The approach may be compared to 'environments' [9] in installation art or participatory performance art. This interaction between the work and the viewer, while present in all works of art, has a specific immersive quality in such environments, which effectively resembles the non-verbal dialogue between artist and viewer in performance art, especially if it demands participation. In both the installations and the performances, the visitor is not just viewer but active participant experiencing the real emotion rather than just being confronted with its representation. Consequently, work such as the 'participatory objects' of Robert Morris (Tate Gallery, 1971) explicitly form an environment in which the visitor becomes the actor of a performance. The same holds for visitors of virtual worlds: as soon as they enter and interact, they become part of the work and as such performers within an environment.

If we understand the physical laws as instructions underlying the universe, then we can see *physics as concept* in the sense of conceptual art. One of the most influential texts on conceptual art [10] explains that "The idea becomes a machine that makes the art." Physics is the idea that makes the universe. And if the physical law was an artist's idea, the resulting universe is art.

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DRIFTING AND IMAGING BEIJING

Maayan Glaser-Koren

Is John Craig Freeman's "Imaging Beijing" a contemporary expression of the Guy Debord's dérive theory, made possible in Second Life?

Freeman's overall project and its individual components such as "Imaging Beijing" are analyzed here through Jean Baudrillard's book *Simulacra and Simulations* (1981), and particularly his notion of the simulation.

In John Craig Freeman's Imaging Beijing, Second Life Installation, © 2008 Maayan Glaser-Koren

While discussing the contemporary American artist John Craig Freeman's *Imaging Beijing* I will evaluate how Guy Debord's notion of the dérive is applied to the internet environment while also discussing the ways in which Freeman's work challenges, tests, or confirms the dérive as a theory, followed by a discussion of its relevance today. Freeman's piece *Imaging Place* is an ongoing site specific artwork combining photography, video, documentary, 3D software, and virtual reality. The original project started in 1997 when Freeman began to document the locations he visited. Every location was documented and then installed into Second Life in 2006 [1]. These locations are depicted as a platform that merges satellite images of a specific site in the city, panoramic photography, and digital video. *Imaging Places* assembles different places in the world such as *Imaging Wall Street*, *Imaging Belfast*, and *Imaging Beijing.* Freeman's complete project and its individual components, such as *Imaging Beijing* (2007) can be analyzed through Guy Debord's dérive

Debord's theory of the dérive (1960s) refers to drifting throughout the city (Paris) in a rapid manner without planning ahead. The result is awareness of the environment and the surroundings. The subjects must separate themselves from the activities of daily life and especially from the media for this to be successful. Debord, writing in an era characterized by the soaring popularity of television and the wild proliferation of commercial media and advertising, noted that society itself was being transformed by technology. His *Society of the Spectacle* (1967) describes the emergence of a consumer society and proclaims that the spectacle that is mass media dehumanizes the Western world. Debord's proposed solution was the dérive, which was to arouse in subjects an increased interest in the geography of the city.

Debord claims that "in a dérive one or more persons during a certain period drop their relations, their work and leisure activities, and all their other usual motives for movement and action, and let themselves be drawn by the attractions of the terrain and the encounters they find there." [i] More compellingly, the dérive was to create new encounters between people and places that were not otherwise possible and through this allow for positive social change. The intent of the Situationist International Project and its leader, Debord, was to change the confined society of which it was a part [2]. Their goal was to battle against media saturation, boredom, and the capitalist co-option of life. The dérive was a situation the project constructed to disrupt social spaces.

John Craig Freeman's artworks emphasize the notion that in our Western contemporary society we are still influenced by the media and therefore do not pay attention to our surroundings. He claims that he uses the dérive because "it is a subversive act which calls into question the constructed social order of the city. It is my intention to do the same in the social spaces of the Internet." [ii] Is the experience of the dérive the same in the virtual world as in the Situationist's European city? In order to answer this question, I will examine if Freeman's claim is possible throughout the use of Second Life.

In Freeman's dérive, which is performed throughout the use of the virtual world, participants encounter his work through an avatar that takes the role of the dérive's psychogeographer. This allows for a new awareness of the terrain. For example, in *Imaging Beijing*, one's avatar enters the city through satellite images and experiences it through panoramic documentary photographs. *In Imaging Beijing, the avatar's* dérive starts *from a satellite image of the disc of the earth. On earth there are rotating enter signs that indicate the cities on the map to which the avatar can teleport.*

China's capital city, Beijing, is represented by a satellite photograph from a Google map showing central Beijing and translated into virtual reality. On this platform are sixteen spheres, inside of which are panoramic photographs taken by Freeman during an actual visit to Beijing. On the platform are four each of red dates and paths connecting the spheres to the platform that indicate a location on the grid. Clicking any of the dates opens a blog, which includes Freeman's real-life documentation, stories, and photographs from the day he experienced in Beijing.

The idea that Beijing is represented by Google satellite image relates to Debord's notion of the spectacle. The spectacle can be the mass media, the consumer society, commodities, the consumption of images, spectacles, or contemporary capitalism and its effect on modern society. Therefore today's technology, for example, Internet Web sites, satellite images, and virtual worlds, are part of the spectacle. However, if *Imaging Beijing* is a spectacle, then how can it be a subversive art piece? In the essay *Debord and the Postmodern Turn: New Stages of the Spectacle* (1997), Best and Kellner suggest that virtual reality, computers, and multimedia are the new stages of the spectacle. They propose that there are two kinds of spectacle: an interactive spectacle and a pseudo spectacle. The first "is one that the individual herself has created."[iii] It can be one's Web site and chat room. The latter is created by "corporate

forces that themselves construct the spectacle in which one is merely a part," [iv] for example, television shows and radio talk shows that can monitor and control an individual's participation. Consequently, Freeman's *Imaging Beijing* is an interactive spectacle because it was created by an individual and is limited to the participants' experience.

 The notion is that *Imaging Beijing,* as an interactive spectacle, is enhanced by narrations from a Beijing resident, Peter Guo. When an avatar stands in the center of each sphere, the audio narrative begins with Guo discussing his memories and childhood anecdotes from his life in Beijing. In a way, this is a point in virtual space where cyberspace, the real world, and the virtual world become one. For example, entering into these spheres provides one the experience of using a first perspective view of the actual location - a panoramic photograph, providing the sensation of being part of that location. Then, the experience is enhanced by real sounds such as Guo's voice, and the environmental sounds, contained in the audio clips. Moreover, Guo narrates the story in English and then in Mandarin. All of this creates a realistic sensation, a sense of knowing Beijing, its residents, and its atmosphere without physically being there, which results in a simulated dérive.

The dérive is a way to inhabit space. According to the Situationist International, the best place to perform the dérive is in an urban space. Participants in the dérive separate themselves from their daily activities such as jobs, media and leisure and are drawn out by the attractions and encounters in the city. Additionally, the more people who participate in the dérive as a group, the more likely they will conclude that the experience was rich. In addition, the dérive holds the idea of the psychogeography.

Debord's notion of psychogeography attempts to create a new awareness of the modern city and the urban landscape. According to Debord, it is a detailed study of how specific geographical environments affect the emotions and the behaviors of individuals.

Freeman's work interrogates Debord's notion of psychogeography and the dérive within new cyberspaces. *Imaging Beijing,* according to Freeman, expands the concept of the dérive on two different levels. He states: "There is the level that occurs in the field on location, such as in the Hutongs of Beijing. I am testing whether immersive media is capable of capturing and representing the experience of the urban drift and the resulting emergent situation. So there is a quasi-documentary side of the work." [v]

The second level, which extends the notion of the dérive, according to Freeman, is "at the delivery of the work as a new form, whether it is online or in an exhibition. This puts the avatar or audience in the role of the psychogeographer drifting through the virtual world. It is still an image, but one that you can navigate, explore, have adventures and social interactions in."[vi] In other words, the avatar navigates by walking into the spheres. Each sphere is different and includes different audio narratives by Guo. In addition, the sounds that surround him in the Hutong neighborhood enhance the sense of the exploration and adventure to navigate the spheres.

Exploration and navigation are part of the dérive that occur in Freeman's work as well as with the Situationist International. Furthermore, there are more similarities between the theory of the dérive and *Imaging Beijing* that Freeman applies to his work. First, the subject of both the dérive and *Imaging Beijing* is the modern city. Second, in both dérive, the navigation starts in a specific place, be it a street in Paris or the Earth disk in *Imaging Place.*

Finally, the dérive deals with chances of social engagements, unique conversations, and new relationships. When one drifts through a city, one encounters a large number of people, and therefore there are many possible encounters. The same happens in Second Life, where other avatars access the same place simultaneously. The virtual world allows people from all over the world to connect through the form of their avatars. The unfamiliar creates the opportunity to develop new relationships that will start with a chat. Furthermore, Freeman encourages the use of more than one avatar. This is because avatars can share their online experiences with other avatars they meet and add comments on his work. The same is true for the dérive, the more participants, the more objective the conclusion.

According to Freeman, "Like all good dérive, one must be willing to become lost."[vii] In *Imaging Beijing*, there is a feeling of losing one's sense of awareness, especially when entering the spheres. The avatar merges into a panoramic photograph of a real location in central Beijing. Thus, as the avatar merges with the location and the surroundings, a sense of true direction is lost. Moreover, because of the fusion between the avatar and the photograph, there is a sensation of mixed realties. The panoramic photographs, the sounds, and the audio narrative are real. The mix takes place when the avatar merges with those elements. Thus the lines between the realistic and the photographed landscapes are blurred. It becomes, according to the American philosopher Richard Kearny, a *pseudo-world* where "the line between the imaginary and the real has been abolished."[viii] This elimination of the boundaries among the real and the imaginary result in a simulated experience.

The simulation is a term that the contemporary theorist Jean Baudrillard discusses in his book *Simulacra and Simulation* (1981). Baudrillard claims that modern values can no longer be applied to current society and are considered dead. The existence of simulation, implosion, and hyperreality are the inability of the consciousness to distinguish between reality and fiction[ix]. This is partially due to the virtual world's ability to blur the lines between the two. Thus hyperreality also relates to simulation, which is the process of replacing real with virtual. By using virtual reality according to the theorist Sherry Turkle, we "blur the boundaries between self and game, self and role, self and simulation." [x]

Simulation is the reason why *Imaging Beijing* does not translate to the real experience of drifting in urban space. However, Freeman is not trying to do so. He simply investigates whether the dérive is possible in Second Life. *Imaging Beijing* is a semi-simulation of Freeman's real dérive, made specifically to install in Second Life. Thus the avatar only experiences one view of the urban city, as it appears in the eye of the artist creating the virtual installation.

To conclude, Freeman has already acknowledged in his project *Imaging Places* that he is inspired by the ideas of the dérive. He is not trying to replicate the dérive, but he uses the geography in such a way as to develop "new practices for the Internet."[xi] He has succeeded in bringing the technique of the psychogeography into Second Life with *Imaging Beijing*. The avatar is a psychogeographer, drifting through the satellite images of Beijing, and it experiences the Hutong neighborhood by entering into and merging with the panoramic photographs contained therein.

 However, the navigation—the drift—is done by sitting at home in front of the screen. There are no real dangers that one encounters in a real dérive; the avatar cannot be injured by walking on the virtual platform. This is different from Debord's notion of the dérive where risks are part of the drift in the modern city. Because there is no risk, sitting in front of the screen makes the participant a spectator, which is the opposite to the intent of the dérive. The participant using his avatar is not getting out of the house and being drawn to the city's possibilities.

Furthermore, he is being seduced by the interactive simulation and is therefore engaged in a new stage of the spectacle. Then again, the avatar still navigates through virtual space. It is a mix of spectator and navigator. Could this be the next step in the evolution of the dérive? Does this suggest that the spectator/navigator must participate in a particular way in order to have a more random encounter, and thus a "dérive"? And if so, does this work reflect back on Debord's original theory of the dérive, suggesting that in the city, as well, the spectator/navigator has a degree of agency and responsibility? These questions are difficult to answer because in some ways *Imaging Beijing* is a spectacle.

References and Notes:

[1] Second Life is a 3D virtual world that developed by Linden Lab. It is a place where Second Life users can interact with each other through their virtual resident an avatar.

[2] The Situationist International is an avant garde artists' collective from the 1960s in France.

[i] Guy-Ernest Debord, Theory of the Dérive (1958). trs Knabb Ken.

[ii] John Craig Freeman, personal communication.

[iii] Best, Steven and Kellner, Douglas. Debord and the Postmodern Turn: New Stages of the Spectacle, 1998.

[iv] Ibid.

[v] John Craig Freeman, personal communication.

[vi] Ibid.

[vii] Ibid.

[viii] Richard Kearney, In the Wake of Imagination (USA: Taylor & Francis, 2007), 302.

[ix] Jean Baudrillard, Simulacra and Simulation (Michigan: University of Michigan Press, 1995), 126.

[x] Sherry Turkle, Life on the Screen Identity in the Age of the Internet (New York: Simon & Schuster, 1995), 192.

[xi] John Craig Freeman, personal communication.

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RANDOM WAR: WHEN ART SPEAKS THROUGH SOCIAL MEDIA

JANICE M. GLOWSKI

Social media is not art, but in the hands of artist Charles A. Csuri and gaming programmers Devin Moore and Wesley Adams, it has become the next playground for a 'Happening.'

A young woman sits at her computer. The archaic sound of a telegraph machine clicks rhythmically, while the names of her friends and family neatly appear across the top of the screen. The synchronized sound and words contrast with the random flashes of red and black 'army men,' who appear in a dizzying and constantly changing array below the letters. She has entered an artist's game called *Random War* (2011).

In Kaprow-esque fashion, artist Charles A. Csuri has placed his renowned work *Random War* (1967) in the hands of people using Facebook, one of the most popular social networking sites of our day. The online version of *Random War* (2011) takes its conceptual cues from the original *Random War* (1967), which used a random number generator to determine which of Csuri's colleagues, friends or a number of famour people, would be slated to one of five categories: "Dead," "Wounded," "Missing," "Survived," or "Medals Awarded." In the original work, the names that Csuri typed into the mainframe computer appear in neat columns in the upper register, each individual assigned a serial number by the machine. Below these outcomes, red and black color-coded soldiers, based on Csuri's drawing of the iconic 'little green army man,' are randomly cast onto a battlefield. They appear tossed about, as if floating in the minimalist, white ground plane. Their haphazard arrangement in the vacuous landscape contrasts effectively with their purposeful stance. People viewing the original *Random War* would recognize many of the soldiers' names; including Gerald Ford, Roy Lichtenstein, and Ronald Reagan; but, unlike Csuri, who directly experienced *Random War's* creation and random process when the mainframe computer printed the results in 1967, they would be left to interpret the results as a static art object.

Random War (2011) realizes Csuri's original 1967 intention — that people experience art as a real-time virtual event. He sought technology that could create a meaningful art object, which personalized the consequences of war. Csuri created a number of *Real Time Art Objects* between 1970 and 1974, many of which pushed the boundaries of art and technology and were funded by the National Science Foundation. However, his vision of *Random War* (1967) as an interactive art object is only being realized as he celebrates his 89th birthday. Using gaming software, Devin Moore and Wesley Adams have written a program that accesses any Facebook Friends' database. Moore and Adams stay true to the original work's aesthetic, carefully preserving *Random War's* (1967) forms and structures. They made raster copies of Csuri's 'army man' (originally rendered as a vector drawing) and tediously duplicated the original machine code-like font.

The online *Random War* (2011) is a thoughtfully made and skillfully programmed animated work that brings *Random War* (1967) to life. It is a dynamic unfolding that feels archaic and cutting-edge, timeless and immediate. It engages and creates suspense without gimmicks and gadgets. Most importantly, in front of a young woman sitting at her computer, it feels personal.

Charles A. Csuri is a traditionally trained artist who taught painting and drawing as a Professor at The Ohio State University for over twenty years. In his early forties, he began making art with a mainframe

computer and punch cards, launching a more than forty-year career as a computer artist. Today, Csuri is recognized as one of the most pioneering computer artists in the world, receiving the prestigious SIG-GRAPH "Lifetime Achievement Award" in August 2011.

References and Notes:

Janice M. Glowski is an Assistant Professor of Art History and Religion at Wittenberg University, Springfield, OH. She has been studying and curating Charles Csuri's art since 1999, and is editor of the exhibition catalog Beyond Boundaries: Charles A. Csuri (1963 – present).

STRUCTURING SOMNOLENCE: SLEEP SCIENCE TECHNOLOGY AS A MEDIUM FOR DRAWING WITH THE BODY AT REST

Lisa Carrie Goldberg

In December 2010, three volunteers participated in a two-week sleep study conducted by artist Lisa Carrie Goldberg and administered by a certified sleep technician. It was through these nocturnal events that the process of employing the body and the mind during sleep as a means of art making was realised. This paper, therefore, will investigate the fields of sleep science and art.

INTRODUCTION

At present, there is no universally acknowledged definition of sleep. While the science of sleep remains nebulous, now is a time rich with possibilities for artistic intervention and interpretation. According to William C. Dement, a forefather of medical sleep science, the modern incarnation of the field was aided by advances in sleep science technologies and the availability of imaging tools to visualise the brain. [1] Through this advancement in technology, sleep appears more tangible, or at least more visible and more measurable, to researchers. Yet at present, while the production of technological devices is ever increasing, there still exists no unified definition of this corporeal state. In the Structuring Somnolence project, I was not concerned with categorising or labelling sleep. Rather, my investigation is a striving for the comprehension of sleep through various modes of observation and my interest lies in looking at how sleep is being perceived by science today.

The Structuring Somnolence project is an investigation into the points of intersection and commonalities between the fields of sleep science and art, drawing particular attention to the semantic and diagrammatic parallels between sleep science, art, architecture and infographics. Over two years of research, I have seen how aspects of contemporary sleep science warrant highlighting and probing. These aspects pertain to the sleep science's strong reliance on technology and quantification as a means of visualising 'truth' or 'optimum health' or 'disorder' in the endeavour to understand the phenomenon of sleep. A component of this research consisted of a performance event wherein three participants slept over in a sleep laboratory. This act helped to demystify the nocturnal facility by introducing foreign media and 'healthy,' 'non-disordered' sleepers into the space.

SLEEP AS REPRESENTED THROUGH SCIENCE

The study of sleep is a learned language. In its contemporary form, it is composed of an alphabet that can only be acquired and deciphered by an acutely trained eye. Therefore sleep is also an exclusive language. [2] The graphical interpretation of sleep seems to have become the sine qua non for professionals working in sleep research, linking symptom and diagnosis. It remains, at its core, a human-made device that may or may not completely and faithfully reflect the workings of sleep, much less its essence. Without the materialisation of an image either to prove or disprove medical predictions, technologists and clinicians would be hard pressed to find solutions for 'sleep-related issues' with any certitude.

The application of lines as inscription identifiers for sleep research has undergone many incarnations, with each technological development adding to the visual dictionary of sleep throughout history. In its

scientific qualification, sleep is given a written language consisting of a variety of expressive line drawings ranging in thickness, shape and colour – each feature corresponding algorithmically to a physiological process. This contrasts with painterly depictions of sleep, traditionally represented in the fine arts as a scene from a nightmare or as a body lying tranquilly supine, eyes shut and no movement.

In the sleep laboratory, when a patient makes a claim concerning a condition relating to his/her sleep, the claim may only become valid once a data image is produced. The lines in a sleep graph wield tremendous amounts of scientific credence. These lines represent the health of the subject as it pertains to sleep. There appears to be an almost unquestioning reliance on, and trust in, the machine. One aim of the Structuring Somnolence project was to debunk this notion. By constructing drawings with the body using sleep science technology, I bring about a rupture with its normal purpose and highlight the possibility that the computer or 'inscription device' [3] can lie; even when it seems to be all that meets the eye. Theorist Don Ihde makes reference to imaging technologies as 'truth-telling' devices, stating that they "carry this 'eyewitness' quality" and an "aura of seeing-believability." [4] This reliance on visualisations through a "framed space" [5] or "technological mediations," [6] reduces sleep research to an almost monosensory approach.

SLEEP AS A VISUAL LANGUAGE

The imagery and text in the Structuring Somnolence project play with semantic and diagrammatic appropriations across various disciplines. I am interested in the juncture at which seemingly opposite fields meet. The term 'sleep architecture' is commonly used by sleep researchers and technologists to describe a patient's period of sleep. Visually similar to that of a natural or built landscape, it reflects the stages of sleep and awakenings that take place across the night of a study. In the 1980s, Alexander A. Borbély depicted sleep patterns as diagrams, presenting the stages of sleep as the "Sleep Staircase" and REM as Doric columns. [7] Body positioning, as recorded in sleep also produces images that resembles structural landscapes. With this notion in mind, I felt compelled to explore the possibility that the science of sleep is malleable both in its definition and in the application of its designated technologies.

STRUCTURING SOMNOLENCE

In December 2010, I conducted a two-week performance study in collaboration with both SymbioticA, the art-science research laboratory and the Centre for Sleep Science at The University of Western Australia. I was aided by Stuart King, manager of the sleep centre, who was also the head technician for the entire series of performances.

As part of the experiment, three participant sleepers selected a copy of one architectural/landscape image that appealed to him or her in a significant way. Throughout the development of the project, the participants were made aware that together we were attempting to mirror this image through their body positioning in sleep. From the onset, it was explained to the participants, that this project was not about 'sleep hygiene,' sleep efficiency or even a good night's rest. In fact, I would be interfering with their sleep.

The participants were chosen based on their interest in sleep as well a confirmation that they had never been inside a sleep laboratory and had no identified sleep disorders. These volunteers were given the

rare opportunity to see documentation of their sleep in addition to having access into the inner, nocturnal workings of a sleep laboratory. For me, as the lead researcher and conductor of the studies, I was interested in finding participants who wanted to share in exploring and embracing the strangeness of sleep.

Each participant was required to sleepover in the laboratory over two nights. For their first night, the control experiment, the participants took part in a basic, standardised sleep study. This served not only as a baseline study for the entire experiment but also as an aid in familiarising the participant with the laboratory environment and protocol.

The second night, the Somnolence Structuring, involved my intervening with participants throughout the night. It was my responsibility to place the participant's body in a set positions that mimicked their chosen architectural/landscape image. The aim of this animation was two-fold. It was to have the participant's chosen image mirrored in the body position graph depicted within the computer software, which is conventionally used for measurement and diagnosis. At the same time, it would call upon the notion of sleep as an 'active state.' In addition, it would play upon the term 'sleep architecture' through architectural forms built by the body. The Contour Diagram was employed as a draft or map, which was used throughout the studies. It was a booklet comprising a series of structure outlines or contours superimposed on the participant's chosen image. I then plotted the timescale of the entire study, approximately 11:30 pm to 6:00 am, against their chosen image. This booklet was used as the template directing the repositioning of bodies through the night.

Once the participant was in his or her allocated room, electrodes were set in various positions on the body along with the sensor, which was placed on the chest. The electrodes indicated when the participants were asleep and their stage of sleep throughout the night. These sleep indicators included: Electroencephalogram (EEG) for brain waves, Electromyogram (EMG) for chin muscle movement and Electrooculogram (EOG) for eye movements. An Electrocardiogram (ECG) as a heart monitor and a Transducer belt as a breathing monitor were employed as a safety precaution. A body sensor, which was fastened to the Transducer belt that sat around the chest, was responsible for collecting data on the participant's various body positions during sleep. The sensor captured four types of body positions: right, back, left and front. Each position is represented as four coloured bars in the body position graph: red, blue, green and pink. In order to produce the artistic outcome of the experiment, each movement of the body was predetermined by a timescale that spanned the participants' entire sleep period throughout the performance study. This was outlined in the Contour Diagram.

SLEEP AS A FORCE TO BE RECKONED WITH

Much of this project has been about playing with invisible forces, whether they be the nature of sleep or our internal, intangible circadian rhythms. Recognising that sleep is a powerful force, I invariably experienced a sense of urgency when repositioning the bodies. This was because the body position sensor tracked and recorded every allocated posture it sensed every 30 seconds. Sometimes I was unable to move the body fast enough or, in a few instances, I had found repositioning difficult on account of resistance from the sleeper's body. Also, if the participant's body were to move of its own accord, which is a natural submission of the human body to sleep, I was responsible for gently restraining it and expediently repositioning it. This became a mediated guidance. On other occasions, the body position sensor

became loose on the belt. The result was a calculation configuring and recording of the 'wrong' body position, not the one planned and outlined in the sleeper's Contour Diagram. Because of these features, my position and role within the room was crucial.

Technically speaking, if the body position sensor was placed in one position for more than 30 seconds, that position would be recorded on the sleep position graph. This then equated to a race against time, in that if the sensor was off kilter in some way, I had no more than 30 seconds to remedy the situation before it would be imprinted on the graph forever. And since one of the objectives of the studies was to create a replicated image of the participant's chosen structure within the sleep graphs, every second – the equivalent of a line – counted. Working within this zone of urgency kept me alert and sustained my concentration throughout the night. Leaving a major factor of the project up to chance significantly aided my alertness and awareness, both of which were imperative in such a situation: struggling to stay awake, in a dark room, while watching someone sleep, throughout a night and into the early morning. What can be seen as the final product of each Somnolence Structuring is a graphic depicting coloured lines that match and those that do not. It is in these 'happy mistakes,' these moments of missing coordination, that the force of sleep is exemplified.

SLEEP ARCHITECTURE AS SOMNOLENCE STRUCTURING

The three architectural/landscape images chosen by the three different participants were the Parthenon, Monument Valley and the Perth city skyline. Each image had its own unique challenges and intricacies. Enacting the Parthenon involved an acute awareness of timing and a repetitive, simple motion. This consisted of only two moves, right and front, implemented precisely every half-hour for the entire night in order to give the shape and look of the iconic columns.

The vast expansiveness of Monument Valley, Utah, as enacted by the Somnolence Structuring, was translated into long stretches of time – periods of two hours occasionally – where no engagement with the sleeping body was required. And yet, in these lengthy durations were moments where alterations to positioning had to be conducted in precise 2–4 minute blocks of time. These motions were required for the final graph to reflect the intricate detail of the rocks silhouetted against the Utah sky.

The Perth city skyline is an image that most closely resembles that of 'sleep architecture' or a body position graph in its original form. Because most of the buildings on this horizon are flat rectangles, coordinating this structuring involved a relatively even balance of time spent positioning the body and time of non-engagement.

Along with observing sleep as an experience embodied within others, for me the Somnolence Structurings entailed comprehending sleep viscerally through a phenomenological approach. [8] Sleep, most often, just comes upon us, or over us; it sweeps through us. However, when it is taken away from us, it is, a form of a debilitation. Thus I come closest to understanding the essence of sleep when I deprive myself of it. The very lack – the very need – allows me to approach, as near as I now can, to grasping sleep, as that is when it visits us (while we are still in consciousness) in its most concrete and tangible incarnation. This could be said to be a universal experience, however, as long as we have not grasped its essence, its lack gives us a visceral experience and one way to attain a sense of it.

Rejecting notions of sleep as 'an inactive state' or 'life's little death,' these body focused works became intimate engagements between artist and subject, who performed together while teetering between

transient states of consciousness – the artist being awake, tempted to sleep, and the participant asleep, waking slightly with every body reconfiguration. This duet emancipated the sleep laboratory bedroom from its purely scientific function.

Sleep, being outside conscious awareness, always escapes the observation of the sleeper. It can only ever be observed from without. There is a strong link between the impossibility of pinning down the lived experience of sleep and the unending variations and immense diversity in its representation within the arts. Like much art, Structuring Somnolence is playful as it is serious; it is a game played with nature in that I set up parameters and regulations as a sort of organisational tool or framework for the piece, knowing very well that in the end these will be ineffective as science and irrelevant to anything of a utilitarian nature. The act of carrying out an unconventional sleep study experiment as a performative artwork is, in and of itself, a reminder of the artificiality, the theatrical staging quality, of the sleep laboratory bedroom. With the data that emerged from the sleep technology commonly used to calculate and measure patient's sleep, together artist and participant forged a new configuration of graphics.

STRUCTURING SOMNOLENCE AT VISCERAL: THE LIVING ART EXPERIMENT

I was offered the opportunity to present my research at an exhibition entitled Visceral: The Living Art Experiment, which ran from January 25 to February 25 2011, held at Science Gallery at Trinity College in Dublin, Ireland. In essence, this rendering of Structuring Somnolence was similar to the experiments held in Perth: an all-night performance that produces certain outcomes – both intended and unintended ¬– including a body position graph that mimics the outline of an architectural/landscape structure. As with the laboratory experiments, a volunteer sleeper and a sleep technician were required for this adapted version. On this occasion, variations to the experiment consisted of the environment in which it was situated and the technology used to conduct the study.

Structuring Somnolence at Visceral was an exercise that purposely invited unknowingness and happenstance. How would this live sleep event unfold amongst the myriad variables as a juxtaposition to the studies of the private, protectively encased sleep laboratory? Bedrooms specifically designed as sleep research facilities are crammed with technological apparatuses. However, with the advent of portable sleep measuring devices, also known as portable PSGs, it has become possible to gather data on a patient's sleep while that patient is removed from the laboratory setting by using Bluetooth wireless technology. The same technology was employed for this rendition of Structuring Somnolence.

This sleep study was to serve as a public performance event, a single nine-hour performance from January 28–29 2011, wherein people passing on the street became witnesses to the experiment taking place in real time, 9:00 pm to 6:00 am to be exact, only inches away from the glass façade of the Science Gallery. The portable PSG, was used to measure a basic electrode application set-up for a sleep study. In this gallery study, the participant sleeper chose to replicate the street block directly across from the Science Gallery. He liked the idea of mirroring what he saw and what he knew would be right beside him as he slept.

It was neither my main objective nor my main concern to wholly replicate the studies held at the Centre for Sleep Science inside Science Gallery. While the plan was to follow loosely the processes of conducting a sleep study with an artistic outcome, the concept behind Structuring Somnolence at Visceral, stemmed from a desire to see what would happen when we transported the sleep laboratory systematisation into an art space.

CONCLUSION: SOMETHING TO SLEEP ON

The investigation put forth by way of Structuring Somnolence was not to detract from the empirical values of science, but rather to highlight other ways of knowing and experiencing. Far from being a motionless and passive state, sleep has its own unique form of energy and dynamism. While scientific research has been among the ways of discovering this, one crucial role of art and my practice, is to defamiliarise all that we have named and categorised. This defamiliarisation serves as a reminder that sleep is a phenomenon, and that it is a lived, felt, forceful experience and one which can be expressed and interpreted in a multitude of ways.

The overriding demand to seek this 'truth' has led to evaluations carried out in artificial conditions (laboratories) with the subjects adorned in a plethora of clinical paraphernalia. As a way of approaching and addressing these matters anew, the development of this creative process focuses on harnessing the sleeping body as a means for drawing so as to repurpose sleep measuring and diagnostic devices for artistic gains.

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BUILDING COMPLEX REALITIES: ARTISTIC USES OF LOCATIVE MEDIA AND AUGMENTED REALITY

M. Luisa Gomez Martinez

This text intends to analyze the artistic uses of LM and AR systems as indexes and catalyst of a paradigm shift in the relations between real and virtual spaces. This paradigm, articulated around notions as mobility or hybridization and concreted in "augmented spaces", is understood both as a result and materialization of the epistemological paradigm of complexity that regulates the social construction of reality since postmodernity.

Throughout the 20th century the artistic realm underwent a progressive transformation due to its increasing intersections with technology. This caused a redefinition of the artistic object's aesthetic basis and its relation with the spectator, but also meant the multiplication of genres and typologies linked to the new production, visualization and communication devices. However, in the last three decades and due to the Internet's expansion, the aesthetic boundaries of art have rapidly extended beyond its limits thanks to a whole new set of technologies related to the Internet and based on different types of information processing which, every time more infiltrated within the socio-cultural environment, fluctuate between everyday uses and artistic applications.

Thus, after the development of Net.Art and the improvement of the Virtual Reality (VR) systems in the 90s, we have witnessed – since the beginning of this century – the development of new artistic forms related with the Locative Media (LM) devices and the Augmented Reality (AR) systems, which in turn are frequently combined and closely related to the development of wireless interconnection networks.

Without focusing on the debates that question the aesthetic specificities of LM and AR or, especially in the case of LM, its status as an artistic avant-garde, we are interested in analyzing their "artistic uses" as indexes and catalyst of a possible paradigm shift in the relations between reality and virtuality, a role that can be played thanks to the reflexive and experimental way in which the artistic practices use the new technologies as creative tools, therefore expanding – at a phenomenological and imaginary level – its potential uses and interpretations. This change in paradigm is articulated around mobility, reterritorialization and hybridization of spaces, and, at an epistemological level, signifies overcoming a dual and exclusive model of reality to give way to a model based on integration, multidimensionality and complexity.

Comprised in the term LM are all those communication technologies which involve localization; that is, that "provide a link or information related to a specific place by means of GPS devices, mobile phones, PDA, as well as portable computers or wireless networks." [1] On the other hand, the term AR alludes to a data visualization system that involves "the laying of dynamic and context-specific information over the visual field of a user." [2]

One of the novelties of these systems – in comparison with the technologies used in Net.Art or the VR – is that they enable new mobility logics. While the traditional interfaces for accessing Cyberspace – computers or VR helmets – implied a total or relative physical immobility in relation to the terminal, the LM in general, as well as the smartphones and other AR visualization devices, allow information to be instantly accessed from a fully mobile position. Therefore, to our infinite capacity of virtual mobility

through the immaterial networks and information fluxes – which allowed us to virtually overcome the spatial-temporal barriers in communication – we must now add the capacity for actual mobility. Apart from entailing a considerable increase in the complexity of our perceptive experience, it allows us to control information in our surroundings (now constantly re-defined and implemented with virtual information) and transform our relations with the same. This new relation to information corresponds to what Lemos defined as 'informative territories': areas in which the information flow on the intersection between Cyberspace and urban space is digitally controlled. [3] This produces what Manovich defined as 'Augmented Space': "the physical space that is overlapped by dynamic and changing information." [4]

These new interactions with our surroundings through the 'augmented' flow of information on reality and the ability to control it, imply new ways of inhabiting, occupying and experiencing physical space; they make up different reterritorialization strategies that seem to challenge the widespread notion in the 1990s that the emergence of a Cyberspace and the potential virtual ubiquity involved a process of deterritorialization of subjects and objects, weakening their relationships with the material space and leaving it practically obsolete. Although some authors like Haesbert have deeply questioned the deterritorialization concept, [5] the truth is that some artistic practices such as Net.Art, VR and all those based on Tele-presence, have contributed to establish within the social imaginary the logic of a progressive exclusion of real space in favor of a virtual space which – as pointed out by Castells – absorbed all our social and cultural logics. [6]

However, the reflections and experiences proposed by the artistic practices based on LM and AR point at the reterritorialization and hybridization of spaces. Far from focusing solely on virtual space and pushing physical space into the background, they reevaluate the latter as a place of action with a geographical location: they make us reconsider our relation with space, redefining it through new potential/virtual narratives and rebuilding it by means of new socio-cultural routines based on physical mobility. In this way, the LM (proposing new pathways and cartographies based on social action over the physical space) and the AR (introducing a new paradigm in regard to Cyberspace where virtual objects are rendered on the physical space) promote a logic of spatial hybridization that reflects, manifests and materializes the complexity of our current technologically mediated reality.

The project *WalkSpace: Beirut-Venice* by Connor McGarrigle, currently on view at the 54th Biennial Exhibition of Venice, exemplifies the abovementioned within the context of LM. The piece consists of a tour through the cities of Lebanon and Venice, interconnected with each other in such a way that the tour through Lebanon is guided from Venice and vice versa. As the artist himself points out:

"The object is not to create a finite discrete work but to create a peripatetic relational space which can evolve and respond to the situation, the desires of its participants and serendipity, with the work being created through the actions of its participants. The space is furthermore overlaid with a hybrid, networked space connecting both cities and augmenting each space with the absent presence of the other." [7]

The virtual 'pavilions' exhibited at the Biennale make up another example of this new relational paradigm between virtuality and reality, in other words, of the ways in which the physical environment is transformed aesthetically and phenomenologically through virtual information. The official project *Invisible Pavilione,* commissioned by Simona Lodi and the extra official projects of the artistic group Manifest.AR, transform the venue's empty spaces into new AR pavilions, even setting a refugee camp on St. Marco's Square.

The presence of these projects at the Venice Bienniale, but also at many other exhibition contexts during the last years, can be understood as an attempt to demonstrate the new artistic possibilities offered by these media – especially by AR, which aesthetic and critical potential have only recently started to be explored by art. But is also symptomatic of the expansion of a new model regarding space and reality.

In this model, what is real and what is virtual are no longer experienced as two opposed territories in constant tension, but rather, become flexible and osmotic. Whereas, until not so long ago, it was only possible to penetrate the virtual realm, these types of practices have caused virtual information to leak into reality, altering not only our relationship with space and its aesthetic forms, but also creating a new concept of reality based on the synthesis of both elements, leading to an augmented, complex, hybrid and multidimensional reality in which what is real, virtual, imaginary and symbolic become inseparable.

The epistemological paradigm of complexity being developed since the beginning of the 20th century – subsequently spurred by cybernetic and information system theories – and which seemed to reach its full philosophical expansion during postmodernity, is no longer an accurate metaphor to describe a new reality, but rather, through the visual and visualized information accessed 'here and now', becomes an aesthetical and phenomenological experience that adopts the shape of an 'Augmented Space'.

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CHAMELEON: A STUDY OF EMPATHY

Tina Gonsalves

This paper will discuss *Chameleon,* an interdisciplinary video project exploring empathy and emotional contagion. *Chameleon*, shown at ISEA as part of the Australian Forum, is a six screen video installation, foregrounding emotional contagion and empathy. This paper will focus on the development of the cross cultural emotional expression video portrait database built for *Chameleon.*

Fig 1. Chameleon, installation view, Fabrica, Brighton, UK, 2009 (photo: Philip Carr)

Fig 2. Chameleon 7, installation view, RMIT Gallery, (as part of ANAT's Superhuman: Revolution of a species) Melbourne, Australia, 2009 (photo:Mark Ashkanasy)

Fig 3. Chameleon 6, installation view, Natural History Museum, (as part of After Darwin: Contemporary Expressions) London,UK, 2009 (photo:Natural History Museum)

Past work:

My work has always explored aspects of the intimacies and vulnerabilities of being human. In the past I have explored the emotional signatures of our bodies, using pulse, sweat, prosody and movement as agency for moving image interactive works that highlight the nuances of emotions and its importance in our lives. [1]

Universal Emotions and Cross Cultural Nuances.

When we feel emotions, they tell us something important about ourselves, our relationship with the world and our relationship with each other. The ability to read emotions in both others and ourselves is central to empathy and social understanding.

Researchers suggest that over eighty percent of human communication is encoded in emotion facial expression and body movements. In the 1960's Psychologist Paul Ekman traveled the world, from the USA to tribes in Papua New Guinea, showing pictures of facial emotion expressions to people. Following anthropologist Margaret Mead's theories, he had set out to establish the differences in emotion expression. To his surprise, he found more similarities in the way people express and understand emotions than differences. He concluded that the facial expressions of some emotions are not culturally determined, but universal across human cultures and thus biological in origin. He established that the five universal emotions that all cultures can read and respond to are fear, sadness, happiness, anger, and disgust. This research lead Ekman to develop the Facial Action Coding System (FACS), a system for deciphering which of the 43 muscles in the face are working to express emotions at any given moment. Using FACS lead to a verifiable database of facial expressions representing emotional states. This research revolutionized the study of emotions and although these images and research is now nearly forty years old, this verified database is still prominently used in most emotion neuroscience research today.

With in our own culture, the understanding of emotional expressions happens automatically and without much conscious awareness. We are highly attuned to subtle and covert emotional signals and people automatically and continuously synchronize with the facial expressions, voices, postures, movements of others. Through the dance of unconscious mimicry, we become carriers, infecting each other with our emotions, forging a bond with each other long before we utter a word, blending into the tone of our emotional environment. The face informs the self, not just others. One of Ekman's most fascinating findings is that if a person merely arranges his face into a certain expression, he will actually feel the corresponding emotion. This is the beginning of how we catch each other's emotions. Scientists call the mimicry of social situations the 'Chameleon Effect'.

However when we are taken out of our 'in-group', one discovers quickly that cultures do differ considerably in their use of emotional expression and cultural display rules vary about when, where, and how one should express emotions, how these emotions are experienced, the reactions they provoke and the way they are perceived. For example, research suggests it is Russians, closely followed by the Japanese and South Koreans, who most tightly control the display of their emotions, which may make Americans (who display the least control over their facial expressions) feel uncomfortable. In the West, we are more focused on the individual, with more attention to our own inner states and feelings, in the East one reads the emotions of a group with a lot more ease. As the complexity of our society broadens, when communicating, the overlay of cultural display rules can often get 'lost in translation', leading to a membrane of disconnects and negotiation.

Building Chameleon: An emotionally responsive video portrait project exploring empathy

With Chameleon, an aim was to investigate the social role played by the unspoken language of emotional expressions while exploring personal, technological and scientific biases and nuances.

To build *Chameleon*, we focused on three parts, the emotional code that triggered the video portraits was developed with neuroscientists Chris Frith, Hugo Critchley and Bruno Averbeck. The facial emotion reading technology that monitored the emotional expression of the audience was developed with affective computer scientist Rana El Kaliouby and Ros Picard at the MIT Media Lab. I directed the video database developed with everyday people sourced over the world. While developing *Chameleon*'s code, the video database and interaction, we worked with Nadia Berthouze to analyze user experience. Working with curator Helen Sloan, we decided to take a more experimental and intuitive approach to exhibition, developing the work in nine progressions, turning each exhibiting experience into a 'lab'. We exhibited at a range of venues, including hospitals, museums and galleries.

Chameleon's emotional video portrait database:

Most scientists agree that we respond differently when we look at an image of a chair, and an image of a face. Intuitively I know when I see a face, I can feel my body shift, an awareness takes over my body. Science tells us that with the perception of faces, major activations occur in the brain particularly in the *fusiform gyri*. I was interested in creating a work that exploited our biological predisposition towards faces. [2]

I was interested in creating a new, more dynamic video database for emotion studies, and I hoped this could be of use for science. [3] It was important to shoot the work cross culturally to explore the cultural, social and individually determined responses to the six universal emotions being explored

in *Chameleon*. Faces are rich and varied, a brief glance of a face can provide us with knowledge to the individual's gender, their origin, their emotional state, their familiarity to us, their personality, their attractiveness or interest in us which in turn, influences our emotional response. I wanted to pick up on these nuances.

Over a year and a half, I set off over the world, asking volunteers to be filmed expressing emotions. Shoots often took place over weeks. The subjects were shot in a private studio space with a neutral black background, with simple lighting.

Technical considerations for the shoot

As a video artist, it was important to create Chameleon's video database using the medium of video. Although a 3D computer graphic rendered model of portraits would have been a much easier to create, easier to control, and more fluid, I was adamant that I wanted to document real people as part of the database. I was concerned about the 'uncanny valley' affect of 3D imagery. The theory holds that when renderings of people look and act almost like actual humans, they become overly "strange", thus will fail to evoke the empathic response I was looking for. At the beginning, I attempted to adhere to high production values using 3 HD cameras, large studios. I realized I needed to release this ideal and respond to the people I met everyday. I had my camera, a black sheet and made do with ad-hoc lighting so I could work with a range of people, in a range of spaces, in range of countries. I attempted a lot of continuity in post-production.

When creating the interactive design of *Chameleon*, it was integral to develop a novel interactive solution that matched both the conceptual and metaphoric content of emotional contagion. For a work about social emotions, it was an obvious choice to explore automatic facial emotion reading technology. It allowed for group interactivity, no training was needed with the audience and the monitoring of emotional state could happen from a distance, therefore a more fluid and seamless interaction loop could develop. Conceptually, interaction mode was delicate, provocative, and by analyzing the face, it was intimate. It also elicited awareness of these types of emotion recognitions technologies (both with fear and intrigue). We developed with the software with the MIT Media Lab (the software is called FaceSense). [4]

When designing the shoot, I was very aware that when the audience viewed the final video portraits, the emotional impact of the video portraits would need to trigger an unconscious emotional expression response in the viewer that the facial emotion expression technology needed to recognize.

Emotion Eliciting Techniques in the Studio

I elicited the emotional states using various techniques guided by my collaborators and others (psychologists, psycho-analysts, acting coaches, actors). For example, with disgust, I would ask the participants to view footage of people vomiting (that I had shot previously for a collaborative project about disgust). For surprise, I would talk calmly and then scream as loud as possible. For sadness and anger, I employed classical psychoanalytical techniques such as encouraging the volunteers to imagine different personal emotional scenarios from their past and to re-enact them as if in the present. I would often discuss personal emotional memories while shooting the participants facial emotion expression response to the stories. The studio time became a very intimate, vulnerable, trusting and often moving process for all involved. For a shoot to work, I learnt to listen attentively, subjects became friends.

Cross-cultural effects revealed themselves. One participant from Portugal displayed barely discernable emotions. North American participants were often the most vocally and facially expressive. Generally, participants from the UK had a harder time expressing anger. I wrote in my studio notes in March 2008 while working in Canada "...*It's taken a while to get comfortable asking people to evoke emotions. It's been exhausting, because it feels so personal. It's been a varied response, ranging from deep deep crying for half an hour to more laughter and very light expression..*" Whereas my notes in April 2009, working in Paris "*It's harder to coax Parisians to reveal emotions… I need to spend more time getting to know participants, to develop a more trusting relationship. The studio time needs to be much longer than it was in Canada…*"

On reflection, despite cultural differences, sadness was the easiest emotion to elicit. Most of the shoots resulted with the subjects in tears, sometimes deep crying lasting for up to an hour. I had to halt my intuitive response to step in front of the camera, to hug them, and make them feel better. I could only watch from behind the camera, and at most times, I ended up crying as well. After the shoot I asked the participants to reflect on the experience. *"I felt messy and really really sorry for myself and very very lonely which made me feel even sorrier for myself… I felt like she* (the artist) *had been my therapist and that I owed her £50 for the session".* (email correspondence with artist August 2009)

I had developed a database of emotional expressions that were both felt and also acted. At first, I was on a 'search' for authentic, felt emotions, however, I soon realized that this was not important. In everyday we express emotions that are not 'felt', and their primary purpose may be some sort of manipulation . In everyday life, we seem to have an embodied awareness which drives a constant search of each others' faces for truth. I also wanted this dynamic to evolve in *Chameleon*.

By the end of the project, I shot 30 participants, adding up to a 23-hour database of mostly non-verbal facial emotional expressions.

Post production

This material was treated carefully. Some footage was edited, as the footage would have been detrimental to the participants, as it was too private. Some footage was given back to the participants, to make their own works from. I edited the work by assigning in and outpoints for each emotion. I wrote in my blog in August, in Brighton 2009: *"…I have built up compassion and attentiveness in the studio, I then have sat and analyzed and categorized that footage – more as looking at narrative and science of what an emotion is. This process has felt harsh – as if I am fragmenting a lovely relationship, objectifying it, making it into a production".*

Audience Response to Chameleon

The work was exhibited often, with most exhibition venues providing a chance to evaluate audience interaction. We tested a range of scenarios, with different types of screens (3D, low pixilation, High Definition, sculptural), displaying different portraits. We worked with the UCL Human Computers Interaction Center to evaluate the work.

Throughout the interviews of participants, feelings of intimacy came up repeatedly in the interviews although they were not explicitly part of the questions. In many cases the audience was affected by the emotions expressed by the characters, and the constant search for meaning and introduction of context

generally followed this. *"I was thinking of some sad things that happened to me, when [...the digital portrait] was sad for a while, it felt like a long time, and it reminded me of some things."* Also, *"I didn't like it when he looked sad and I didn't know why."*

A goal of the work was to bring up reflective questions about our own emotional expressions. *"I made a man start to scream, which was a little worrying - did I look like I needed to scream? Did I look frustrated? I then of course looked worried, which made someone else smile to make me feel better..."* Another reports that the lack of interaction had made one questions there own facial expression *"maybe I have got a tired face, umm… and sometimes when I am not smiling people say to me 'oh cheer up, as if your … you know, maybe I do give that off instead of my feeling like I am emotionally upset or angry."*

Exciting Initial feedback suggests that the contagion of emotion leaks out of the gallery spaces. *"I went out afterwards and felt like I was picking up the feelings of everyone I passed."* My hope was that *Chameleon* reminds as that our body as a clear-cut distinction with the rest of the world is dissolved, revealing that we are all interconnected.

The Art and Science collaboration

Chameleon successfully brought together a genuine and rare collaboration across the boundaries of arts and science, creating art installations, research papers, and novel, more dynamic models for scientific research. I was very aware, in choosing the title *Chameleon*. It related to the project, but it also reflected my artistic role. As I collaborated, looking at my work through new lenses, I was moderating my language accordingly, depending on whom I was working with. My work was becoming a synthesis, influenced by the qualities of multiple collaborators, attempting to reach a balance that would meet the needs of each collaborator. I felt like a Chameleon, shifting, adapting, a 'changing self.'

The scientists involved in *Chameleon* reported feeling a sense of 'freedom': Chris Frith sees the cross disciplinary collaboration as liberating: *"This project has developed far beyond what I would dare to do in the carefully controlled experiments that we are restricted to. But the end result will provide us with marvelous tools for doing new experiments."* Nadia Berthouze writes: *"I see Chameleon as a source of ideas for the creation of digital environments conducive to patients becoming aware of their emotional states".* Rosalind Picard, who is mentored the building of the face reading technology, is interested in its use for people with autism: *"As I watch people to learn from the interactions portrayed. These are scripts with naked emotion, uncovered, and whether ugly or beautiful, they are hard to turn the eyes from. Here is an engaging palate for helping people who don't naturally understand emotional interactions, and who want to deepen their ability to do so".*

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1. http://www.tinagonsalves.com
2. I had had an interest in dynamics of portraiture for years. In earlier work such as Feel: Trace (2005), and Feel: Ferment (2006), I had began to explore the static facial emotion recognition databases most often used in emotion research such as the Ekman and Friesen Database, and the Karolinska database. In Feel: Insula (2007), I had begun the creation of a new moving image portraiture database that searched for a more authentic expression of emotion. Over a few months, I worked with clinical hypnotist, David Oakley, asking him to hypnotize me into different emotional states to create a more genuine representation of emotional expression. This became part of a video installation, and also the voice track for a short film, Feel: Melancholia (2007).
3. A large percentage of current scientific experiments exploring facial emotion expression uses Paul Ekman's 1970's visual database of static facial expressions representing emotional states. Since I finished the database in 2010, I have had quite a few requests for the database to be implemented in science studies.
4. Please visit http://www.tinagonsalves.com/chamcatalogue.html to download an interactive catalogue about Chameleon.

ELICITING COMPASSION : AN ARTIST IN RESIDENCY AT THE MAX PLANCK INSTITUTE, LEIPZIG

Tina Gonsalves

This talk will discuss my residency (funded by the Australia Council's Inter Arts Board) based at the Max Planck Institute for Cognitive & Brain Science in Leipzig, a research center in Germany working with the director of the social neuroscience lab, Prof. Tania Singer. Singer's research area explores the role of trust, compassion and altruism in our lives.

Fig 1. Group photo of invited researchers at "The How to Cultivate Compassion Workshop 2011", Studio Olafur Eliasson, Berlin, Germany, July 2011, (Copyright: Max Planck Institute/Studio Olafur Eliasson).
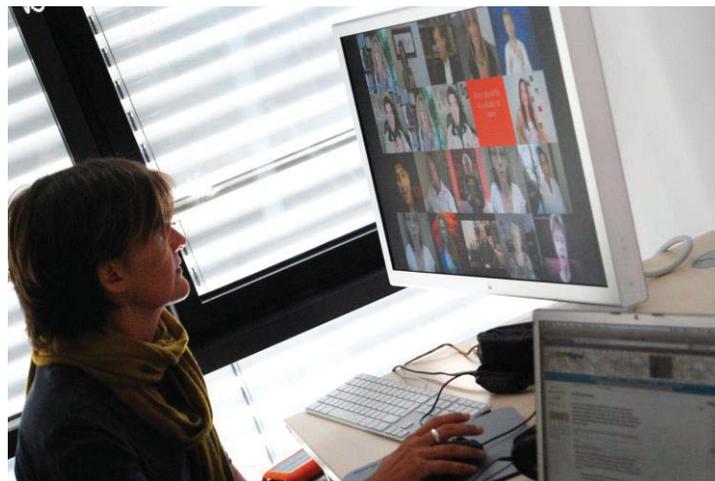
Fig 2. Tina Gonsalves working at the Max Planck Institute, Leipzig, Germany, August 2011 (Photo: Matthew Wild, copyright: Tina Gonsalves)

Fig 3. Tina Gonsalves testing "Percolate" which uses eye display technology developed by Nokia Research Center in Finland. The conversants look probingly into each others eyes as they converse, Nokia Research Center, Tampere, Finland. (Photo: Martin Schrader, copyright: Tina Gonsalves)

PROBING THE PSYCHO-PHYSICALITY OF EMOTION

As an artist, my work has always explored the emotional body through drawing, painting, collage, video and interactivity. I met Prof. Tania Singer, director of the Social Neuroscience lab at the Max Planck Institute for Cognitive and Brain Science in Leipzig, six years ago, when I was immersed in a year-long fellowship Arts Humanities Research Council/Arts Council England fellowship at the Institute of Cognitive Neuroscience (ICN) at University College London (UCL). I was at the ICN working with neuroscientist, Hugo Critchley whose research explores emotional psychophysiology, and Singer was part of Critchley's group.[i] Singer was at the ICN working on some very interesting experiments exploring the effect that love has on empathy. At this time, Singer had just began developing her interest in how meditation may impact the biology of the brain. Singer invited me to the initial meetings at the ICN with Matthieu Ricard, a Buddhist monk, French interpreter for the Dalai Lama and member of the Mind & Life Institute, an organization dedicated to collaborative research between scientists, Buddhist scholars and meditators on the effect of mind training and meditation on the brain. Singer began scanning Ricard's brain while he meditated in the fMRI scanner. I found it fascinating.

EXPLORING SOCIAL EMOTIONS

After my fellowship with Critchley, I began to work with social neuroscientist Chris Frith. Singer was part of both Critchley's and Frith's research groups. I initiated a residency at the Wellcome Department of Neuroimaging at UCL, working Frith. I was curious about how our sense of self arises from our need to map relations between self and others. Frith was discussing how a building block of human interaction is emotional contagion, the tendency to catch and feel emotions of others, so that we automatically mimic and synchronize with the vocalizations, postures, and movements, converging emotionally. Emotional

contagion can sow the seeds of empathy, as one then begins to identify with another's feelings. We embarked on a video project called *Chameleon*, exploring emotional contagion and empathy. Over nine prototypes, we worked with a range of research institutes to transform scientific, technical and visual theories of emotional transfer into poetic interactive installations driven by emotions of the audience and the portraits on the screen. Each day the mood of the *Chameleon* portraits adapt to the range of visitors' emotional expressions, affecting the tone and emotional ecology of the   gallery space. I worked with a team of human computer interaction scientists to study audience experience. *Chameleon* was successful in exploring the concept of empathy and foregrounding emotions.

ELICITING COMPASSION

Chameleon lead me to contemplate ideas of compassion, and how it could be highlighted in the interaction scenarios of the work. Compassion is a complex state of being. Empathy explores the feelings of another. Compassion requires empathy, and it also requires a time investment, as one feels compelled to alleviate or reduce the suffering of another. The Dalai Lama discusses compassion in dialogue with Paul Ekman in their book 'Emotional Awareness: Overcoming the Obstacles to Psychological Balance and Compassion'. *"… It is translated as a sense of connectedness, a sense of endearment to others, where the idea is cultivating a state of mind that makes the sight of others' suffering unbearable to you. Cultivation of that is the crucial component of compassion. It is said that the stronger this sense of connectedness, the greater your feeling of unbearableness when you see others suffer. . . . When you reach that state of mind, then others are seen almost as an extension of yourself, as part of you."*

These thoughts lead me to contact Singer. Since our first meeting six years ago at the ICN, Singer, along with other renowned scientists, had been working with the Dalia Lama and his close circle exploring the biological effects of compassion meditation on the brain and body. I was intrigued by Science's interest in incorporating a more holistic approach to knowledge. I was also intrigued by Buddhism's interest in science *'offering powerful tools for understanding of compassion, revealing the interconnectedness of all life, and that such understanding provides an essential rationale for ethical behavior and the protection of the environment'.* (Dalai Lama)

In 2010 Singer was awarded a large European Research Council (ERC) grant to research "Plasticity of the Empathic Brain: Structural and Functional MRI Studies on the Effect of Empathy Training on the Human Brain and Prosocial Behavior". We decided that the time was right to begin a residency.

In September 2010, I began the journey to the Max Planck Institute in Leipzig, Germany, meeting with Singer, and her ever-growing team. Singers' approach is multi-method and interdisciplinary, combining techniques and paradigms from the fields of neuroscience, bio-psychology, economics and the arts. The ERC grant will encapsulate an ambitious longitudinal study, taking place over a twelve-month period (the initial starting date was March 2011). Up to 200 subjects will be recruited. The subjects will have little or no background in meditation techniques. Over a year, they will undertake compassion training, while partaking in everyday life. They will be monitored up to six key times over the year (fMRI scanning, pathology, self reporting). This is a leap beyond previous studies as most studies of compassion training usually take place over a shorter period. The training usually takes place in a 'retreat' type of environment and the subjects usually have some meditation back ground.

Over the study period, the group are investigating the degree to which short and long term affective and cognitive training can significantly induce functional and long-lasting structural neuronal changes in the brain and lead to pro-social behaviour. They are also looking to the hormonal, health-related, and behavioural changes.

As an experiment like this has never been done before, much time has been spent discussing approach. Over long meetings, protocol and ethics considerations get refined. We discuss the importance of appointing the appropriate teachers to administer the compassion training. My role has been to brainstorm how we can use technology to create 'compassion interventions' with in everyday environments. Each of the subjects will be given a mobile phone that will be both a reporting tool and a tool to elicit compassion. A secure web based 'meeting point' may stream meditations, hold each days learning activity and become a place to share stories of compassion. It may also hold questionnaires, options to upload comments and chat online with subjects.

In July 2011, Singer held the "How To Cultivate Compassion Workshop" to refine the protocols, teachings and ethics that will be implemented in the longitudinal study. The workshop was based at the Studio Olafur Eliasson in Berlin. Eliasson is an Icelandic contemporary artist known for sculptures and large-scale installation art, employing elemental materials such as light, water, and air temperature to enhance viewer experience. In 1995 he established the Studio Olafur Eliasson a laboratory for spatial research where he collaborates with scientists, artists, architects and engineers. Eliasson is working with Singer on a compassion based project from the 2012 Olympics. Over four days, a mix of neuroscientists, psychologists, psychotherapists, academics, Buddhist monks, artists and like-minded international researchers studying compassion gathered. The approach to this gathering was more experiential, less didactic. Powerpoint presentations , 'p' values, graphs and statistics were not high on the agenda. Instead the discussions about compassion moved into 'interventions', so each of the researchers can 'experience' the teachings. This was matched with macrobiotic vegan food and group meditations designed to elicit compassion. Throughout the 5 day meeting, I found myself crying often! Reflecting, many of the Scientists were walking around Eliasson's studio with red and swollen eyes, which resulted in a lot more discussion, hugs and also laughter. For all involved, it was a felt, compassionate learning experience. I find this multi-method approach of Singer's is intriguing and inspiring. Out of the workshop she gathered committed key advisors to help oversee the study.

To me, it seems Singer is also attempting to 'live' the study. When we discuss the study, she often speaks about it very personally and her words become emotional. She talks of meditating daily and often attending meditation retreats. Quite a few members of the group meditate each day. Before I arrived, Singer and her research group undertook an eight week Mindfulness-Based Stress Reduction (MBSR) program together. The course was developed Jon Kabat-Zinn, at the University of Massachusetts Medical Centre. He sees it as ' *a way of learning to pay wise attention to whatever is happening in your life that allows you a greater sense of connection to your life inwardly and outwardly'*. The MBSR program started in 1979 and is now offered in over 200 medical centers, hospitals, and clinics around the world. The training teaches methods of stress-reduction and formal practices in mindfulness meditation, encouraging the development of greater compassion. The group reported that undertaking a course like this with work colleagues was enlightening, vulnerable and strange. However, it did lead to a lot of the key issues that the subjects will encounter when undertaking the longitudinal study: Attendance motivation, ethics, the importance of great and inspiring teachers, the importance of keeping the study secular, and deeper issues of trust and sharing.

CREATING COMPASSION INTERVENTIONS

My role here is viewed in many ways. Some researchers see art as a way of making the science more accessible, working well for public engagement. Others see it as the illustrations of concepts, communicating new ways of seeing, moving the science forward. I see my main role here is to influence the 'design' of the protocols. Artists often investigate ideas in different ways than scientists, allowing fresh perspectives. My knowledge in biosensors and creating 'emotive' video content, as well as my work with mobile technology and the web has influenced the structure and delivery of the protocols. I have been working on a range of video databases that may elicit feelings of calmness and altruism and anxiousness. Throughout the residency I have been holding 'compassion' interventions with in the lab and the other departments of the Max Planck Institute. One intervention created 'moments' of compassion, asking the researchers to define compassion, discuss personal memories where compassion was the primary feeling. Another explores how compassione renders itself on the face, asking the researchers to look at the video camera while mediating on compassion.. Another intervention explores a heightened awarenss of time, inspired by Marina Ambromovich '*The Artist is Present',* and psychological studies, I asked particpants to sit opposite me,as we sit and non verbally communicte for two minutes.

While at the Max Planck Institute the aim is to shift this research into *The Nowness Project.* This series aims to disrupt 'communication' technologies that have become embedded into our everyday social interaction, revolutionizing the way we share information and experiences to those close to us. In particular, I have been repurposing live chat, video conferencing such as skype, and social networking tools. I was interested in the idea *"We are more connected than ever, yet people report feeling lonelier and more isolated than ever"* (Cacioppo). By understanding more about compassion, I am hoping to embed compassion eliciting techniques into the coding /visualization/performance design/ interaction strategies of the work creating 'compassion interventions'. We are negotiating if and how we can implement these into the studies.

The first prototype we have been working on is *Present Perfect Continuous.* Audiences will download a chat programs/widgets to there own computer systems/phones. The objective is disruption: Audiences will have to rethink habitual communication response as the chat program will only allow them to talk in present tense.

The second prototype in production is called *Unravel.* It explores, via chat program interventions how language shapes our emotional feelings and how we make sense of the world around us. Objective is intimacy: The work will look to neuroscientific paradigms to probe the emotional content in text (rapid linguistic processing) aiming to recognize when emotions are expressed in text and then generate text with specified, more overt, expression of emotion eliciting questions.

The third prototype is called *Percolate.* It uses eye display technology developed by Nokia Research Center in Finland. As a phone call begins, a captured image of the conversants' eyes is transmitted to each conversant via the eye display technology. The conversants look probingly into each others eyes as they converse. The objective is to create new, more intimate communications by breaking down the usual social ritual of body space and cultural difference in gaze frequency and duration. At the Nokia Research Center, we conducted an explorative user study in a laboratory context with five pairs of users to understand their experiences with this system. The results show that this kind of mediated communication can cause a variety of experiences, such as "interesting", "surprising", "tranquil" or

"pleasantly strange". Overall the user study suggested the full-screen display appears to create a more focused communication, and thus can help make the discussion more intimate and focused on the moment. We envision that a system like this could become a tool for deeper listening.

A fourth prototype is called *Take a Look Through My Eyes*. Research suggests that imagining yourself in 'someone else's shoes' helps increase your empathy for their plight. This prototypes reworks skype and eye display technology to transpose each other's vision. First person viewpoint of video is taken through video attached on eye display. This is streamed to each of the conversants. The video facing the conversant's eye is also captured. This is masked, for example, we can experience when each other blinked, stared, changed eye gaze. *Take a Look Through My Eyes* allows us to escape the confines of our own worldview, and allows them to see things from each other's perspective – the beginning of empathy.

A fifth prototype *Ponder,* is an intervention that allows one to ponder on oneself. Most communication devices allow us to communicate with others. This communication device allows one to communicate with oneself – an intrapersonal communication. Glasses are repurposed with mirrors, so the wearer can only contemplate at him or herself.

A sixth prototype *Breath* is an application that sends out a sonic breath file to computers and phones at key times, as a small intervention to remind people of the present.

The Max Planck residency has provided a platform and a reflective space to conceptualize and produce projects, share ideas and knowledge while learning more about the themes that are essential to my work. The institute and Singer have been generous in supplying a private office, access to the building, researchers, all talks, and organizing access to an apartment in Leipzig. Although the actual study has been put back to 2012 (due to the logistics of housing new scanners, construction of new buildings, refining protocols), both Singer and myself are now investigating how I can spend more time in Leipzig to be involved with the actual study in 2012.

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Critchley's research in interoceptive awareness (consciousness of internal bodily state) was integral to my work. At the time, I needed to know more about the body's signatures of emotions: how to probe, entrain and monitor emotions to create emotionally responsive video installations, generating an awareness of the internal sensitivities of the body that we usually ignore. Together, we created Feel_Series (2005/06/07), a series of installations that responded to heart rate, sweat and movement. We also created a range of visual databases for use with in Critchley's scientific experiments to probe different emotional states.

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THE USE OF ANIMATION IN THE GENERATION AND DOCUMENTATION OF IDEAS IN SYSTEMS PAINTING

PAUL GOODFELLOW

This is a review of my personal application of animation techniques to analyze and document visual rules within in systems based approaches to painting. I describe my art process and how animation is used to document visual decision-making at each stage of the work's development. This process allows me to capture any deviation from the system. My interest is to document the intuitive decision making processes within a controlled environment

Figure 1, Berlin Walk, (Color Study detail), 2011, Paul Goodfellow, Digital Film

Figure 2, Berlin Walk, (Composition Study detail), 2011, Paul Goodfellow, Giclee print, 422mmx297mm

Figure 3, Berlin Walk, (Detail), 2011, Paul Goodfellow, Acrylic on canvas, 1600x1220mm

This paper will summarize the systems art making process of the author and how animation is used to generate ideas and document visual decision-making processes at all stages of the development of a piece of work. This paper is written in the first person, where it relates specifically to the authors personal experience and work.

As an artist with a systems background, I am interested in the borderland between systems based approaches to investigation and intuitive experimentation in art. In thematic terms I am interested in applying this to the areas of environment and place and how this can be experienced and interpreted as an artist in four-dimensional space and how this can be reduced to an essential representation in a painting.

SYSTEMS ART

Systems have been identified within most disciplines and in simple terms can be described as a set of integrated elements that form a coherent whole. Boulding noted that 'a system is anything that is not in chaos. We could turn the pattern around and define a system as any structure that exhibits order and pattern.' [1] Systems theory, as applied to art grew from a group of conceptual artists in the late 1960's, such as Burham, Haacke and Sol-Lewitt who referenced Weiner's Cybernetics, and Von Bertlanffy's General System Theory in their writing and work. Their work was concept driven and organised by rules, and although referenced or incorporated technology made a distinction between their conceptual art and art-and-technology, (electronic art). Sol Lewitt's noted the divergence between conceptually driven cybernetic work and technology driven work in his essay "Paragraphs of Conceptual Art" (1967). He described conceptual art as a quasi-mechanical process: "In conceptual art the idea of concept is the most important aspect of the work . . . [t]he idea becomes a machine that makes the art." Whereas electronic art was in danger of being uncritically focused on the materials and the spectacle of technology. As Sol Lewitt's stated "new materials are one of the great afflictions of contemporary art. . . . The danger is, I think, in making the physicality of the materials so important that it becomes the idea of the work (another kind of expressionism)." [2]

A key figure in Systems Art is the artist Hans Haacke. In 1971 he proposed a Guggenheim show in which a caged Mynah bird repeated the words 'All systems go'. Haacke could not train the bird to repeat the phrase though, and the project was treated as a conceptual proposal. The suggestion in the title is that ultimately all systems are open, and subject to failure or uncontrollable external factors. In an earlier work, (Chickens Hatching, 1970), Haacke had created a controllable system that relied on a simple feedback system of lamps and thermostat to control the hatching of chicks. This contrasts with 'All systems go', as the later work relied upon a parameter that could not easily be moderated in a system; namely the bird talking. [3]

I am interested in the space between these two works. I am interested in controllable systems, and the limits of controllable systems. I am interested in the role of the artist, and whether the Mynah bird's free will represents the free will of the artist to submit completely to a system, or even the viewer and their role in the wider distributed system.

BACKGROUND

I originally worked in development of Geographical Information Systems, (GIS), for environmental and development projects. I was drawn to the way complex physical and social systems were integrated, modeled and visualized spatially and temporally. In my research I was coming across spatial and temporal patterns and phenomena in the data that could not be explained by the defined system or model. I was finding visual patterns in the data through intuitive visual manipulation, (such as animating the data over time), that could not be readily explained by subject specialists. I did not understand how I could perceive patterns in the data, when the system could not support such a finding. Thus the system required constant revision to accommodate the new findings. Alternatively the limited models could be understood as offering a supportive framework to interrogate the data to a certain depth, but ultimately the last step required an intuitive leap of the imagination. It was this borderline between a well-defined system and the transgression of the system that fascinated me, and continues to fascinate me as an artist. How systems are revealed, revised, transgressed and fail.

WALKING AS AN ART SYSTEM

Collecting experience and information through walking is a personal attempt to bring the technological approach of spatial analysis in the forms of GIS and GPS along side the surrealist, aesthetic and impressionistic approach of visual art. This duality of objective and subjective is accommodated in the ideas of Psychogeography. The origins of Psychogeography can be traced back, primarily to Paris and to Charles Baudelaire's 1863 essay, The Painter of Modern Life in which he described the Flâneur, "a person who walks the city in order to experience it." [4] The first major written work by aFlâneur practitioner was the unfinished The Arcades Projects by Walter Benjamin in which he documents in great detail his walks and interactions in the former arcades of Paris. This idea of the passive urban stroller was transformed in the 1920's by the founder of surrealism André Breton who used the urban stroll as a positive tool to challenge perceptions of reality. Over time the perceived failure of Surrealism to reform society through these methods new, more explicitly political groups developed that played on surrealist ideas. The Situationist International, under the direction of Guy Debord did much to define Psychogeography as it is understood today. At the heart of Psychogeography was the aim of combining subjective and objective knowledge and studies and Debord attempted to resolve this inherent paradox in his 1958 book "Theory of the Dérive." [5]

On another level my work references environmental art and artists, such as Richard Long and Hamish Fulton. Long, for example, has based his routes on geometry, giving his walks structure and a self-contained composition. Thus he avoids any sense of ritual or potential narratives, such as the following of Ley Lines. He has also removed any historical associations from his paths, to concentrate on the geometry. He uses systems to keep his choices to the minimum, so the walks don't become a personal response to or expression of the landscape. In contrast my walks, although based on systems, (which can include geo-information, maps or socio-economic systems,) are a way of finding the point where I can transcend the system in both walking and mapping terms and express a deeper essence of the place, as articulated in Heidegger's conceptions of place and topology. [6]

On a practical level walking has been chosen as it is a direct way of experiencing a place qualitatively, and a useful way of capturing data quantitatively, due the relatively slow movement through space. A walk can be defined as an art system that produces outputs, which in turn is representative of both the environment and sense of place. The walks I make are a private performance that is recorded. The art work made from the walks are a culmination of organizing and interrogating the recorded information in

a systematic way, and then transcending this order to make controlled, but spontaneous decisions during the final making process.

METHODOLOGY

I take a walk and document the walk with digital cameras, and log the positional information with a GPS device. I use this as source material to make animations that map the walk through the duration of the film. I also attempt to reduce the walk to a single image by collapsing all the frames into one image. This is made into computer-generated images, drawings and paintings.

The work is based on a set of procedures for the collection, organization, and manipulation of the source material. The source films are re-played and manipulated in real-time through a set of systematic rules that are controlled through numerical ranges, and digital controllers, as you would a computer game. At this stage the work being created is a mix of programmed rules and variables that are being manipulated by the controller. It is therefore a piece of work that is contained within a rigid set of rules, albeit one that allows for a range of choices. Animation is crucial at each stage of the creative process and these will now be described in order.

Stage 1. Data collection using stop-motion animation

During a walk a time-lapse camera is worn on the chest. This automatically takes a photograph every 10 seconds, and a GPS logs the position. The geo-located images from the walk are turned into a stop-motion film.

Stage 2. Studies in color using real-time & procedural animation

Using a digital drawing tablet a continuous line is drawn over the film, directing the pen to sample colours and aspects of the photographs that interested me. The line produced is combination of sampled colours and sampled photographic details. In my other hand I controlled a set of midi sliders to control parameters such as sample size. This process requires a continuous line to be drawn for the duration of the film. See Figure 1.

Stage 3. Studies in composition using real-time & procedural animation

During this stage compositions can be generated in real-time through a combination of intuitive interaction with certain parameters using midi controllers, and procedurally controlled parameters that are driven by data, such as altitude. From this process several outputs can be derived. These include computer-generated prints, drawings based on paths taken from the GPS, (gpx), files and detailed studies for compositions. See Figure 2.

Stage 4. Painting development using projected animation

The real-time animations made at the composition stage are complete when I am happy with the composition. As this is recorded as a film I can scrub backwards and forwards through time to understand how the image has been constructed and use it as a guide for the construction of a painting. At this stage the animation is projected onto the canvas, and used as a frame of reference. The overall composition of the painting will be taken from the animation. Each new element appearing in the animation

denotes a new element for the painting. For each of these elements I need to make an explicit decision on the canvas; whether to use the 'design' from the animation or to make changes in terms of color, shape and position. The only factor that will not change is its relative layer of painting, as this equates to it's position on the timeline. See Figure 3.

Stage 5. Capturing the painting process using stop-motion

During the painting process the canvas is photographed with a camera using remote control shutter control. This captures the addition, subtraction and alteration of each new element. Thereby capturing each painting decision that deviates from the animated version.

Painting is a modest way of fixing variables and glitches in material, that stands in opposition to the increasingly interconnected and ephemeral distributed system of commodified communication and consumption. Painting captures the spatial and the temporal, and all the decisions that have been made regarding the construction of the painting. It condenses time-based work or systems into a single frame. It allows the artist to take something temporal, held mentally and make it visible, non-linear and compositional. It is an antidote to technology, programming, and perfect closed systems, as it is a way of having closure, forcing commitment to the material world. Painting is time-dependent, the drying paint forces decisions within a certain time frame.

Stage 6. Post painting time-based analysis using compositing techniques

The final stage is to replay the real-time animation created at stage 3 and the stop-motion animation created at stage 5 simultaneously. Firstly these will be played adjacent to each other, and secondly they will be overlaid using compositing software. This will highlight the differences between the two works, and these differences can be extracted as a new film. In essence this Boolean operation will generate the difference between the two works, and make explicit where I made decisions that deviated from the system. I am interested in the boundaries between these systematic rules and the intuitive real-time decisions in these works. I am interested in mapping out the systematic, and highlighting the intuitive. A key question to explore in the future is whether there is a difference between decisions made in real-time on the computer in a structured environment, as compared to real-time decisions made in painting in a structured environment?

CONCLUSIONS

There is no such thing as a perfect closed system or model in the real world that perfectly reflects the phenomena it seeks to represent, as there will always be variables that you cannot account for. A system therefore can only be an approximate model of the real world. Likewise a systems-based approach to painting can only be an approximate model, and cannot explicitly encompass all the decisions a painter makes during the painting process.

Animation is used to document the systems methodology I employ at each stage of the creative process. It allows me to capture any deviation from the system; to map the randomness, and chaos. My primary interest is to document in a time-based way the intuitive decision making processes taking place within a controlled environment. Animation is an excellent method for such documentation. Ultimately I am interested to understand what this might say about the relationship between intuition, conscious and sub-consciousness decision-making in art.

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THE MATERIALITY OF DIGITAL UTOPIAS

Baruch Gottlieb

The citizen creator of the current age is advertised to be empowered of unprecedented means for transforming the world. This paper will attempt to evaluate the Utopianism of the digital age with reflection on the material circumstances of the hardware expected to realize it.

Can we see in the predilections of our hardware the concretion of the certain social priorities? Can such social priorities be said to invoke ethical models? And if both questions can be taken, can we then infer that ethical values are inscribed in our hardware? If the response to the last question is positive, as I would like to argue, we have a situation where the highly miniaturized, multiplied automated processes of the hardware that makes today's industrial reality run are perpetuating certain moral values, and that these moral values deserve discussion.

The materiality of our contemporary environment is the product of large, to varying degrees global processes involving the collaboration of myriad people, excavating, working, thinking, planning, moving the materials around until they have settled in the forms we can observe here today. The production of the contemporary surface requires collusion, as Bruno Latour put it "An object cannot come into existence if the ranges of interests around the project do not intersect." [1] these overlapping ranges of interests constitute society. Therefore there is a sociology, and an anthropology to the present and it is grounded in the past, and, going further I claim, the physical reality of contemporary objects are, materially inscribed with the social processes by which they were generated.

If our technology is ingrained with, and propagating, social and moral messages, it is important for artists and critics to inscribe themselves there. When Flusser said "true freedom is to turn the accident around and make something, which was very improbable necessary," [2] he was speaking of Dante writing his Inferno, how unlikely it was that he wrote it, and how it became historically necessary in retrospect. This is exactly the kind of retrospective necessity we need to generate today. We should not take what has happened (the accident) as necessary, but decide what unlikely thing we wish to have become necessary in future retrospect.

I would maintain that there is, at every moment, the possibility, even the propensity for technology to be different than it has been in the past. Technology, as a human product is the site of a battle for ideological hegemony, thus claims of its neutrality are politically spurious. We could, from today, have a very different world of technical effects and objects, engendering different world-views and sociabilities, if, or course, the "ranges of interests" of enough people involved would intersect to support enough divergent projects.

It would appear that our age is very well disposed to exploring alternative social modes. Instead we have a society which is profoundly conservative, prey to the least threat of insecurity, constantly assailed with threats of various kinds, air and water pollution, distant and immanent wars and terrorism, global environmental disaster, etc. The litany of dangers reformulated endlessly over the course of every day's news feed, engenders an atmosphere of insecurity which cows populations into submission to any

regime which promises to protect them. In other words, despite superficial technological advance, politically we are still living in the 1700s, if not the 1300s. This fact alone casts significant aspersions on the claim of the neutrality of technology.

Let us take, for example, design errors which caused the deaths of (according to the US Congress) [3] over six million people. A holocaust broke out in the late nineties when engineers at Apple, Nokia, and other electronics manufacturers determined to use tantalum in their circuit boards. Tantalum's unique heat-resistant and high-conducting properties allowed the next generation smartphones, games and laptops to be designed thinner and lighter. Nobody asked where these materials would come from. Wars broke out for control of mines in DRC and Zambia, and millions were killed. This was patently a design decision which went wrong. Is the design neutral? Obviously not.

In 2002 the European community decided to ban the use of lead in solder. The project was called ROHS, it came into full effect in 2006. Other, safer alternatives to poisonous lead, such as tin, were available, which would protect tens of thousands of electronics assemblers around the world. No-one asked about where the tin would come from.

World-wide transition to non-lead solder for electronics meant that massive and inexpensive new sources of tin would suddenly have to be found. [4] Suddenly a civil war sprung up in eastern Congo over cassiterite (tin ore) mines, [5] hundreds of thousands were raped and murdered as militias, and sections of national armies, often supported by multinational mining corporations battled for control of the mines. There will be no Nürnberg for the inadvertent bureaucratic criminals, who simply though ignorance generated mass slaughter.

Since the earliest days of our 200-year industrial revolution, and before, back through to our philosophical ancestors in the greeks and Egyptians, we have a certain tolerance for collateral damage, human exploitation, slavery, indentured labour, in the interest of social progress. We need to see that cruelty as part of the pedigree of our indubitable technological and scientific accomplishments. My point is that we cannot plan, or even envisage a technical utopia that is conveyed on hardware created under intolerable conditions. I deny the neutrality of hardware as I assert its persistence as a record, an archive of the social conditions of its emergence. As Garcia & Sandler concluded in their article about whether human technological enhancement could help resolve social justice problems "We must fix social injustice, the technologies will not do it for us." [6]

The engineers and designers, after all, were just looking for a practical solution for a technical problem, how to get as much heat resistance and electrical efficiency in the smallest space possible. Their negligence can not be abstracted from their competence, we need to take a sociological/anthropologic view of these specialists and attend to what is motivating them to make the decision they did. Following from Latour, Johansen, [7] Traweek, [8] my own field research, and that of others, I claim that the decisions of the engineers were based on their immediate social needs inside their company, ethical concerns about any possible repercussions of their actions were not significantly considered. Their quest for status by having solved the design problem overruled their ethical skepticism. They hide whatever shame they have behind a simplistic notion of progress.

"The various manifestations of socialism destroyed both their peoples and their ecosystems, whereas the powers of the North and West have been able to save their peoples and some of their countrysides by destroying the rest of the world and reducing its peoples to abject poverty. Hence a double tragedy: the former socialist societies think they can solve both their problems by imitating the West; the West

thinks it has escaped both problems and believes it has lessons for others even as it leaves the Earth and its people to die. The West thinks it is the sole possessor of the clever trick that will allow it to keep on winning indefinitely, whereas it has perhaps already lost everything." [9]

In this quote we have a good critique on how the convergence of political economic agendas between capitalist and former socialist nations after the fall of the Berlin wall was based not on reasonable evaluations and commitment to an empirically superior system, but on self-delusion and false advertising. Industrial globalized capitalism is just one of innumerable possible economic systems for the people of the world, yet it is presented teleologically as a foregone conclusion, meanwhile it requires permanent maintenance of an atmosphere of imminent doom and threat.

If the technicians at Apple or Nokia, (and all the other cellphone producers, and the computer chip producers and the game unit producers, they are all in it together) had been motivated to create technologies which were really beneficial for all humanity right now and not just factoring in the potential deleterious effects of their design decisions as collateral damage, necessary in the war for market dominance, we might have seen the emergence of numerous divergent alternative forms of technology, since the materials needed for the smartphones, video games and computers we have today would have come at too high a price. Technology is not neutral, its values are inscribed in its hardware.

Electronics company technicians could be encouraged to create design solutions which would somehow foster social renewal in the countries where they live, but they are not., instead with all values heavily weighted with concerns over profitability, they allocate general prosperity the role of the greater social good, and export the problematic effects of new, urgent and extreme industrial demand somewhere far away and unknown.

Marshall McLuhan, lauded as the great prophet of the electronic age, always declaimed that he made no prognosis, but rather simply observed what was already happening. New technologies, such as nanochemistry do not bring about any Kuhnian paradigm shift either in scientific practice or in society. "It has never happened that a lab has shut down as a paradigm change in Kuhn's sense occurred. No equipment was thrown out, no people (least of all the clerks who produce the required lab equipment) were fired. The Kuhnian denial of the cumulative growth of knowledge is mistaken with respect to the technical side of science" [10] (On the other hand, a lot of consumer products have become obsolete as they were planned to- on the level of production, techniques have remained the same, only the fashion changes.) The last technical revolution was the first one, starting with the Gutenberg press and the steam engine and exponentially since the photograph. Though we in the elite may experience it as a Motley (ein buntes Gemisch) [11] our age is fundamentally not post-modern but rather hyper modern, with century-old industrial processes still humming along inside, albeit miniaturized.

The period we live in is properly not called post-industrial, but hyper-industrial. The industrial paradigm has not been surpassed. The self-proclaimed revolutions in the sphere of communications still utterly depend on industrial infrastructure. The industrial reality hums imperceptibly on in the background, in factories on the edges of the cities and in the great networks of tankers on the oceans. All ths and more are 'assumed prerequisites' for the 'advanced society' in which we exist.

That the electricity which glows this screen-full of hopeful emancipatory meritocratic rhetoric is generated by turbines which have to be built in highly hegemonic systems all the way down, is something I wish to integrate in these very words. We need an epistemology generated from this symbiosis of structure and freedom.

Industrial paradigms persist everywhere in the creation of the hardware on which we generate our software Utopias. Many have heard recently of the sweatshop conditions of Chinese workers who assemble the iPad, how are we to perceive a utopia built on such dispositif? Yes the aspirations of humankind are great, they are also palliatives, rationalizations and apologia for the enormous human sacrifice such aspirations have always required. And after all the sacrifice, how much closer are we to that ideal?

Here I must claim with David Bloor's conservative Wittgenstein that "we don't need the present to contain the future, it is sufficient that it contains the past," [12] the future will be generated out of what we do with our past, not how we prepare or postulate or plan future scenarios. An unprecedentedly variegated technological reality is ready to emerge, will it ever get a chance?

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DISCOMFORT DESIGN: CRITICAL REFLECTION THROUGH UNCOMFORTABLE PLAY

LINDSAY GRACE

Consider that uncomfortable moment in life when people discover a playful experience ceases to be worth playing. Just as an arm is broken on the playground, or a relationship can no longer be mended, there are explicit moments when art transgresses some unforeseen territory leaving us with fear of its potential. This paper explores the potential of taboo game design.

© Lindsay Grace 2011. Characters from Match, a Critical Gameplay computer game about matching races.

Introduction

Taboo is a construct that defines borders. It tells us where we can and cannot go. The social more is as much a looking glass to reflect on our values as it is a place to test our mettle. This paper seeks to explore how games offer unique critical experience through socially prohibited play. It simply seeks to discuss how play through taboo gameplay exposes that which we may not want to discuss. Taboo game experiences are more than just uncomfortable situations, they are opportunities in rhetoric. They punctuate an experience and offer opportunities for thoughtful reflection on social values.

Games are structured play, and it is their structure that reflects social value. The game of tag gives players two options, hunt or be hunted. So too, when designers of games construct play, they are defining a world and its options.

DEFINING TABOO AND THE MOMENT OF DISCOMFORT

Taboo is at its simplest, a strong social prohibition. It ranges from the distasteful to the unfathomable. The borders of the taboo are defined by social values which inevitably overlap, wax, wane and contradict themselves and the borders of those around them. They are somewhat like human emotion, as something clear to sense, but difficult to articulate beyond the tension of shame or ridicule (Browne 1984). It is as the old saying goes, people may not be able to define it, but they know it when they see

it. It is then appropriate that some of the most clear discussion of the taboo and its inherent ambiguity is provided by a text which declares itself as non-academic (Thody 1997), although written by an academic.

While taboo may not have a clear and fixed demarcation in cultural space, it is best defined by its attributes. Taboo is often ostracized and discomforting. When something is taboo, it is often put away, absconded with, or otherwise removed from a general experience. Almost upon release, taboo becomes fetishized or ridiculed (Browne 1984). As a result, taboo play is a very tricky area of research. While many people may have heard of the famed Custer's Revenge Atari 2600 Game (Hernández-Avila 2005), how many have played it? What prevents them from playing it? Is it the shame of seeking it, the fear of enjoyment or something even more dark?

The question of experience is exceedingly important. To know that something is taboo is to have taboo prescribed. To experience something taboo is to understand it. Designers of experience must understand, not merely be told. Likewise the power of taboo experiences are greatly reduced once they are reported instead of experienced. Returning to the example of Custer's Revenge, few people know much about the game's other experiences, only its taboo penultimate experience. This reduces the game from a complete experience to a caricature. One or two traits obscure all else. In so doing, we may even miss the most important element of the design – the moment of discomfort.

The moment of discomfort is the point at which play no longer feels right. It is like the rhetoric of speech. Players are lead down a path and follow intently when the experience is good. The moment of exceptionally high impact is when the player wants to follow, but fears what follows. It is even more impressive when that moment is of great conflict. Like the rhetoric of a powerful orator seeking to change your mind, the game may lead you in, have you nodding, and ultimately encourage you to agree to things you had not planned.

The moment of discomfort is the critical moment. It is the point where all things human meet. Players are at odds with their emotions, their social norms, their identity, and their understanding of what they believe is truth. Even the staunchest defendants of games as something outside of the everyday can reveal a moment when they have asked themselves if they should or should not be playing a certain way. This is the moment of discomfort. It is the moment when the player is brought back to the cerebral tension of reflection. It is the *wait a moment*, moment.

It is important to contextualize taboo and its moment of discomfort in a critical sense. It is not enough to ask why something is taboo. Instead, the important question is what about the moment of discomfort in taboo play makes it uncomfortable. Why does playing mean more than thinking? What actions in play drive the moment of discomfort and what borders of social appropriateness have been transgressed? It is also important to understand that the moment of discomfort is more than its moment. Just as a theatrical production or a political movement are more than just the few minutes of highlights, the moment of discomfort is a result of all game experiences within the subject game and the games that preceded it.

Sex and Recent History:

In the recent controversies of violence and video games in the United Stated Supreme Court one taboo reveals itself grandly. In the recent and widely publicized case involving the banning of violent games

sales to children, the majority opinion voiced by Justice Scallia indicate the dichotomy of sex and violence that are integral to American social norms. He writes "There is a critical difference, however, between obscenity laws and laws regulating violence in entertainment . . . obscenity had long been prohibited, see Roth, 354 U. S., at 484–485, and this experience had helped to shape certain generally accepted norms concerning expression related to sex. There is no similar history regarding expression related to violence." (Brown, Governor of California,et al. v.Entertainment Merchants association et al. 2011)

The fact that prohibition rests not in the malevolent destruction of another simulated being, but in the revealing of their natural parts or by participating in the act that created them is beyond telling. A game franchise such as Grand Theft Auto (Rock Star Games 1997) is not taboo in its acts of malice, but in its acts of giving pleasure. The game is arguably objectionable for its killing, but unsalable for a single act of sexual play, as evidenced by the prohibited sales of the then shocking hot coffee mod (DeVane and Squire 2008). The versions of the game sold with this programmed trap door, allowed players to unlock a portion of the game that affored players the ability to simulate sexual intimacies with a non-player character. When discovered, hot-coffee mod containing versions of the software were pulled from retailer shelves. This was an enormous effort of prohibition.

On the continuum of distasteful to unfathomable, another commercial release sits neatly for American audiences. As the subject of more ridicule than objection, BMX XXX (Acclaim 2002) is a game that reveals that the moment of discomfort is not as simple as haphazardly grinding through taboo. The game is a fairly traditional, collection oriented extreme-sports title for off-road trick bikes. It rewards players by allowing them to see full motion video from the Scores chain of adult entertainment clubs. One reviewer put it succinctly, "aside from making the 'groundbreaking' move of featuring a lot of cursing and strippers, BMX XXX doesn't do anything particularly well" (Gerstmann 2002).

What is most interesting here is that unlike Grand Theft Auto's hot coffee mod, BMX XXX is not prohibited. While both games contain nudity, one must modify Grand Theft Auto to experience it. It is more likely that the moment of discomfort for Grand Theft Auto comes from its simulation. BMX XXX provides full motion, high fidelity images of sexual content in plain sight. Grand Theft Auto provides relatively low quality simulation of sexual acts. The moment of discomfort must then derive not from depiction, but from any variant of simulation. This is a distinct trait of games, as play is about acting, not merely watching.

Yet, the significance of simulation may not be that simple. Consider the Dark Room Sex Game (Collective 2009), which requires players to simulate sexual intercourse by shaking Wii remotes back and forth to rhythm. The game has no images, merely sound and motion. It is also, not generally subject to the same taboo response as Grand Theft Auto.

Grand Theft Auto's moment of discomfort is largely about juxtaposition. Acts of violence repeatedly practiced, among a single sexual act is perhaps far more inciting than the act of simulation itself. This is important, as it indicates a much more complicated relationship to social discomfort. It is not merely that some Americans are uncomfortable with sexual simulations as play. It is that the juxtaposition of sex and violence is somehow taboo. Beyond that, it is the simulation of violence and the simulation of sex comingled that make taboo play. Other games that couple sexuality with violence, such as the Dead or Alive 3 (Team Ninja 2002) tread in a much less taboo area.

Race and Historical Contexts

Juden Raus is an important historical game. It is not important for its mundane gameplay or mediocre design. It is important for its almost abysmal failure. It was an anti-Semitic game, so poorly designed that the Nazi SS audience purportedly rejected it (Morris-Friedman and Schädler 2003). It was considered too propagandist and in poor taste (Morris-Friedman and Schädler 2003).

The game, which roughly translates to Jew Out, requires players to move Jewish characters out of the city limits. For contemporary audiences, the entire scenario is taboo, yet for its audience, it was likewise dismissible. These types of games continue to illustrate the complications in constructing an effective moment of discomfort. It is not enough to be controversial. It is not enough to be bigoted. In the case of Juden Raus or BMX XXX, the designer does little to offer any type of rhetorical structure. Much of what needs to be known about the game is known in its first pitch. These games can be easily boiled down to moments of disrespect and cruel humor, while there experience is flatly structured. That is to say, the player learns nothing more from playing the game, than from hearing it. This is because if they play the game, they are not uncomfortable with its taboo. Or, if they are, there is also a part of them that wants to explore this taboo experience. Like fetish, they are lured by the experience and perhaps even seeking it.

This is an important aspect in constructing the moment of discomfort. While it is not wholly dependent on surprise, leading a player to a conclusion they did not expect is important. This is not a surprise, but it is an action in rhetoric. If properly constructed, a moment of discomfort is like well formed formal logic. If I as player enjoy A, and A implies B, why am I uncomfortable with B?

Ghettopoly (Chang 2003) is a game which touches a taboo topic in American culture. The game is a re-skinned Monopoly (Barbara 2007) based on the parodied experience of American ghettos. Railroads and community chests become gun shops and liquor stores. The game was sold in the popular Urban Outfitters chain, until political pressure removed it. It also resulted in an intellectual property lawsuit. Despite this chain of events, it's fundamentally unclear if the game really contains moments of discomfort. Players received much of what they expected. Simple attempts at humor at the expense of the misfortunes of ghetto life coupled with a pile of stereotype and racism.

The game and the ghetto it constructs are racial and economic. These are some of the United States' most sensitive topics. There are many spaces in race and economics that are fairly taboo for Americans. Yet, the game itself does not land squarely in social prohibition. Perhaps it is because Ghettopoly can be played at home, far away from the population it insults (Lardapide et al, 2010). The moment of discomfort for this game comes not from playing the game, but from where the game is played. Play the game on a city park bench in the middle of some of America's worst ghettos and the game is far more loaded with moments of discomfort. This is perhaps, why Juden Raus also failed. The moment of discomfort is as much about social space as it is designed experience.

Such claims are somewhat supported by the tension of Nazi paraphernalia for German audiences. As localization experts can attest, digital games for German audiences must remove Nazi allusion. This means turning the WWII Wolfenstein (Raven Software 2009) game into something other than a fight to kill Nazi soldiers. Here, the moment of discomfort is directly related to proximity - physical, historical, and social.

Social proximity is even more complicated when considering design source. While many players do not stop to ask who made the game they are playing, moments of discomfort, with their tension of reflection, drive players to these questions. Consider the board game Life as a Blackman (Sawyer, 1999). This game attempts to illustrate with a serious tone the complexities of achieving success as an African American male. The game was distributed by an independent publisher and developed by a young African American marketing professional. While it was never retailed at a chain like Urban Outfitters, it also never achieved the popularity of Ghettopoly nor the critical attention shared by similar games. Is it because a game by an African American, about African Americans lacks the tension of a game about African Americans by Taiwanese American, David Cheng (Ho and Mullen 2008)?

Given how infrequently players ask who designed a game, it may be that Life as a Blackman fails to be taboo enough to be fetishized? Unlike Juden Raus, Life as a Blackman had the support of some members of the African American community (Chadwick 2002). Unlike Ghettopoly, Life as a Blackman also did little to incite frustrations from insensitivity. Perhaps it is because the game was critical, but offered few moments of discomfort. The game instead, structures its rhetoric plainly and without tension. It does not say what is good or what is bad, it merely says what is. In doing so, it offers little opportunity for players to explore taboo around race. It is likely that Life as a Blackman is not uncomfortable because it asks players to explore no space we have not already explored. It asks players to think about many things, but it fails to create that jarring moment that forces critical thinking.

Conclusion

This reflection merely reveals the patterns in moments of discomfort. The important question still remains. What does a moment of discomfort do for critical reflection? The answer depends on the situation. Just as juxtaposition is a harmonic device in composition, or a rhetorical device in poetics, the moment of discomfort offers designers a highly effective opportunity to remind players to think. It is most powerful in its ability to rip a player from the rhythm of play into to the laboratory of thought. Like a child who falls off a bike, or the recipient of a great gift, the player is likely to ask – what happened? Sometimes the moment of discomfort will lead to positive revelations, other times they will be negative. It is most important to understand that it is an opportunity to effect players. It is an opportunity to exploit the rhetoric of play.

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UNDERSTANDING THE ART PRACTICE OF CRITICAL GAMEPLAY DESIGNS

LINDSAY GRACE

The paper explores the recent growth in critical gameplay, an application of critical design to the production of computer games. This paper outlines play pedagogy and game rhetoric, relating critical design practices to the creation of computer games. It attempts to explain the art practice of critical game design, providing a brief digital game history and identifying prominent creative works in this relatively new space.

Introduction

In the maturation of a field, nothing is more telling than the creation of its discontents. Critical Gameplay games are the logical next step in the extension of games into a mature expressive medium. Critical games are political, social, expressive and even philosophical in their address.

These games reflect an art practice that is both intellectual and visceral. It serves as an experiment, eliciting player response and seeking to understand why these alternative ways to play had not been demonstrated previously. Each of the games pursues a single hypothesis with resolved specificity. The games ask questions about player values, gameplay heuristics and how we find entertainment. It recognizes the democracy of play, understanding that people not only like to play differently, but that playing differently expands the potential of games as expressive entertainment.

In design practices, there is a simple dichotomy that can be used to fundamentally describe the difference between affirmative design and critical gameplay design. This dichotomy divides designs by depth and breadth. Design depth is the continued exploration of familiar experiences. Design depth is the improvement of continued experiences, either incremental or dramatic. Design breadth is the exploration of unfamiliar experiences. First designs of any product or experience tend to offer breath, as they lightly explore a number of potentials. Later generation designs, seek deeper exploration of the same basic design concepts.

The trajectory of modern digital game design is largely rooted in deeper explorations of existing game verbs and mechanics (Fullerton, 2008). Under this model, comparatives evolve into superlatives. What was good gets a few models of better, and in time bests are created. Players do more shooting, or more jumping. If they are simulation games, designers may seek more realistic experiences in the pursuit of authenticity. A baseball game may incorporate a weather algorithm, or a car racing simulation may employ more complex physics. The central focus of this type of design is the continued affirmation of previous design decisions in an effort to make a better experience. This is the pattern of affirmative design (Dunne 2001).

The affirmative design model develops much like a plant grows. First an original experience sprouts into a full fledged game. Then subsequent designers employ algorithmic enhancements to that central concept, perhaps bifurcating one key notion or refactoring key elements like a fractal. The mechanics of moving through space move from 2D in Super Mario Brothers (Nintendo Creative 1985), to 3D in Super Mario 64 (Nintendo EAD 1996), and even add a 4th dimension (Blow 2008). It is often not until some element of a previous experience falls from these branches that a new and novel game rhizome evolves.

Consider the number of unexplored designs dismissed by employing this affirmative design model. The

decision tree for design begins with an assumption that what existed previously is worth continuing. Each car racing game, places the player in control of a car instead of the many other possibilities. Is it not equally possible to create an engaging play experience centered on maintaining the cars for another driver? Is it not possible to make an exciting experience where the player does not swing a bat or pitch a ball, but instead manipulates the weather algorithm to support their team?

Critical gameplay, analyzes, reflects and responds to affirmative design by demonstrating the possibility of play and interaction ignored by convention. It fills gaps, reminds players of other perspectives and engages imagination through a different practice in creativity.

If affirmative design is trajectory driven, Critical Gameplay is without trajectory. Critical gameplay is a practice in which players are asked to play differently. The goal of which is to expose players to experiences that highlight the relative absences in our daily gaming experiences.

Pedagogy and Rhetoric of Entertainment

To understand critical gameplay, one must understand how it intersects with pedagogy, entertainment and design practice.

Psychologists frequently identifying the value of play in delivering a safe space to practice skills and experiment (Millar 1968). In this framing, games are merely structured play spaces designed to meet specific goals. Where traditional games like Chess may analogize the battle field, playground games like tag may offer an opportunity to play both hunter and hunted (Crawford 1984). Digital play offers similar experiences. Digital games can simulate the experience of handling the soft suspension of a 1970's sedan or leading a squad of soldiers through a battlefield. The fundamental question for critical game research is what lessons are missing from the canon of gameplay experiences.

If games are inherently pedagogic, then there are several ways to investigate the lessons being taught. The first is to analyze common games, catalog the experience, and assess the lessons. This is the somewhat common practice of investigation into game content. It is well housed under the areas of game studies. Researchers seeking to understand violence in games, for example, have been actively involved in this type of cataloging research (Anderson 2004). The fundamental problem with this research is that it is highly content driven. It is inherently problematized by the act of mining content. Imagine the challenge of analyzing a literary canon by identifying the acts of violence in The Lord of The Rings (Tolkien 2004), The Complete Works of Shakespeare (Shakespeare 1996) and Crime and Punishment (Dostoyevsky and Gibian 1989).

Cataloging what exists does a better job of describing what is, than describing what is absent. If a person wants to add an addition to their house, it is nice to catalog the rooms they currently have, but it does nothing to speak toward the potential of the construction project. Cataloging is a retrospective activity, indicating what has been and is. If an addition is to be built, a person who understands the structures of homes and imagines the unrealized is hired. Building something new is not about cataloging; it is about knowing the catalog and realizing the new.

Another approach to investigating the lessons inherent in gameplay models is much more common among art and design. Instead of cataloging the experience and attempting to apply a scientific schema, artists and developers often create a collection of demonstrations. For critical games, these are functional experiences that not only highlight difference through contrast, they demonstrate other potentials. As literary authors or filmmakers, have previously exposed audiences to worlds they had forgotten how to imagine, game makers have the ability to re-imagine the way players play.

Secondly, while catalog approaches may provide exhaustive lists and somewhat compelling data, they often fail to offer solutions. Evidence merely reveals what exists, it does not provide resolutions. If we understand that games of violence are engaging, and we endeavor to inspire non-violent game play,

isn't it our responsibility to demonstrate how those non-violent games can work? More interestingly, if game design wants wider audiences, isn't it essential that wider play experiences be explored? Critical games are inherently pedagogic. They endeavor to teach by way of example.

For this reason, critical gameplay games are often not only pedagogic, they are also rhetorical. Critical gameplay games make an argument about what is engaging entertainment. They are often responsorial, calling upon a convention and then either exploiting the convention's own assumptions, or inverting them. At their best, they demonstrate the magic of creativity, turning a simple cardboard box into a spaceship. They do so, by converting what can seem like a stale set of experiences into something for which there is no precedent. Or, they can remind designers and players of the discarded potential they dismissed. Bugs are turned into play, like a tin can substitutes for a soccer ball. A pile of rubble becomes a play space again.

The lessons in critical gameplay may not necessarily be desirable, just as varied audiences find offense in conventional play. Yet, critical gameplay is by definition critical. It is self-aware. As an explorer generally knows which way they plan to head, critical designers are directed by something other than the current trajectory. Affirmative design follows the line of logic laid before it. Critical design, sets an uncharted target. Both design approaches may not always land where they expect, but they have distinct paths.

The Design Practice:

Like many revolutions, the impetus of critical design is born from gaming discontent and relative outsiders. If game design is understood as travel down a straight road, critical gameplay design is the scenic route. The designers of critical gamepaly are not seeking to continue the trajectory; they are offering another way to get somewhere else.

These game designers are providing new paths and new vehicles for travel. If the fundamental unit of game design is the game verb, then these designers are most commonly investigating new verbs. Many independent game developers have offered alternative verbs, but what distinguished critical gameplay is that these game verbs critique game standards themselves. Instead of merely offering the ability to do something players have not done before, critical gameplay games reference existing game verbs as critique. They provide notable play moments, that are most novel to games players and least notable to people who don't play games. Just as an 8 sided die is novel to some, and a table top RPG standard to others, the experience of critical gameplay discerns the familiar and the unfamiliar.

In some cases, the most efficacious player of a critical gameplay game is one that has not been trained in conventional play. It is this situation, the benefit of unfamiliarity that highlights the pedagogic content of games and the potential power of critical gameplay. Where a good gamer is typically understood as one who knows all the conventions of games, this inversion of power is a central pivot in critical gameplay. Critical gameplay games may be games that are easier to play for non-gamers than gamers. There can be little better evidence of the pedagogy of games.

Like a good experiment, most critical gameplay games are very specific in their address. They do not attempt to change everything about the way players play, but instead, they seek one or two points of investigation. Instead they may begin by questioning everything, but they end with one specific question.

Early Critical Gameplay Games:

Like many historical first, defining the earliest critical gameplay games is problematic. It could be argued that Monolopy (Hasbro 1990) is an early significant critical gameplay. As a rhetorical game design, it is inherently designed to teach the travesty of landlordship (Orbanes 2006). However, this example fails to appropriately reconceptualize conventional play. All lesson-oriented games are not critical gameplay.

it is important to understand that true critical gameplay is not only different, it is pedagogic and self reflective.

The space of contemporary digital games is perhaps an easier place to begin to identify appropriate critical gameplay. It is easier because it rests on an established canon of traditional and digital play. It is also easier because of documented exploration. These designers explicitly identify their designs as critical, providing the ever essential artistic intention. Much the way the writers of the theater of the absurd appropriately contextualized their work with both intention and a contemporary lens (Esslin 2009).

Digital games were moved toward critical gameplay when the work of groups like Molle Industria and Faber Ludens started their success as early as 2004. Molle Industria creates games that are socio-political. Games such as Faith Fighter (Molle Industria, Faith Fighter 2010), which re-contextualizes religious conflict into a classic fighting game, laid the foundation for critical game design. Interestingly the game is an inversion of critical game design. Instead of seeking to critique play, the game serves as a critique of the social-political patterns which in Molle Industria's terms, are game like (Molle Industria). The group continues to create a variety of games that fuel wonderful tensions between digital play experience and socio-political issues. The Molle Industria games are essentially social-critical experiences, not play-critical experiences.

The Brazilian group at Faber Ludens has also been engaged in design work that is both political and playful. Unlike Molle Industria, which often produces playful tensions, Faber Ludens creates somewhat discomforting interactions. The group investigates concept designs like the Lead Years, a student project which was envisioned as an opportunity to provide interactive contextualization of historical torture in Brazil (Faber Ludens 2009).

Both groups apply the medium as an opportunity to critique societal characteristics, which lays a foundation for players to understand the notion that critical gameplay critiques game characteristics. While many of these games are critical, they too are not critical of the way our society chooses to play. They are more commonly critical of socio-political practices and their likeness to games, than the practices of play as political rhetoric.

Digital Games in Critical Gameplay:

The earliest intended critical games were created by the author of this paper in an ongoing project called the Critical Gameplay project and by Mary Flanagan. Flanagan published a book entitled Critical Play (Flanagan 2009), in which she takes a game studies oriented approach to cataloging critical play experiences. One of Flanagan's most notable contributions to the design of critical gameplay is a Giant Joystick (Flanagan, Giant Joystick 2006). In this work Flannagan offers a new play experience by a simple manipulation of input. She creates an Atari Joystick so large that one player cannot control it by themselves. Instead, multiple players must cooperate and communicate to accomplish the general goals of common, existing games. This is critical game design more in hardware, than game design. Giant Joystick does an essential job of reminding players, theorists, and designers of untapped potential.

The Critical Gameplay project has visited Asia, Europe, and locations in North and South America. The current collection of eight games is well documented through varied conference proceedings and book chapters (Grace 2010). These games are at the heart of critical gameplay practice. A few of the games include:

- Wait: a game that rewards players for balancing seeing with acting
- Bang!: a game that allows the player to kill other players , but by killing them the player must endure a long interruptive experience which forces the player to review the fictive history of their victim.

- Black/White: A game that thwarts the common proactive of stereotyping non-player characters by making threats and non-threats look the same, but act differently.

Recently a new breed of developers have begun incorporating critical gamepaly practices into their designs. One Chance is a game by Awkward Silence (Awkward Silence Games 2010) that highlights and responds to the gameplay standard of multiple endings. The player has the opportunity to play this adventure game through the last few days of earth, but once players complete the game all options for other choices are eliminated. As the title suggests, there is but one chance to determine the game's resolution. It is this omission of second chances that is a direct critique of gameplay standards. If game design had taken a different trajectory, there would be nothing novel about committing players to a single resolution. Yet, it is this concept of only one chance that makes the game noteworthy.

Complimenting this experience is Zack Gage's Lose/Lose. As a self-declared art game, it endeavors to couple a play experience with real world consequence. When the player shoots an alien in the game, the game deletes a single, random file off of the host computer. If the player dies, the game deletes itself. It is this second property that strongly propels Lose/Lose (Gage 2009) into the critical game space. Most games have a pay to stay or learn to play algorithm. If player fails to learn and successfully employ the game verbs they are either subject to game end or required to deposit more money. Yet, Lose/Lose inverts this relationship by eliminating itself. Failing to play the game well, saves the player from harm. Once Chance and Lose/Lose are obvious in their pursuit and not very subtle in their execution. They are big in their presentation, but small in continued potential. Other critical games offer more potential for scale and provide a deeper experience.

A House in California (Elliot 2010) is a nostalgic game. It is a game that is personal in its origin, but universal in its experience. Designed as a kind of homage to Roberta and Ken Williams' Mystery House (On-Line Systems 1980) the game becomes critical at its game verbs. If one evaluates the dominant verbs of typical text and point-click adventures, the verbs are highly physical. The players are asked to act upon the world by taking, leaving, attacking, and others. Elliot provides new verbs, in a standard list of look, remember, forget, play, learn and catch. Remember and forget are much like a cerebral take and leave. Learn is a deeper verb, offering something beyond remembering. These three verbs, remember, forget and learn are at the heart of this critical gameplay experience. Consider how few games have ever afforded the player these actions. Then consider the rarity of a verb which conceptually, but not ordinally builds on the other. It is common to ask a player to punch then kick, but to punch through kicking (which is not the same as punching and kicking simultaneously) is rare. So the player is left with an important ambiguity. If I can remember and forget, what does it mean to learn? An even more important question also arises – why haven't other games employed these verbs?

The opportunity for critical play to make rhetorical claims has not gone unnoticed. Arizona Justice is a game designed (Social Activist Games 2010) as political rhetoric. The game is a fairly standard, small serious game about a political controversy in the United States. The game employs an aesthetic and similar mechanics of Nintendo Wii's Mii Match (Nintendo EAD 2006). However, it is designed to critique the expected nature of an Arizona state law allowing authorities to question people who look like they may be illegal immigrants. The player must determine which players are illegal immigrants as they parade down the screen. The game's primary game verb is ostensibly point and click to identify illegal immigrants. Yet, more careful analysis reveals that the games verb is stereotype and discriminate. While immigrants in the game can be any color, immigrants in the game are disproportionately non-white. The player is encouraged toward clicking on non-white non-player characters, driving the player toward the patterns that the game critiques in opposition.

Critical gameplay design continues, although it is clearly in its infancy. It is the authors hope that game designers embrace its ability to expand the experiences of play and potential to impart new rhetoric.

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NEURAL GHOSTS AND THE FOCUS OF ATTENTION

Jane Grant

In this paper I will discuss the phenomena of cortical sonic hallucination in conjunction with the new artwork *Ghost*.
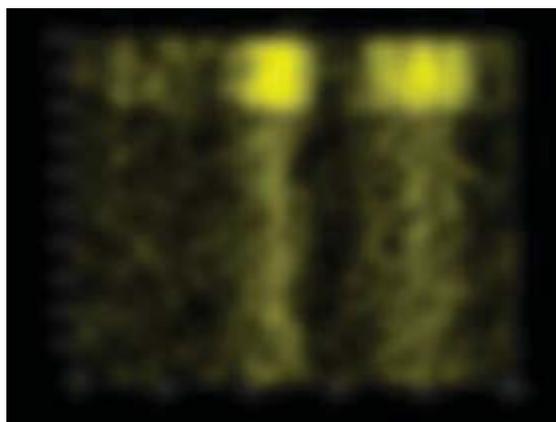
Ghost, Raster Plot, Jane Grant, 2011.

Consciousness as attention to memory is a term that neuroscientist Eugene Izhikevich uses to describe a phenomenon in which the cortex re-lives or re-visits a specific pattern of neural activity in the absence of sensory information. The model brain or cortex, deprived of stimulation, journeys around its own temporal architectures conjuring past 'experiences' or 'memories', pulling them into the present. Evidence that these pathways continue to be re-visited once stimulation occurs again is compelling.

Referring to recent research in developing the sonic artwork *Ghost*, and an earlier work: *The Fragmented Orchestra*, all of which have at their core the Spike Neuronal Network model of Eugene Izhikevich, I will discuss the phenomena of 'sonic ghosts', a term I have used to describe the buffering up of the neural past within the neural present.

What we experience as consciousness occurs at many different cortical locations and timescales. In the paper 'Polychronization: Computation with Spikes', [1] Izhikevich discusses one of the simulated, anatomically realistic models of 100,000 cortical spiking neurons that he and his team have created. These networks of spiking neurons form polychronous (multiple or many times) groups, which fire with 'millisecond precision'. The connection strength between pairs and groups of neurons is intricately dependent upon the difference between spike arrival times, the phenomenon known as Spike Timing Dependent Plasticity (STDP). The groups of firing neurons are 'time locked but not synchronous' [1] and that it is the destination of the spiking and not the activation that gives rise to the complexity of the model. Izhikevich states that these time-based clusters or groups across the cortex, give rise to the beginning of 'simple thought and memory.'

These groups are interesting as they form as a result of STDP, not as a consequence of anatomical clustering, emerging from the 'dynamics of the connectivity between the neurons'. The polychronous

groups, because of this continual formation, grow and then disappear, although some 'live' and become more permanent in the neuronal model.

Izhikevich likens the network of polychronous groups to the immune system in which we appear to have antibodies for all possible antigens, 'even those that do not exist on earth'. He also proposes that these groups contain all possible variation of both thought that is, and thought that is to come – all potential manifestation of human cognition.

A major significance of polychronous groups is that they may represent memories or experience. The neuronal model becomes autonomous, self-activating once a certain threshold is achieved. The model devoid of any stimulation or articulate input generates random memories or experiences not associated with any previous input. The network has exceptional capacity for memory and it is this memory that is re-visited when external stimulus is not present. Once the network exceeds a particular threshold, an activation of groups occurs. These groups represent an external stimulus which go on to trigger other groups so that the number of internally stimulated groups are equivalent to the number of groups activated when externally stimulated. Izhikevich calls this 'the focus of attention.' [1] Therefore when external stimulus is not present, the neuronal model, driven by noisy currents, re-visits some of these firing clusters, following the formation of pathways previously established through external and internal stimulation. In a sense it could be said, that the cortex re-lives previous experiences.

"If the size of the network exceeds a certain threshold, a random activation of a few groups representing a previously seen stimulus may activate other groups representing the same stimulus so that he total number of activated groups is comparable to the number of activated groups that occurs when the stimulus is actually present and it is the focus of attention." [1]

"One can say that the network 'thinks' of the stimulus, that is, it pays attention to the memory of the stimulus. Such 'thinking' resembles 'experiencing' the stimulus. A sequence of spontaneous activations corresponding to one stimulus, then another, and so on may be related to the stream of primary (perceptual or sensory) consciousness." [1]

These streams of primary, perceptual and sensory consciousness are the temporal architectures of the brain, fleeting structures built of time. The structures are remarkable, as the neuronal firing events that the stimulus triggers remain, albeit temporarily, despite that they are no longer being physically, sensorially activated.

The aim of my research is to sonify the events that occur within the cortical structures. Their temporality and complexity are fascinating, in terms of time, the precise, but very fleeting nature of these events, are coupled with the exactitude of the millisecond. Furthermore, each firing event has the potential of infinite dimensionality, complexity in process, thought in the moment of becoming.

The Ganzfeld 'entire or total field' experiment sought to explore extra-sensory perception using mild sensory deprivation, white light and noise, in order to negate defined external stimulation. Regardless of the controversial findings in the field of parapsychology, what became apparent, was that the un-stimulated or sensorially deprived visual cortex begins to conjure vague images or impressions of scenes.

Age related macular degeneration consists of loss of vision occurring at the centre of the visual field. This lack of visual information causes blurred vision and eventually the loss of vision itself. In many

cases it also results in the phenomenon of hallucination ranging from mild to impressively articulate. These hallucinations are thought to be caused by the absence of continual visual information relayed from the retina through to the brain, the brain 'filling in' for the sensory information it lacks. In Ganzfeld, whist every care is taken to deprive the brain of any stimulus; sound, vision and, of course, movement, the brain is never silent. Another more recent study in short-term sensory deprivation found that people not normally prone to hallucination experienced delusions and apparitions during the short period of deprivation. The researchers, from University College, London believe that the hallucinations are produced by a phenomenon called 'faulty source monitoring;' in that 'the brain misidentifies the source of it's own thoughts as arising outside the body.' [2]

The brain, as we have seen from Izhikevich's model, despite the stimulus being removed, creates its own activity, re-visits past experiences, pulling them into the context of the present.

In *Ghost,* eight speakers, eight microphones and a computer are connected to form a 'memory embedded' network of neurons. Sounds have been implanted into the cortex beforehand to provide the system with a buffer or 'memory'. Once installed, live, ambient or performed sounds in the gallery will stimulate artificial neurons, modelled in the computer to fire, sending tiny fragments of sound from the eight microphones to the speakers. When these sounds fail to reach a certain threshold the cortex will journey around its own architecture, re-visiting older, established pathways, using its 'memory' as buoyancy when external stimulus dies away. This memory is its own internal noise, its earliest and primary stimulation. These sounds will be heard as 'sonic ghosts,' a term I have used to describe internal or endogenous noise embedded in the cortex, which reoccurs when the external stimulation is low or not present in the gallery space.

Ghost will reconfigure internal and external sounds causing a temporal and sonic overlapping of the neural past within the neural present, a rupture in the flow of sensory and endogenous information. As the external sonic events occur these will be drawn in to the cortex building an ever-increasing bed of experiences from which to compose.

One of the initial phases of this model was *The Fragmented Orchestra*, where groups of spiking neurons formed polychronous groups allowing a rich and dynamic model of firing activity in the cortex.

"The Fragmented Orchestra is a vast distributed sonic structure created by Jane Grant, John Matthias and Nick Ryan. It was installed in the United Kingdom between December 2008 and February 2009. It consisted of 24 fixed geographical locations, including FACT, Liverpool, University of Plymouth, Landscove Primary School, Devon, The National Portrait Gallery, London, Millennium Stadium, Cardiff and Kielder Observatory, Northumberland. At each of the locations, a 'soundbox' was installed, which consisted of a microphone, a small computer connected to the internet and a Feonic 'drive', a device that transmits audio through resonating architectural surfaces. Sound made in the spaces was transmitted across the internet to a server computer in the FACT gallery. In this computer, we ran an artificial neuronal network, an adaptation of the Izhikevich's recently developed non-linear integrate and fire model that incorporates spatial 'axonal delays' between synapses and a spike-timing-dependent plasticity algorithm, which causes the synaptic strengths between neurons to become updated as a function of the differences in signal arrival times." [3]

In *Ghost*, temporal and topological memories within the cortex, in conjunction with the phenomena of cortical, sonic hallucination are explored. Further research is needed to monitor the buffering up of the

neural past within the neural present in conjunction with STDP. A computer model that creates statistical data and visualization of what exactly is taking place will be developed over the coming year to explore what might be called the thickening of experience. The infinite complexity of how this cortex might perceive what we call experience is extraordinary, a folding in of external and internal articulation, double looped, networks of earlier stimulation extending into the now, sensory architectures building into an endogenous cortical construction of time, the 'sonic ghosts' being the hallucination that the audience hears in the absence of stimulation. It is the crossing of the threshold of the internal to the external and back again which translates milliseconds of neuronal activity into moments of sound dispersed across timescales and geographies and the minute spaces of the brain.

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MEDIA ART EXPLORES IMAGE HISTORIES: NEW TOOLS FOR OUR FIELD

Oliver Grau

The starting point of the following comparisons is the visual manifesto of knowledge, L'Academie des Sciences et des Beaux-Arts, Sebastien Le Clerc created in 1698; here is a print from the Göttweig Graphic Collection. L'Academie can be described as summa of the grand project of mathematizing nature as propagated by Descartes and Newton.

This digitization of a print, which can be magnified some sixteen thousand times, enables new access to the 'dead medium' of graphic prints and allows us to discover details that are barely recognizable in the original, for, to paraphrase Wölflin, "one only looks at for what one is able to see," in order to make new questions and answers possible.

Nested against a background of magnificent architecture, Le Clerc presents the grand spectrum of arts and sciences disciplines: mathematics, mechanics, physics, astronomy, music, anatomy, and philosophy are clearly recognizable. A great deal has been written about this work; I focus on the visual media, which commentators so far have ignored. Interestingly, today as we seek to understand the revolution concerning our visual perception, it is these visual media in Le Clerc's picture that have been picked up by artists.

When we zoom into the image, we see that Le Clerc's summa is also a collection of the optical media of his time, like in a burning mirror: the physiological basis of spatial vision is represented as well as central perspective, with which this drawing aid also refers to the vellum used by Dürer.

ANAMORPHOSIS

The anamorphosis, described by Lacan as the "reversal of central perspective," came to the West from China in the fifteenth century and subsequently developed into a variety of sub-techniques. Severely distorted objects could either be transformed into a recognisable image by using a cylindrical mirror or by viewing them from an acute angle. These images, which could only be experienced, so to speak, in-terACTIVELY could be regarded as precursors of today's processual images.

For years William Kentridge, one of the most known artists of our time, has been working around the subject of vision. Even historic image media, like the mirror anamorphosis, made its way into his con-temporary media art. In 2007 he created a hybrid that had not existed before in the media history of seeing: using his eight minute short *What Will Come (Has Already Come)* he links a hand-drawn anima-tion film with the anamorphosis, which appears connected now for the first time with moving images.

To get an accurate picture of what the distorted pictorial metaphors contain, Kentridge lets us use a metal cylindrical mirror: newsreel images of a colonial war Fascist Italy fought in 1935/1936 in Ethiopia. Kentridge, who comes from a South African Jewish family, fuses descriptions of the war with poetically

floating projections of memories to create a parable about violence — a revolving carousel of images like a visual maelstrom with the power to pull the observer in.

Kentridge gives us a bitter truth in a sugary pill: "Those who cannot remember the past are condemned to repeat it" (George Santayana), a pleasurable deception that we experience naively and at the same time knowingly. Kentridge's video is not a film in terms of any time sequence, but rather a collage with, in part, hermetic elements, which overlap and are used by Kentridge as the vehicles of ambivalent, secret, even magical messages; perhaps inspired by Baltrusaitis's description of the uses of anamorphosis in the course of history.

Kentridge, as we know, photographs different stages of his charcoal drawings for the animation, that is, he adds new details and erases others, working on the relatively small number of twenty to forty drawings per film, and what remains represents the final version of a scene — over a layer of drawings that have been re-worked several times. Kentridge expands the anamorphosis as a medium in two ways: firstly, he draws 'distortedly' with the aid of a cylindrical mirror after the classic manner of anamorphic depictions to obtain the desired proportions. Secondly, with his innovative crossing of anamorphosis and animation Kentridge also expands the possibilities of film: what Gunning claimed for Kentridge's *Stereoskop* in 2001 — a "running metamorphosis" — is clearly ramped up in *What Will Come*. Kentridge not only succeeds in creating a space of distance and of thought through citing the historical anamorphosis; he also develops a media hybrid, which challenges the observer to become aware of their own active role in the production of images. In order to experience the complex, dynamic, and heterogeneous image space, the observer must become physically active — consequently, Kentridge exposes the iconicity of the image, if you like, which only arises through perception — in this case, in the anamorphic process.

It is not surprising that Kentridge develops his artistic approach in a time where the world of images around us is changing faster than ever before: images are advancing into new domains, to new private platforms like YouTube; Flickr, with it's billions uploads; or Facebook, that has received his 700 millionth member and is now the largest image archive in the world. Television became a zappy field of thousands of channels; now in 3D – and 3D experiences as we know are having a renaissance in Cinema as well – here you see previous booms of 3D in cinema's history. Large projection screens are invading our cities, buildings' surfaces meld ever more often with moving images, so that the old dream of talking architecture gets a new arsenal of options; cell phones transmit movies in real time; and *Google StreetView* and *Google Earth* step up the concepts of panoramic image spaces including Satellite views, for example of our Center for Image Science in *Göttweig*.

All this, let's say virtualization, requires a so far unknown material base: Google runs, for example, one million servers in a dozen of countries, even on the ocean, and processes twenty four Peta Byte of user generated data per day. The several million people who died in the race for conflict minerals – here you see a new one hundred Gigaheart IMB Graph Chip – did not even receive a monument of the unknown victim. Digital images became ubiquitous and key tools within the global reorganization of work, but these transformations have hit society to a large extent unprepared. I will not go deeper into that but some results of our research you can find in a newly published volume by MIT Press.

In our most recent present artists venture in a reflective manner towards new measurements of the complex status of seeing and creating images. Images' historical development between innovation, reflection and iconoclasm reaches in the 21st century a new level of global complexity. In the "mine of media history" and the history of image techniques new thinking spaces (Denkraum) are created through new interfaces, displays, hard- and software configurations, often engaging viewers in a form of playful, creative combination. The Media Arts landscape of recent years is being increasingly seized by a phenomenon which has yet not received any significant research, classification or analysis: the use of historic media configurations as an integrated part of contemporary media art installations. There are internationally renowned artists today who create optical experiments, panoramas, phantasmagoria, perspective theaters, camera obscura, anamorphoses, magic lanterns, etc. By reinterpreting old optical media they contextualize our digital image revolution, create distance and with that thinking spaces.

PEEP SHOW

Lynn Hershman provided us with an early glimpse in 1993 with *A Room of One's Own,* a voyeuristic, 'peep-show-like-look' into a miniature bedroom. Through a periscope at eye level on a large black box, the observer directs the progress of the installation interactively by eye movements, by the gaze. This set-up allows Hershman to use the installation, which connects the design of a modern-day sex peep-show with its historic forerunners; to interrogate forcefully the tense, even violent relationship between the female model depicted inside and the presumingly male observer looking in.

The contemporary peep-show, which unites illusion and the quick and furtive look, could perhaps stand for the male, but increasingly also the female, gazing at pornography on the Net; statistically the most frequent use of the Internet, but for academic cultural disciplines still by-and-large a taboo.

CAMERA OBSCURA

In a walk-in "Camera Obscura for Danube" on a cable ferry, installed in 2004 by Olafur Eliasson, passengers see the cultural landscape outside going past on large screens. Although looking like video displays, they employ no electronics whatsoever. At the centre of Eliasson's artistic intention are the users of the ferry, the observers who find themselves inside a machine for seeing that is also a time machine. We know that art and image history owes much to the camera obscura and since Crary there is no need to add anything further including the walk-in variety. Like the visitors at the fairs of yesteryear, the present-day passengers are amazed at how the images of the surroundings outside are generated and this fosters awareness of the Wachau cultural landscape and thus also the dimension of time. A long time aesthetically designed space becomes through Eliasson's modest, but highly precise, intervention acute.

PANORAMA

The panorama, the illusionistic medium par excellence, has enjoyed a revival in media art over the last twenty years in many installations. Here you see world wide exhibited art works from the early nineties by Maurice Benayoun, Michael Naimark, Luc Courchesne and Jeffrey Shaw and their teams; Shaw has been working for decades with immersion and has been using the term Panorama for about fifteen years now. Here, we have another recent interactive, real-time example featuring Melbourne, *Place-*

Urbanity. Users can explore fifteen panoramic scenes of different urban districts that are each home to a specific immigrant or ethnic community.

Whether consciously or unconsciously these artists, as we know today, all refer back to a historic ancestor in the history of art and the media: the 1787 patented panorama. Originally conceived as a new tool of visualization for military reconnaissance, Robert Barker's invention with its circular perspective soon became a mass medium that reached several hundred million people. In a manner reminiscent of modern fears of simulator sickness, the panorama was criticized around 1800 mainly for psychological reasons. It was argued that the illusion could result in an inability to perceive reality and the military leaders of France and England, Napoleon and Lord Nelson, soon realized the panorama's potential as a medium for propaganda.

The amalgamation of traditional Japanese culture – like Zen, Kabuki or Sensui ink painting – with the digital has for years been the goal of Kyoto based Professor Naoko Tosa. Here you see her *Interactive Zen Garden,* which makes us reflect on the comparison of Digital Culture with our traditions, so that conscious ZEN practice, the meditation reappears in contemporary culture – but her discourse between tradition and technology is now driving panoramas history into an unheard dimension. For the upcoming world EXPO 2012 in Korea, Tosa is planning to bring the lineage of huge impressive-immersive pavilions you find in most world fairs with the latest technology to a new level. Tosa's installation *Under Water Sansui with Four Gods* will transpose visitors into immersive 360° projections; a gigantic 250m long landscape wall-panorama, composed of projections of dynamic Sansui ink paintings, each measuring 20m high. Additionally, people walk under enormous flying dragons, which dominate the ceiling, consisting of a gigantic LED display, 23m wide and as long as 2 and a half football fields – imagine!

SHADOW PLAY

The enormous worldwide and especially European tradition of Shadow Play, has inspired Rafael Lozano-Hemmer, one of the most well-known contemporary artists. Indeed, Hemmer has written that he was inspired by Samuel van Hoogstraten's 1675 published *Shadow Dance,* from his book *Inleiding tot de Hogeschool der Schilderkunst*. For over a decade, Hemmer has created multifaceted versions of an interactive shadow theatre through a combination of the spatial relationships of visitors. Recently this development culminated in the installation *Sustained Coincidence - Subsculpture 8*, which forms overlapping shadows of the interactors by reactive light bulbs.

LATERNA MAGICA/PHANTASMAGORIA

In the case of the laterna magica, as I'm sure you know, we come to 'the' projection technology of the modern era, forerunner of cinematography, and — if you like — the video projector in this lecture hall which provides our images.

It is a remarkable fact that since the beginning of the new millennium the most extreme variant of the laterna magica is staging a comeback: the phantasmagoria, an image machine developed after the French Revolution, nowadays reflected by artists like Zoe Beloff, with her *Influencing Machine;* Rosângela Rennó, here with her 2004 *Experiencing Cinema;* Toni Oursler's *Influence Machine;* or works by Gary Hill or Laurie Anderson; all artists who do not have to fear competition with artists using

traditional art media, still preferred by the art market.

Not only that, but the Phantasmagoria has also reappeared in pop-culture; recent and spectacular examples are projections of ghosts in the Hollywood productions *The Magician* and *Inglourious Basterds*. In the latter, the freshly murdered owner of a Paris cinema – whose parents were also killed by the Nazis – appears in a burning cinema to the trapped people – all of them top Nazis – as a large projection; first on the cinema screen, then in the classic phantasmagoric manner on fire smoke, here as avenging angel.

A new variant of this media-art historic lineage was created in just the last few years by Jeffrey Shaw and Sarah Kenderdine with *UNMAKEABLELOVE* in their cybernetic theatre *Re-Actor*. *Re-Actor* is a real time augmented reality application using torch-interfaces to reveal a world of thirty humans, inspired by Samuel Beckett's *The Lost Ones*, though of course its allusions draw much wider to the human tragedies of the last century. Shaw himself mentions as an inspiration early cinema history, quote: "the myriad of extraordinary devices like the Lumiere Brothers Photorama, the Cyclorama, Cosmorama, Kineorama, Neorama, Uranorama [..]" etc. Here, they combine interaction not with a 3D humanoid but phantasmagoric figures, who seem to move in a dark space or even a prison camp formed by a hexagon of six rear-projected silver screens for passive stereo viewing. This results in the most powerful re-apperance of the phantasmagoria: a deprivation, maybe even an icon for we human's in a WEB 2.0 world of 'connected isolation.'

Our Archives of Digital Art count many Media Art works, which are, for example, part of the history of immersion, a recently recognised phenomenon that can be traced through almost the entire history of art in the West. History has shown that there is cross-fertilization between large-scale spaces of illusion that fully integrate the human body (360° frescoes, the panorama, Stereopticon, Cinéorama, IMAX cinemas, or the CAVEs) and small-scale images positioned immediately in front of the eyes (peep-shows of the 17th century, stereoscopes, stereoscopic television, Sensorama, or HMDs).

CONCLUSION

Against the backdrop of the image revolution, today renowned artists are engaged in an ongoing endeavor to gauge the spectra of how images act as well as the continual transformation of how we see. Artists investigate how our gaze can be focused and concentrated, or diverted and dispersed; they analyze how we can be mesmerized, perhaps even ensnared, as well as how we can extricate ourselves from this clasp. Based on impulses from the history of perception, media artists today develop emancipatory strategies. This is in order to characterize how the gaze is constituted and to outline the interlinked quantities of fiction and that which we call reality; between illusion and that which we could term 'pure seeing,' that acts in an enlightened and media-competent manner and exists at most as an abstract goal.

In the new millennium some of the important artifacts from the history of image machines are being mined for the artistic experiments of contemporary art: the magic lanterns and their offspring, the phantasmagorias, are being revived to produce magical, psychological, and eerie effects and atmosphere, and the wide open views of the vedute and panoramas are also making a comeback. Media artists frequently vary them, and reflect and recombine them in the interests of the viewer. The rectified images of the anamorphoses are again being used to convey political messages. What all these image machines have in common is that they are not being utilized for wistfully nostalgic historicism or for one

of the models of the evolution and advance of media development; rather, the artists are investigating the conditions and strategies of generating images and how these are perceived.

Reflection on art, on the aesthetic experience and the act of seeing in general, requires, as Cassirer, Warburg, Panofsky, Merleau Ponty and recently Hal Foster pointed out, DISTANCE. Often experimentally, the artists create new spaces for thought, not only to reflect on image media of the past, but more — it is to be hoped — on the circumstance that the fusion of digital technology with the apparatuses from art and media history will succeed in tracking down, arresting, and rendering comprehensible a piece of the present that has slipped from our grasp due to the distanced position we have taken up.

As we know, mass communication via audio-visual media is regarded as an achievement of the last century, yet the contemporary forms and formations are the result of complex historical processes that go back much further in time to the early modern age; already by the mid nineteenth century technologies, distribution methods, and configurations had developed that catered for mass audiences. Media Art, by definition, is, as we know, a relative term that has experienced transformation over time and currently counts digital media art as its newest representative. Today, film, cinema, and even television are regarded as 'old' media, because the image industries offer new media generations at ever shorter intervals — with the modern and post-modern eras quasi in the rear-view mirror. Although the dominant status of these media ensure that they are increasingly involved in creating collective 'reality' and are therefore rarely the subject of public inquiry or debate themselves, slowly but surely their supremacy is waning and the pre-history of the visual mass culture of the twentieth and twenty-first century is surfacing.

All this sounds like redefining images in their historical dimension and approaches of comparison, which go along with that, are based on the insight that images act diachronic, within a historical evolution and not function simply without reference. Image Science, or Bildwissenschaft, now allows us to write the history of the evolution of visual media, from peep-show to panorama, anamorphosis, stereoscope, magic lantern, films with odors and colours, cinéorama, IMAX, and the virtual image spaces of computers. It is, let me underscore, an evolution with breaks and detours; however, all its stages are distinguished by a relationship between art, science, image and media.

Let me now, in the second part, address elements of the development of media art research and scientific tool building our field needs.

We know that media artists today are shaping highly disparate areas, like time based installation art, telepresence art, genetic and bio art, robotics, Net Art, and space art; experimenting with nanotechnology, artificial or A-life art; creating virtual agents and avatars, mixed realities, and database-supported art. These artworks both represent and reflect the revolutionary development that the image has undergone over the past years.

Over the last forty years Media Art has evolved into a vivid contemporary factor, Digital Art became 'the art of our time' but has still 'not arrived' in the core cultural institutions of our societies. Although there are well attended festivals worldwide, funded collaborative projects, discussion forums and database documentation projects, Media Art is still rarely collected by museums, not supported within the mainframe of art history and nearly inaccessible for the non north-western public and their scholars.

Even if today Media Art, with its multifarious potential of expression and visualization, which thematizes

complex challenges of our societies like globalization, knowledge explosion, genetic engineering, ecological crises etc. quantitatively is dominating the art schools – Media Art is almost ignored by most museums, the acquisition and maintenance can still not compete with traditional art media. Thus, due to the fast changes in storage media, works that originated approximately ten years ago can normally not be shown anymore. It is no exaggeration to state that we face the TOTAL LOSS OF AN ART FORM from the early times of our postindustrial-digital societies.

Media Art therefore needs – as most of us know – as many bridges into our societies as possible: conferences, text repositories, database projects developing collective documentation and preservation strategies – new thesauri and new curricula for the next generation of teachers, artists and collectors.

Image Science and Media Studies help understand the function of today's image worlds in their importance for building and forming societies. With the history of illusion and immersion, the history of artificial life or the tradition of telepresence for example, Image Science offers sub-histories of the present image revolutions. Image Science, or Bildwissenschaft, is an open field that engages equally with what lies between the images and with the new perspectives resulting from interplay with neuroscience, psychology, philosophy, emotions research and other disciplines. Image Science might be considered as a reservoir in which contemporary processes are embedded, like an anthropologic narration, but as well the 'political battleground,' where the clash of images is analyzed.

Already in the 90s it became clear, that Media Art Research is spread over many disciplines and more and more the need became urgent to give it some common ground. That's why Media Art Histories held its first international Conference *Refresh*, for which I served as its chair. In 2005, through a collective process, involving thirty advisors and a dozen session chairs, co-ordinating meanwhile far more than a thousand papers, in co-operation with Leonardo and New Media Centre, *Refresh* represented the wide array of nineteen disciplines involved in the rapidly emerging field of Media Art Histories – some of the results you can find in an anthology from MIT Press. The good news is, through the success of *re:place* 2007, in Berlin's House of World Cultures, the conference series could be established, so that after Melbourne 2009, Liverpool later in September and Riga 2013 are on their way – so you are invited to show up there too.

Building Bridges for Media Art means also to further the establishment of new curricula, as we developed the first international Master of Arts in Media Art Histories – with faculty members like Erkki Huhtamo, Lev Manovich, Christiane Paul and Sean Cubitt – which deals also with the practice and expertise in Curation, Collecting, Preserving and Archiving of Media Arts. It's a Masters for media art's working professionals, the average student is thirty five years old and they come now from five continents; in the meantime a Facebook forum with more than 2900 members also exists.

The field of Media Art Histories, which overlaps with image science, examines the sub-histories of media art: paradigms like artificial life/Automata or telepresence, the history of panoramic perception and it's knowledge with the related history of immersion and the history of projection for example. So, the method of comparison, which is based on the insight that images act diachronic (but not teleological) within a historical evolution –with detours and contradictions, in the sense of Gould, but never, as Warburg pointed out, function without reference – is a central pre-condition to deal with media art. Image science is based on three pre-conditions: 1. definition of the object, 2. setup of an image archive and 3. familiarity with a large quantity of images. Analogies or fundamental innovations in contemporary phenomena can be discerned through historical comparison, allowing us to differentiate and to distance

ourselves from the phenomenon, so archives became again an integral element in Media Art Research and Image Science.

We know that Darwin's work *The Expression of the Emotions* inspired Warburg's*Mnemosyne* image atlas of 1929, which remained a fragment. The Atlas tracks image citations of individual poses and forms across media and, most significantly, independent from the level of art niveau or genre. We may even say, that Warburg redefined art history as medial bridge building by including many forms of images.

Although taking a different approach, the history of image databases should also mention André Malreaux with his *museé imaginare*. Now, we are witnessing the birth of the virtual museum as a key project for the Digital Humanities.
But let us watch for a moment beyond the Humanities.

In the natural sciences during the last decade large collective projects could address new research goals as in Astronomy, the 'Virtual Observatory' compiles centuries worth of celestial observations; global warming is understood with projects like the Millenium Ecosystem Assessment, at a detail never before calculable, and the Human Genome Project has already become legend. So far, unknown collective, international and sustainable structures enable science to give answers to complex problems.

Comparable with natural sciences, digital media and networked research catapult the humanities within reach of new and essential research tools. Linux and Wikipedia might be seen as a glimpse what can be possible, and what we need are collective documentation and preservation tools for media art, or, even better tools, which can manage an entire history of visual media and their human reception by means of thousands of sources. These themes and needs express, in regard to image revolution, key questions for the humanities today.

In 1999 we established at Humboldt University the first online media art documentation, the Database of Virtual Art. As pioneer, it has been documenting – in cooperation with renowned media artists, researchers and institutions – the last decades of digital installation art, as a collective open source project. Since today's digital artworks are processual, ephemeral, interactive, multimedial, and fundamentally context dependent, because of their different structure, they required a modified, we called it an "expanded concept of documentation."

As probably the most complex media art resource available online with several thousand documents and their technical data, more than two thousand listed articles and a survey of seven hundred and fifty institutions of media art, the database became a platform for information and communication. The system allows artists and experts to upload their information and the DVA relies on its advisory board represented by Christiane Paul, Roy Ascott or Jorge La Ferla. Let me clearify that the DVA represents the scientific selection of approximately five hundred artists of approximately five thousand evaluated artists. The policy, whether an artist is qualified to become a member, is, "the number of exhibitions, publications (at least five), awards and public presentations; we also ascribe high importance to artistic inventions like innovative interfaces, displays or software."

The main challenge that existed, and still exists, during the last fifteen years is the establishment, maintenance and advancement of the social corpus, consisting of hundreds of living individuals: artists, whose affiliation is not automatically assumed since the DVA is not defined like other projects, who focus on a festival or a collection.

In addition to searches of themes, Media Art documentation should also admit questions of gender, track the movement of technical staff from lab to lab, technical inventions pertaining to art, the destinations of public and private funds allocated to research. The hybrid character of media art requires a shift of the paradigm towards an orientation of process and context recording, which includes more and more the capture of the audience experience. Media Art documentation becomes a resource that facilitates research on the artists and their work for students and academics, who, it is hoped – now in a new Facebook-like communication structure – will contribute to expanding and updating the information. In this way, documentation changes from a one-way archiving of key data to a proactive process of knowledge transfer.

Now, together with an important unknown art collection, the Göttweig print collection, representing 30 thousand prints emphasizing Renaissance and Baroque works and a library of 150,000 volumes going back to the 9th century, like the Sankt Gallen Codex, the Database of Virtual Art strives to achieve the goal of a deeper media art historical cross pollination. Reaching to the present day, the print collection has grown to be the largest private collection of historical graphic art in Austria. Just as the Media Art Histories conference series bridges a gap, the combination of the two and other databases hopes to enable further historic references and impulses. The collection also contains proofs of the history of optical image media, intercultural concepts, caricatures, illustrations of landscapes in panoramic illustrations. For the future, this may provide resources for a broader analysis of media art.

The collection is being made public and researched through four strategies:

a.)   The 'Scientific Facsimile': Our Digitization Center digitizes with up to 72 million pixels. The detailed digitization of this beautiful hand of a colleague seems already a bit impolite.

b.)   The concept of Virtual Exhibitions (now adopted by main museums) addresses, since 2006, the public with online exhibitions like *Venetian Views*. Virtual exhibitions are divided into sub themes and enriched with different picture formats, literature and meta data.

c.)   Cinema Screen sized projections, give new access to details. Digitized prints can be connected in filmic fly-throughs allowing travel through time and space.

d.)   Fortunately, we have the unique situation to have the large media art archive next to a historic art collection: the Collection will be further networked with archives of contemporary media art via keywording.

Of course, you know that keywording can be bridge building too! The hierarchical Thesaurus of the DVA constitutes an approach to systemize the field of Digital Art: out of the Getty Arts & Architecture Thesaurus and the subject catalogue of the Warburg Library in London, keywords were selected which also have relevance in media art. On the other side, out of the most common used terms from media festivals like Ars Electronica, ISEA, Transmediale etc., new keywords were empirically selected. Important innovations such as 'interface' or 'genetic art' have been considered as well as keywords that play a role in traditional arts such as 'body', 'landscape' or 'illusion' and thus have a bridge-building function. It was important to limit the number to aproxmately three hundred and fifty words so that members of the database can assign, use, and keyword their works without great study of a too complex index. The categories led to natural overlapping, so that the hybrid artworks can be captured through clustering. Important for us was the thematical usability for the humanities: we wanted to avoid something only new, separated from our cultural history.

Let me finish with remarks on the challenging and serious situation of media art research today. With the DVA involved in the field of media art tool development from its beginning, we witnessed the crisis of documentation during the last few years. Since the foundation of the *Database of Virtual Art* (1999 – 2011 and ongoing), a number of online archives have arisen: *Langlois Foundation* in Montreal (1999 - 2008), *Netzspannung* at the Fraunhofer Institute (2001 - 2004), or *MedienKunstNetz* at ZKM (2004 - 2006), the *Boltzmann Institute for Media Art Research* in Linz (2005 - 2009). All these major projects of the field terminated, their funding expired, or they lost key researchers, like V2 in Rotterdam (2001 - on-going). In this way, the originated scientific archives, which more and more often represent the only remaining contextualized image source of the works, do not only lose their significance for research and preservation, but in the meantime partly disappear from the web. Not only the media art itself, but also its scientific documentation fades, meaning that future generations will not be able to get an idea of the art of our time. Even the Europeana, a large but under-funded project for Europe-wide networks of digital collection documentation is rendered meaningless if the foundation, the archives themselves, are not continued. To put it another way: till now no sustainable strategy exits. If we take a look on media art research over the last 15 years then it is clear: what we need is a concentration of high quality scholarly documentation as well as a huge expansion of strength and initiative. 1.) In the field of documentation – systematic preservation campaigns do not exist so far – it is essential to unite the most important lessons learned and strategies developed by initiatives either existing or abandoned under the single roof of an international institution, that can guarantee persistent existence, such as the Library of Congress or an equivalent European or Asian institution. It would need to be supported with adequate expertise from the network of important archives and initiatives – this could be the best way to protect documentations from being lost. 2.) But also the establishment of an appropriate research institution bringing together the best heads of the field would be necessary. 3.) The European Commission expressed the goal to double funds for pilot projects in interdisciplinary fundamental research! But this is not enough: for up to date digital humanities, the funding structures must be internationalized in ways similar to those enabling modern astronomy, genomics and climatology. In order to create enough momentum and the necessary sustainability, responsible sponsors like NSF, DFG, the EU, etc. have to ensure international long-term sustainable structures. Only when we develop systematic and concentrated strategies of collecting, preservation and research we will be able to fulfill the task which digital culture demands in the 21st Century. In astronomy, the funding agencies developed and modernized their systems towards sustainability. The virtual observatory infrastructure is funded on an on-going basis and there is international co-ordination between a dozen or so countries that produce astronomical data.

For Media Art Research, a commitment by the best experts from the field is needed in a long-term occupation. Let's recall the enormous and sustaining infrastructure that was developed for traditional artistic media, painting, sculpture, architecture, even film, photography and their corresponding archives over the course of the last century. What is needed is an appropriate structure to preserve at least the usual one to six per cent of present media art production, the best works. If we compare the world-wide available budget for traditional art forms with the one for digital culture then we understand how inadequate the support for our present digital culture, the most complex material based art, is; it is almost statistically immeasurable. The faster this essential modification to our cultural heritage record can be carried out, the smaller the gap in the cultural memory; shedding light on the dark years, which started about 1960 and lasts till now.

Hearing that there are experts of contemporary (old media art, sculpture, painting etc) that try to exclude the art of our time with the widest need is sad and ironically, as we learned from Shanken, Cubitt and Thomas, the exponents of an exclusion of media art justify this by its connection with technology.

This confession truly is a disaster, not so much for the interests of those people, but for the tax paying public, who deserves the right to be enabled to think about our time through media art. It might be 'blindness,' but it seems more a desire to keep life easy and save the time needed to understand the immense complexity of media art and its preservation needs. This ignorance is not something we should just tolerate: it means that although our societies – the political, financial, and cultural – are more and more driven by modern technologies, the art market, a number of biennales and most 'contemporary art museums' deny the public, which pays their bills, the needed aesthetic and intellectual confrontation with the art of our time. The attempt to separate art from its time is not new, it is also comparable with earlier movements of world escapism, like the forms of 19th century historicism; but our modern societies need to be enabled to reflect on their time and future and, as we know, media art plays a seminal role in that process.

As we see, Media Art needs as many bridges as possible: conferences, new scientific tools like databases and text repositories, new strategies for documentation and visual analysis of complex data, new curricula for the next generation of teachers and collectors. Maybe in a near future we can create collective tools, as represented in Christa Sommerer and Laurent Mignonneau's work *The Living Web*, which generates a spatial information sphere from search engines for web images in a CAVE. The work represents a new instrument for visual analysis, with the option of comparing up to one thousand images in a scientific discussion. Captivating new visualization tools could provide access to the breadth of digital cultural production, which, coupled with the depth of historical optical media, can enable new unpredictable understandings of today's image revolution.

REDISCOVERING HIROSHI KAWANO – JAPAN'S PIONEER OF COMPUTER ART

Simone Gristwood

The paper that follows stems from interviews and conversations held with Hiroshi Kawano in Japan in 2009 and Germany in 2010, as well as from research undertaken with the support of ZKM|Zentrum fur Kunst und Medientechnologie, where the Kawano archive has been held since 2010. The author has also used information gathered through personal correspondence with the artist. This paper forms part of the early stages of an ongoing study into Kawano's life and work.

It is well known that the 1960s was a pioneering decade in the history of computer art, particularly in the West. However, little attention has so far been paid to equally important work being undertaken in Japan. This paper aims to introduce some of the innovative work that was taking place in Japan at this time, and its origins and activities. With the aim of highlighting the importance of this little known history, particular attention will be paid to the work of Hiroshi Kawano (1925 -). Kawano is a philosopher and aesthetician who was interested in both visual art and music, with the first publication of his visual art as early as 1964 in the *IBM Review,* making him one of the earliest pioneers experimenting with computing technologies in art. The paper will discuss how he first became interested in using computers as a way to apply his theory inspired by Max Bense and Claude Shannon, to visual art. His early theories, influences and experiments in the 1960s will be considered as well as his participation in the First Computer Art Contest Exhibition in Tokyo in 1968 and his first solo exhibition that took place in Tokyo in 1970.

Kawano takes a unique position as a philosopher and aesthetician who approached computing technologies with a view to experimenting with aesthetic theory rather than as an artist or engineer. He first studied traditional approaches to aesthetics in the department of philosophy at the University of Tokyo as both an undergraduate (1948-1951) and graduate student (1951-1955). However, despite his love of traditional aesthetics, Kawano moved away from this approach when he was an assistant in the department of aesthetics at the University of Tokyo.

It was here that Kawano came across the work of German philosopher Max Bense and American mathematician Claude Shannon around 1956. Kawano hoped to find a breakthrough – a new approach to study aesthetics - and after reading Bense (*Aestheitca*, 1954) followed by Shannon (*A Mathematical Theory of Communication* 1948), Kawano saw the potential to use these approaches to aesthetics and the possibility of their application to art. Kawano first published an article about his ideas on Information Asethetics in 1962 entitled 美学的情報理論の一考察 (*Inquiry into Aesthetic Information Theory*) [1] and soon after began writing about the possibility for using computers for art.In 1964 Kawano began to program computer graphics.

In order to be able to apply these theories, Kawano began to study the Markov process model. Markov chains are probability-based mathematical states demonstrated by sequences of random patterns. The properties of these chains are defined either by their relationship between the present state and that which immediately precedes it, rather than its entire output history, or the present state alone. This approach worked well with Shannon's theory with regards to language and the letter-based approach if

the alphabet is thought of as a kind of chain. Kawano found that Markov theory had been applied to linguistics and musical expression already, yet he wanted to break from the one-dimensional structure in order to apply the Markov model to visual expression.

Despite studying mathematical approaches such as that of Markov, and grappling with alternative approaches to aesthetics relation to information processing, it was not until a few years later that Kawano began to use computers. Around 1960 the University of Tokyo opened a computer centre that all students, staff and members of the University were permitted to access, and where they could study programming. Kawano began to study programming independently in 1963 in this Computer Centre. He learned the assembler language and used the OKITAC computer. (Fortran, which Kawano first used in 1966, was not introduced in Japan until a few years later). The OKITAC was a room-sized computer made by the Oki Electric Company in Japan that used a magnetic core memory and was attached to a line printer – an output device that influenced, and proved useful for Kawano's approach.

Kawano first published some of his designs made using the OKITAC 5090A in an article about *Computing and Design* in the Japan IMB Review in 1964 [2] and another (*Series of Pattern; Flow)* in November of that year in the Science Yomiuri. [3] Nevertheless, *Series of Pattern: Flow* was actually only "a prototype for his masterpiece *Simulated Colour Mosaic* using a more complex quadruple Markov chain for the vertical and horizontal directions, which was published later in 1969. [4]

Kawano not only saw the potential for creating visual art using the Markov method, but also other art forms such as poems for which he looked to traditional Japanese Tanka poems of 31 letters/characters. Kawano remembers that programming would take many hours, however, the most time consuming aspect to producing works in this way was making the concept for the tree-type Markov model structure. He recalls the concept might have taken as long as one or two months, but writing the program was simple, and generating the poems was even simpler.

In 1967 Japan held its first (and only) computer art contest at the Sankei Building in Tokyo (though there were further exhibitions of computer art in Japan). The exhibition that was held in March 1968 included exhibited works by the CTG, Kawano as well as the first computer animation in Japan. A summary of the exhibition was published a month later in COMPUTOPIA magazine. [5]

Three years later, in 1970 Kawano held his first solo exhibition at the Plaza DIC, Tokyo for ten days between 5th and 14th October. The Plaza DIC is the exhibition hall of the Great Japan Ink Company, a printing company situated in the Nihonbashi area of Tokyo. The exhibition space was found with the help of Kawano's friend and well-known graphic designer of the time, Mitsuo Katsui. The preparation for the exhibition took approximately six months. This included time to complete the programming, printing the output and painting the output. The works were completed on a HITAC 5020 digital computer, designed by Hitachi, using FORTRAN 4 code. In an article about the exhibition published in Kawano is attributed to "planning, Programming and text", the HITAC5020 for "design and works." [6]

The exhibition is significant because not only because it showcased Kawano's work - and in particular, *Simulated Colour Mosaic,* as well as other studies and output, but it also showed his early ideas beginning to develop in relation to artificial intelligence and art, a topic he would come to explore more deeply from the mid 1970's onwards.

This paper has briefly outlined the early stages and work of one of the pioneers of early computer art; Hiroshi Kawano. It has given an introductory overview of the early period in his academic life from when he began to explore new theories and move away from traditional aesthetics in the late 1950s. It has also shown how he progressed to using computing technology to apply his aesthetic ideas to art at a time when internationally, only a few pioneers had begun to explore these areas.

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METAPLASTICITY & INNER BODY SCHEMAS: VR FOR CHRONIC PAIN

DIANE GROMALA

This paper describes a new paradigm of VR created for chronic pain that turns ideas of pain distraction inside-out. This paradigm enables manipulation of inner states, emphasizing the role of aesthetics in therapeutic contexts. We propose that this paradigm extends ideas of body image and schema and dissociative states, providing evidence that managing inner states is possible, a process referred to as meta-neuroplasticity.

The three VEs developed to address chronic pain integrate immersive VR with biofeedback, which serves as a primary means of navigation. The VEs are designed to help immersants become aware of and to gain agency with their inner states in an effort to remap their pain and body schema. Copyright Diane Gromala, 2010.

Pain[s]

Pain is a boundary condition – a non-normative experience that can alter one's perception, distorting it beyond all imaginings. By understanding boundary conditions in more depth, the Transforming Pain Research Group (TPRG) believes that more normative states may be more fully understood.

All humans experience pain[1], an essential warning system that alerts us to injury or disease. Like the historical figure of the pharmakon, pain is indeterminate, unquantifiable and beyond language. When intense, pain is beyond sharing, causing one to curl into oneself in a primal way, stripping away, bit by bit, our most basic feature as a social creature: our ability to communicate or connect with other humans. In The Body in Pain: The Making and Unmaking of the World, Elaine Scarry explains that pain ". . . unlike any other state of consciousness – has no referential content. It is not of or for anything. It is precisely because it takes no object that it, more than any other phenomenon, resists objectification in language" [2]. Pain bears other paradoxes: certain kinds, such as childbirth pain, work in tandem with other biochemical actions, and are thus dimly remembered; other forms, like chronic pain, prevent the kind of forgetting that habituation usually enables [3].

Chronic pain is a category of pain that significantly differs from acute or short-term pain. Acute pain is a symptom of a disease or injury; once the originating disease or injury is cured, acute pain subsides. In contrast, chronic pain is defined as a disease, an on-going, degenerative state [4] in which the pain response systems remain 'stuck' in high gear. Although chronic pain affects, by conservative estimates, one in five people in so-called industrialized countries [5], little is known about its causes or mechanisms. Because chronic pain cannot be cured, the emphasis is on managing this usually lifelong kind of pain.

Background

1991 marked the seventh year I had unremitting, chronic pain. What seemed like a hundred odysseys in search of even temporary ease led, in that year, to two parallel experiences – universes apart, they nevertheless were what neuroscientists term dissociative states. Far from out-of-body travel, they were scramblings of inner and outer sensations, a fluid, otherworldly state that I glimpsed in meditative practices. These practices enabled me to 'remap' my pain, a hard-won ability, to put it in the background of figure/ground experiences that comprise my moment-to-moment, everyday states.

The first of these two experiences was at the Blue Mosque, during a sunny afternoon in Istanbul. The second was in a computer lab in the Banff Centre for the Arts in Canada. In a kind of fate that is too unbelievable to concoct, I was able, to combine and recreate these experiences in an artwork I produced with Yacov Sharir in Dancing with the Virtual Dervish: Virtual Bodies [6]. One of the very first VR artworks, this collaborative effort was continually refined over a decade. The virtual world that immersants experienced was a torso, derived from an MRI of my torso that physicians insisted on in some quixotic quest to 'verify' that some non-existent biomarker of a disease or injury was the cause of my pain [7]. By recontextualizing this torso as a virtual environment (VE) to inhabit, Sharir and I strove to create virtual worlds to inhabit in unfamiliar ways. The VE comprised continuously decaying and reforming skeletal bones that defined a non-rectilinear space, while smaller organs revealed unexpectedly immense and abstract worlds.

Although we created this work at the height of technological discourses favoring a disembodying view, ours countered it. In our view, the new sensations of 'flying' while simultaneously feeling the tug of gravity, or of becoming aware of proprioception, were experiential states that one could not easily brush away into the bin of disembodied experience. This appears to have escaped art critics at that time, perhaps because the notion of transcendent or dissociative states seem to be predicated on an assumption that one is leaving one's body, not experiencing it in new ways.

Throughout the next two decades, I explored multiple ways in which diverse technologies could provoke non-normative states that brought usually quiescent, inner sensations to the foreground of awareness, from interactive books made of meat [8] and typographic fonts that changed according to one's biofeedback to evolving forms of VR [9]. Although the TPRG investigates other technologies from robotics to social media, VR is currently our main focus, in part because prior and current research makes it clear that VR provokes or opens access to inner sensations in multiple and persistent ways.

Immersive VR

Building on our experience in creating well-known virtual environments designed for artistic [6], cultural heritage [10] and medical applications [9], we examine the affordances of immersive VR through a fundamental human experience – pain. Known strategies for managing chronic pain necessitate that we design systems which bring inner senses to the foreground of awareness, and sometimes are seemingly exteriorized so chronic pain patients may learn how to remap their pain in sustainable ways.

Although virtual reality is admittedly an unfortunate term, artists and others working in videogames and online communities such as Second Life redefine the terms 'virtual' and 'immersive,' eliding the long-standing distinction between screen-based work and immersive VR as defined by its originating disciplines, or they perhaps mix ideas of social presence with immersion [11].

VR differs from 3D videogames and online communities, however, in the complexity and affordances of its integrated technologies, including interactive stereoscopy, spatialized sound, haptic force-feedback and six degrees of freedom, among others. But the most important distinctions are experiential: in VR, attention is far more directed, and the human sensorium – interceptive and exteroceptive – is tightly bound in technological entanglements, or what computer scientists term feedback loops. And although much of the focus is on experiences manifested within the VE, these experiences persist beyond it. The use of immersive VR for training pilots and surgeons illustrates the profound degrees to which our embodied processes are affected in long-term ways that alter perceptual, neurological, sensorial, autonomic and other systems. The brain and nervous system were believed to have been set in adulthood; however, their long-term malleability that results in structural changes is now recognized as meta-neuroplasticity.

Although similar phenomena may be observed in other media forms, immersive VR maintains specific affordances that are important to explore. The intensity of sensorial and embodied perceptual involvement in VR remains profoundly and measurably different. For these reasons, I maintain the longstanding distinction between immersive VR and other interactive, 3D work.

Pain and VR

The tendencies to create enhanced, unfamiliar and dissociative experiences, and to explore boundary conditions, have deep roots in human history: we have carved out spaces, places and environments; created communal experiences and practices; and ingested opioids, hallucinogens and now-common mood-altering drugs [12]. It is, therefore, perhaps no surprise that humans have developed technologies that function similarly.

Over the past decade, immersive VR has been explored as a non-pharmacological analgesic [13], a sensorially-rich method of 'pain distraction' for attenuating acute pain. This directing of attention outward

proved to be more effective than videogames in reducing pain, and provocatively, is on par with opioids. Simultaneously, V.S. Ramachandran's research in how chronic pain may relate to body image and body schema grew from his use of mirrors to produce analgesic effects for phantom pain[14]. The profound effectiveness of mirrors in alleviating phantom pain led to the acceptance of of mirrors as the first instance of 'VR' for pain [15].

Still other forms of technology initiated by Paul Bach-y-Rita enable sensory substitution [16]; this further demonstrated that our neurological systems are plastic or not as hard-wired as was once believed.

Current Work

Currently, our three works-in-progress are varied VEs createded to address chronic pain. The first, nearing completion, is the Virtual Meditative Walk, an extension of our prior work, the Meditation Chamber [9]. It integrates VR with biofeedback and a treadmill to train immersants in mindfulness meditation. Both biofeedback and mindfulness meditation have proved to be effective in treating chronic pain [17] through 'self-modulation.' In studying the different forms of meditation across cultures, we chose walking meditation [18] because many who have chronic pain become less active, a phenomenon referred to as kinesiophobia. In the Virtual Meditative Walk, immersants slowly walk on a treadmill while their GSR (galvanic skin response) and HRV (heart rate variability) data are fed into a computer. This data drives the visual, binaural and spatialized sonic elements in real-time. Immersants see a 3D forest that changes form in response to moment-to-moment changes in their physiological data. Immersants also initially hear a vocal 'coach' that guides them through the method of walking meditation.

We are concurrently developing two other prototypes that use similar biofeedback as a method of interaction. Cool! is a snowy world, created in partnership with Firsthand. Seated immersants develop skill in meditating – the more they approach a meditative state, the higher they 'hover,' to about a meter above the terrain. The VE becomes progressively non-realistic, designed to enhance a sense of weightless 'floating' that is often noted by experienced meditators.

Both prototypes comprise several phases. The first phase is designed so that immersants may discover the cause-and-effect relationships between biofeedback and those aspects of the VE that respond. An important issue that remains unexplored by others is that when those who have chronic pain try to meditate for the first time, their awareness of their pain tends to temporarily spike. To address this, we designed non-normative experiences, such as hovering or manipulating proprioception. Proprioception, the sense of where we are in our bodies and where its boundaries may be, affects one's body schema. We think that the unfamiliar experience of distorting proprioception may help immersants manage their initial spike in pain, and may help them discover that they can learn to self-modulate their pain by remapping their body schema. Initial tests appear to confirm that this approach indeed works [9]. The aesthetics of the VE are crucial here, for artists are arguably expert in creating otherworldly or non-normative experiences that are compelling enough to evoke one's sense of proprioception.

Through this work, we have found that visuals tend to pull one's attention outward, while non-linguistic sound seems to remain in an ambient or background relation to attention. Thus, the second phase promotes a transition of focus from the visual to the sonic. It is in this phase that immersants accrue their greatest skills in meditation practices.

The Sonic Cradle, our third and fully developed VE, is predominantly sonic, and does not incorporate any visuals. Immersants sit in a suspended, semi-reclined hammock. They are told little except that they should breathe slowly and regularly from the belly, which alters sounds in real time. When they hear a sound they like, they hold a deep breath in order to 'add' that sound to the on-going sonic composition. Immersants don't know that this VE is built upon Kundalini Yoga practice and theory. The sounds spatially rotate counter-clockwise among four speakers, while a sub-woofer vibrates the pelvis. According to principles of Kundalini Yoga, rotating sound in this way enhances our body's electric field. This system is designed for immersants to add sounds and repetition in order to drive this field up and out toward the ceiling. While little scientific evidence has verified this phenomenon, initial participants report that they feel deeply relaxed and 'float' upwards, which they describe as mildly euphoric. These reactions are probably not responses to any known intention of the system design, since no references to mediation or yoga are made.

Neuroplasticity: Persistent & Intentional Change

In the wider, related arenas of VR research, the process and role of gaining skills to intentionally manipulate inner or interoceptive senses – besides exposure therapy – has rarely been explored. Although 100,000 times more of our resources are dedicated to sensing inner states, compared to those for the five exteroceptive senses [19], our inner states are necessarily quiescent, lest they overwhelm our awareness [20]. Yet humans have the ability to learn how to access and consciously affect some of these inner states, as evinced by yogic traditions, biofeedback and newer technologies with intensive practice, these skills result in longterm changes.

Unlike pain distraction, which is useful for acute pain, the TPRG developed a different paradigm designed to enable those with chronic pain to learn both biofeedback and mindfulness meditation. Both are skills that persist beyond VR, and are standard in managing chronic pain. Obviously, technology is unnecessary for learning how to meditate. However, it provides real-time feedback, which our subjects report is important for learning, and reduces frustration in not knowing if they are making progress [9]. The tight feedback loops and multiple perceptual and sensory modes engaged by VR appear to enhance skill acquisition, according to over 400 immersants [ibid]. Finally, skills acquired in a VE are known to persist. With practice, we believe it is possible for immersants to make long-term meta-neuroplastic changes that may dampen pain levels. Therefore, we are using standard pain research methods to measure pain thresholds.

Our design of these VR systems takes the knowledge of media producers, interactive artists and sound designers as fundamental. Through extensive preparatory interviews and participation by patients, we have learned that in the first phase the VEs must act in direct response to immersant's changing inner states. In other phases, however, the VE functions better as a counterpoint. The visuals and sounds are emphasized and de-emphasized, according to the ways immersants respond.

We have also learned that expectations based on knowledge of other media do not directly translate in immersive environments. For example, when walking and meditating, a meditator learns not to become

distracted by visuals. They concentrate on what it feels like to step forward, using their peripheral vision as an ambient guide. Thus, while we believed that fog would parallel this experience, we found the inverse to be true. Therefore, we are developing principles derived from interactive art, media studies, perceptual science and neuroscience. None provide working principles in isolation, yet their combination appears to work. At present, we are focusing on ideas from the nascent area of neuroaesthetics, particularly by creating a VE to work with and against body image and schema, and by drawing upon aesthetics from Indian and Middle Eastern samas. It is important to note that the ways in which chronic pain affects experience foregrounds our work. For example, those who have chronic pain are often sensitive to certain kinds of sound, and have issues with moving and anxiety, among other factors.

Finally, while recent technological advances have dramatically reduced the cost of VR, it remains relatively complex and inaccessible. Thus, we are testing our systems in physicians' clinics and hospitals so that chronic pain patients will not need to travel to another site. Further, these systems are being extended to home computers and mobile devices, both to reinforce the VR meditation sessions, and to track progress, compliance and changing pain levels.

User testing includes both qualitative and quantitative methods, drawing upon the varied expertise of each researcher. It is particularly fortunate that the preponderance of wider research in chronic pain is based on a biopsychosocial model. While the group members work together to create the VR systems and methods of testing, each member also examines ideas within their particular domain. This approach prevents any one disciplinary bias from dominating, yet allows for concurrent research in each discipline.

Conclusion

Because VR has been successfully used in therapeutic realms, including treating acute pain, numerous researchers have called for the development of VR to address chronic pain [15]. The TPRG is the only group we are aware of that focuses specifically on VR for chronic pain. The VEs we create are designed to help immersants with chronic pain to learn biofeedback and mindfulness meditation techniques. These are long-term, intensive skills which, when practiced, are effective ways of self-managing chronic pain. We verified that the affordances of VR provide real-time feedback that enhances skill acquisition, and are investigating how the roles of dissociative experiences may help initial spikes in pain, and in learning to remap relations between pain and body schemas. Our paradigm runs counter to methods of pain distraction, since it is unreasonable to spend all wakeful hours in VR. By focusing on learning skills to self-modulate inner states, we believe this paradigm may extend knowledge of VR as it relates to body image, body schema, dissociative states, chronic pain and pain self-management. The focus on the aesthetics of VR distinguishes this work from other therapeutic uses of VR. Finally, if our paradigm proves successful, we believe that what is learned in VR and practiced outside of it may persist in ways that reduce pain levels and may result in structural, meta-neuroplastic changes.

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BOTANOADOPT, A PARTICIPATORY INTERDISCIPLINARY ART PROJECT

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botanoadopt is a participatory interdisciplinary art project among art, science and social commitment. The project defines plants as independent beeings and offers them for adoption on the internet. A hatch is available for the anonymous local handover of plants.   The humorous contextual displacement makes it possible to question one's own definition of nature, and the adoption process establishes links with the theme of responsibility.

Fig. 1. botanoadopt plant, adoption contract | Internetplatform www.botanoadopt.org, 2011, 2009 © by 431art, living plants, website, photo: © by 431art

Fig. 2. plants hatch, 2009, © by 431art (Used with permission.), wood, aluminium, LED, 60 cm x 80 cm x 60 cm, Photo: © by 431art

Fig. 3. Internetplatform www.botanoadopt.org with feedback-photo of adopted plant, 2009, 2011 © by 431art, Feedback-photo: Pedi Matthies, © by 431art

Introduction

Botanoadopt is a participatory interdisciplinary art-project among art, science and social commitment. The project shifts perspectives by humorous recontextualizations.

Botanoadopt presents plants with charming biographies as independent individuals and offers them for adoption on the internet. A plants hatch is available for the anonymous local handover of plants. The adoption contract asks adopters to send botanoadopt photos of their fosterlings. These photos are then published at botanoadopt.org offering insights into the socio-cultural environments of the whereabouts of the plants.

The humorous recontextualizations allow to question one`s own definition of nature, and the adoption process insinuates the topic of responsibility. Botanoadopt draws on alternative economic models of exchange and donation.

Thus the issue of environmentally responsible behaviour is investigated via models derived from realms beyond the boundaries of art.

Keyrole of plants, artistic statement and strategy

"Never before has the extinction of species been as massive as today. If this development will continue, it is to be feared that within a shortest period of time flora and fauna will shrink by 60-90%." [1] At the same time plants from all over the world are merchandised as mere decoration items. Several stores offers them very cheap and as a consequence plants are seen and treated as disposables.

Here, at this massive discrepancy botanoadopt comes into play. In merchandise management systems plants are regarded and used as decoration, as food and as supplier of material resources. Woodlands formerly considered as inviolable and to be protected are more and more subject to economic interests. Botanoadopt subverts this political and economical system by defining plants as individual beings and by taking them out of the circulation of commodities. As a result, the only possibility to obtain a botanoadopt plant is by way of adoption.

Botanoadopt is a participatory art-project with the aim of rethinking our idea of nature as such. Plants are playing a keyrole on our planet. They could live without human beings easily. Conversely, men are not able to survive on planet earth without plants. The artistic statement of botanoadopt is: plants are individuals with their own independent perception.

Plants interact with their surrounding in a very sensitive way. For example, they react extremely sensitively to negative thoughts. The book "The Secret Life of Plants" [2] explores the concept that plants may have sensations, despite their lack of a nervous system and a brain. To prove this the authors, Peter Tompkins and Christopher Bird, describe several scientific experiments and evoke a deeper understanding of plant life.

This undergirds our artistic theses: Every plant is to be seen as an individual being with its own perception, its own name and its individual biography. This biography deals with social, emotional, economic or ecological aspects. With the adoption project we are blurring the line between fact and fiction, in order to broaden the perspective, to leave behind common definitions of nature, to open avenues of thought leading to new and individual concepts of nature.

After having rescued several plants from the trash heap in the year 2006, we clearly became aware, that a basic knowledge about plants is not part
of our general education anymore. Withered plants are thrown away even if they were able to live on for years to come. Usually, they just need a short recovery time – a normal and necessary process within the cycle of nature. The daily life of industrial societies is no longer connected with these cycles. We think that this loss of being involved into the cycles of nature and the imperative of our capitalist society to be productive all the time and everywhere while ignoring the current critical environmental situation, is the main cause of the immense social and environmental problems of our planet.

Saving plants and giving them up for adoption with name and biography is our strategy, that people become aware of their own definition of nature and behavior. Even a small house plant which could be bought very cheap and easily is a living beeing.

baseline shifts and modules of botanoadopt

BOTANIA

In 2006 we founded the plants village "Botania". Its name refers to the free city-state "Christiania," [3] which is part of Copenhagen, the capital of Denmark. "Christiania" was founded in 1971. It is a self-regulated state without police forces. Its peoples' aim is to live in peace with each other and in harmony with nature. This idea is strongly influenced by the hippie movement. Accordingly, in "Botania" plants can recover from their sufferings and bad treatments. "Botania" can as well be seen as a symbol for the utopia of living together in peace.

INTERNETPLATFORM BOTANOADOPT.ORG

Nowadays life is deeply influenced by digital technology. So our aim was to realise our main idea with the aid of Internet technology, not only as a means to advertise the project all over the world, but also as a means to help nature. The Internet platform botanoadopt.org was launched at the beginning of 2009 and is a digital interactive network to organize a different and sustainable future society.

The website offers plants for adoption (Fig. 1). Plants handed in from all over Germany are given a name, a biography and an ID picture. The biographies inform about family background, preferences and the respective relationship patterns of the plant individuals. These biographical profiles play a key role in our project and exemplarily exhibit our artistic approach: the humorous shifting of contexts.

Succulent "Edward Tomlinson," [4] a plant of Argentinean origin, grew up in London and has been training Polo since he was a little child. He founded one of the first botanic Polo teams in Great Britain. This team did its secret nightly training in the Royal Botanic Gardens until unfortunately several windowpanes got broken by a club. The incident was never cleared up. Nevertheless the players moved their activities to Richmond Park, became the world's best botanic Polo team and arranged tournaments in the Hyde Park once a year. With a handicap of +7, "Edward" is among the best players of his age and committed himself to achieve the official recognition of plants as professional Polo players. Furthermore, he is interested in Sinology and has a liking for red-white checked ties. Edward found a new home in Huddasfield, UK.

Money tree "Lehman" [5] is a latecomer and the youngest of four brothers. He left his extremely materialistically orientated family very early and tried to become a stand-up comedian. Due to certain language barriers and his appearance the audience regarded him as stopgap. But he kept his life's motto: "Humour is laughing in spite of it all!". Against his wish he was brought into a casino and explored the rules of successful gambling. He internalized them and now he helps everyone close to him to gain material wealth that is based on natural growth. Eventually, a leading employee of a German financial institution at Frankfurt/Main adopted "Lehman".

At the end of 2009 an article about botanoadopt and "Lehman" whose name and biography refers to the Lehman Brothers and the crash of the financial market was published by in the German version of the "Financial Times". This article is an example, how deep botanoadopt is interwoven with contemporary society beyond the strong boundaries of art.

Botanoadopt is an entirely non-commercial project. The "currency" adoptive parents have to pay is responsibility. The adoption is regulated by a contract and the adopting person undertakes to send a photo of his protégé to botanoadopt twice a year. These photos are published on the web, so that every visitor can follow the development not only of the adopted plants, but also of the sociocultural environment that is partially documented in the photographs.

WEBSITE AS ADOPTION PLATFORM AND POOL OF KNOWLEDGE

One can easily apply for adoption by an online form. Available plants can be found by full text research and postal code. A checklist [6] for plant adoption offers an aptitude test to every potential adoptive parent. More than 350 plants have already been adopted; most of them live in Germany and some others all over Europe.

In general, the adoptive parents pick up the plant themselves – residence and first digit of the postal code are published on botanoadopt.org, so that plants in your area can be easily found and selected (Fig. 3). Adoptiv parents collect their fosterling at the plant owners home. In this way people independently from their origin, education, religion or social status meet each other. In rare cases plants will be sent by mail or by organizing a lift. On botanoadopt.org it is also possible to put plants up for adoption, a service that has been used by people from all over Germany.

The website offers a huge and versatile pool of knowledge and tagged articles, as well as online-databases on plants and biodiversity. This collection is constantly updated and can be consulted under "Fakten." Thus, botanoadopt.org can also be used as a knowledge base. In addition to biological facts about plants, many more facts about genetic engineering, farming, scientific research, new European laws or biodiversity can be found. Eventually, links to other non-commercial organisations, networks and projects are provided, that altogether aim at a new view of nature. The virtual platform contains a wide range of topics around our central theme plants life.

The page "Media" is linked to documentaries and reports like for instance a documentary film about Monsanto [7] or a report about "Smart Plants" (both ARTE). A "Forum" can be used for knowledge exchange. The whole project combines online- and offline strategies. It brings together global concerns with local actions as well as digital technologies with plants life. Conversely, locally based actions are always announced and documented on the Internet platform and published by using social networks as facebook and twitter. As we implemented the translation tool of Google on our website, botanoadopt can be visited from all over the world.

PLANTS-HATCH

Independently from the Internet, we also wanted to create a space where everyone can hand in his unwanted plant anonymously and without restrictions, instead of throwing it away. Consequently we invented the "Pflanzenklappe" (plants hatch) in which unwanted plants can be put into similar to the

human baby hatch (Fig. 2). The "Pflanzenklappe" takes place at different locations for only a short period of time of 10 up to 14 days. Its idea is derived from the baby hatch, which is very popular in Germany and Japan too. Baby hatches can be linked to the former parochial custom to care about anonymous babies abandoned from mothers in trouble. Those babies were usually left in wicker baskets at church entrances.

The idea of altruism, which is anchored in every religious system, leads to the ethical code of caring about others, particularly about persons with physical infirmities, disabilities or maladies; this code also includes the requirement to pay respect to old persons. Accordingly, adopting a plant or using the plants hatch is an act that shows respect for plants and their invaluable capability to clean our air, to nourish us, to provide resources and medicine, which helps us to relax, to smell good and to have fun.

In February 2009 the worldwide first plants hatch was officially unveiled in Schöppingen by its mayor. The word "Pflanzenklappe" lead to more than 100.000 Google-entries within 10 days. Journalists from all over the world were reporting about the plants hatch. The plants hatch 2009 and 2010 was mounted in different districts of Frankfurt/Main and in September 2010 in the botanical garden of Münster. During a period of 10 days, more than 150 plants were left in the plants hatch.

ON-SITE ACTIVITIES

Furthermore, botanoadopt arranges regular on-site activities and performances in different cities, e.g. adoption offices and empathy trainings. Adoption offices were installed so far in Frankfurt, Berlin, Cologne, Schöppingen, Münster, Dortmund and London. In 2011 an adoption office offered its services at the Schirn Kunsthalle Frankfurt. The empathy trainings offer "trainees" the opportunity to test their capacity to be empathetic and – at best – to develop and increase it.

BANNWALD - A FOREST MIGRATION

Another botanadopt activity was the "Bannwald-Migration" at Kelsterbach close to Rhein-Main-Airport in February 2009. With the help of proactive supporters botanoadopt saved 34 beech tree seedlings from a "Bannwald", that faced clearing because of preparing works for a new airstrip.

In Germany a "Bannwald" [8] is a forest that is protected by law and has to be maintained in any case. The "Bannwald" near Frankfurt was protected by law since the early 1980s as a result of the protests against the runway "Startbahn West," [9] which was being built in a former forest. In 2009, 25 years later, this "Bannwald" had to disappear in order to clear space for another runway.

2009 the company was really well prepared, the whole building area was surrounded by fences and protected by the police. Therefore, botanoadopt decided to intervene tactically and create a catch-22: We successfully managed to pass the police barriers unchecked, gained access to the area and collected a big bag of young beech trees, while nature activists where living in tree houses to save the forest.

Finally, botanoadopt succeeded to shift 31 of them to the grounds of a foundation in Schöppingen, where a new forest was created – a site-specific artwork called "Bannwald". The mayor of Schöppingen adopted another three beech tree seedlings.

CONCLUSIONS AND FUTURE

botanoadopt saved more than 350 plants since 2009. Most of them were given away anonymously by using the plants-hatch. These plants live in their new homes in Germany and other European countries. In general plants could be adopted by using our Internetplatform or in locally based adoption-offices, f.e. 2011 in front of Schirn Kunsthalle Frankfurt. In 2012 we plan to install the plants-hatch accompanied by adoption-offices f.e. in Cologne. Furthermore we are developing an interdisciplinary participatory education concept, which will start 2012.

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COLONIZATION AND SCIENCE NETWORKS BETWEEN PERIPHERIES AND THE CENTER: THE CASE OF THE NATURALIST FRITZ MÜLLER

YARA GUASQUE

The correspondence and the exchange of specimens between Fritz Müller,1822-1897, and Charles Darwin, 1809-1882, characterize what Bruno Latour called transformation networks. The naturalist's procedure in his observation of the phenomena in loco in the forest could only be legitimized as science after the screening of the "transformation networks".

The construction of scientific knowledge takes place far away from the periphery where data are collected. The scientist, with a focused view that differs from that of the naturalist immersed in the forest, reduces the phenomenon to an abstract inscription. The peripheries with their ecosystems are the ones that feed the centers, with data collected among a diversity of phenomena, through the "transformation networks". The correspondence and the exchange of specimens between Fritz Müller,1822-1897, and Charles Darwin, 1809-1882, characterize what Bruno Latour called transformation networks. Fritz Müller, a voluntary emigrant in the Brazilian South region, belonged to the first settlement group of Dr. Blumenau's colony in Vale do Itajaí – Alto do Itajahy. He found in Brazil an almost untouched nature which he visited in his lonely pilgrimages along the coast and also in the plateau, accompanied by the highway engineer Dr. Oderbrecht, in the service of Dr. Blumenau. Without having visited the capital city of Rio de Janeiro and without ever returning to Europe, Fritz Müller lived 45 years between the village of Blumenau and Desterro, in Santa Catarina – from 1852 to 1897, when he died – and there he conducted studies and research on aquatic flora and fauna - according to Zillig, 'on commission,' [1] sent by letter to his foreign correspondents. The botanical material expatriated through letters has not been dimensioned. *Oxalis, Cassia, Abutilon, Gesneria — Corytholoma, Maxillaria, Plumbago, Coccocypselum, Eschscholtzia, Heteranthera reniformis, Epidendrum* are the names contained in the letters he exchanged with Darwin. Many specimens collected by Fritz Müller in the Atlantic Forest biome, which portray the diversity in the South of Brazil in the 19th century, are in the English herbarium of Kew Gardens. In Brazilian institutions, only 158 samples have been preserved, 152 at the National Museum and 6 at the Botanical Garden. Without quantifying the ones sent to Charles Darwin in the form of seeds or dried specimens, Teixeira, Santos, Hagen and Fontes [2] cite the 483 specimens that Fritz Müller sent between 1867 and 1869 to Joseph Dalton Hooker, who was, at the time, the director of Kew Gardens, near London.

Fritz Müller graduated in Medicine in Germany and, attracted by a libertarian dream that had spread in Europe about life in the recently founded German colony, he abandons his country to run away from social and religious pressures. During the period between 1852 and 1897, in which he lived in Santa Catarina, he established a link with Charles Darwin and with other foreign researchers: Hermann Müller and Wilhelm Müller, his brothers, Hans Spemann, Max Johann Sigismund Schültze, Ernst Haeckel, Ernst Krause, Oscar Schmidt, Carl Friedrich Wilhelm Claus, Wilhelm Moritz Keferstein, Friedrich Hildebrand, Friedrich Ludwig and Friedrich Leopold August Weismann in Germany; in France, Henri Milne-Edwards; in Italy, Paul Meyer; in the United Kingdom, Raphael Meldola and Joseph Dalton Hooker; in the United States, Alexander Agassiz, Robert McLachlan and Herman August Hagen. But he continued exchanging information with researchers in Brazil: Ernst Ule, Hermann von Ihering and Nicolau Joaquim Moreira.

Peer recognition contributed to Fritz Müller's projection as a scientist. In the period in which he lived in Brazil, Fritz Müller received several titles, among which two Ph.Ds, sixteen years after the University of Berlin, where he had studied Medicine, denied him this title because he had not taken the oath: Ph.D. *honoris causa* in Medicine, conferred in 1868 by the dean of the School of Medicine of Bonn, Max Schultze, during the festivities in celebration of the 50 years of the School; Ph.D. *honoris causa* in Natural Sciences by the University of Tübigen, in its 400th anniversary celebration in 1874 – the year in which he was also invited to be Correspondent Member of the then recently founded Argentinean zoological society, National Sciences Society, of Buenos Ayres; and the title of Honorary Member of the Entomological Society of London, in 1884.

Although Fritz Müller's garden is large, the space reserved in the house for scientific work is little and modest. A critic has said that the size and opulence of the laboratories were many times in inverse proportion to the importance of the works that were conducted in them. I remembered these words whenever I saw the small office of Blumenau, from where so many fertile ideas were launched to the world. The small room has only three square meters. Beside the window there is a simple table covered with the most necessary devices for work, among which there is an old Hartnack microscope. In addition, there are a very simple bookcase, a bed and a lavatory, and next to the only worn out chair there is room only for a second one. There are no collections. I don't believe that in the entire Earth there is a wise man who is more worthy of this name that is satisfied with such a modest device. But all the zoologists and botanists know how many scientific results were achieved with that small device. [3]

In his voluntary exile in the Southern Hemisphere – which made him venture as a settler in the recently founded colony of Dr. Blumenau – he starts a pioneer research. The Brazilian ports, open at that time to European scientific expeditions, would not reserve to Fritz Müller, a European among us, the post of sole observer of the flora. The fact of having lived in the colony restricted the interchange of ideas with scientists from more advanced cities of the Brazilian Empire, like Rio de Janeiro and São Paulo, but he conducted an investigation in the open air about the coastal vegetable cover and the crustacean larvae of Santa Catarina. His notes survived the timid environment of Desterro, as Florianópolis was then called, and Blumenau, and were also launched beyond the national network of researchers that was being formed around the National Museum of Rio de Janeiro or São Paulo's Museum. His friendship with European scientists, Ernst Krause, Charles Darwin and Ernst Haeckel, among others, enabled him to publish short papers in *Kosmos*, in *Notícias Entomológicas,* and in other zoology journals, such as *Relações da Sociedade Botânica Alemã.* During his exile in Brazil he produced 237 of the 248 papers he wrote in his life. Many of them, extracted from the manuscripts contextualized with detailed illustrations he had shared with his European correspondents, were published abroad as if they had been written by the addressees of his letters. The publications of the National Museum in the Brazilian territory that had been promised by its director, Ladislau de Souza Mello e Netto, if carried out in time, would not be important to the European scientific circle – despite the effort of institutional consolidation.

Although he worked in Brazil with modest equipment, his enormous advantage was the scientific background he obtained through the education and formal schooling he received in his native country, Germany. Afterwards, in Brazil, his education was consolidated by the network of international collaborators and the activities of teacher and Traveling Naturalist. Immersion in the forest did not prevent him from extracting singular discoveries from the live material he observed. We highlight just a few of them, like the insect-plant interaction in the bromelias and orchids; his ontogenetic recapitulation of phylogeny – recognized as an Ernst Haeckel's proposition; his representation, in branch diagrams, of shared characters to show phylogenetic relationships between species – known today as cladistics; and Müller-

ian Mimicry, about which he wrote in 1875. Developing the Batesian Mimecry, in which palatable but-
terflies imitate unpalatable butterflies, Fritz Müller demonstrated mathematically that, between two
species of unpalatable butterflies that imitate each other, the rarest would have a smaller number of
losses, being benefited regarding the non-predation of its individuals in an inverse proportion to the
square of the number of its individuals. [4]

His investigation for the National Museum, and his job as an elementary school teacher in the cities of
Florianópolis and Blumenau, mix with his difficulties to adapt to the Southern hemisphere and live as a
colonist in Blumenau. Beside the hard work in the colony and the distance from Rio de Janeiro, another
obstacle that the naturalist had to overcome to act professionally as a teacher, and afterwards as a Trav-
eling Naturalist, writing reports, was the Portuguese language.

The legitimation and the scientific nature of his job depended on the international collaboration net-
work, but also, on the enculturation and formation of the Brazilian research institutions, responsible for
the scientific circles that were created around them: the National Museum, the Botanical Garden of Rio
de Janeiro and São Paulo's Museum, directed by his colleague Ihering from Rio Grande do Sul, also a re-
searcher in the service of the National Museum, like Fritz Müller. The efforts of Imperial Brazil in relation
to equipping the scientific and cultural institutions are determinant, although they were still below the
expectation of a European with university education. D. Pedro II was recognized in Europe as a friend of
the arts and sciences. It is worthy of note the influence of D. Pedro II on the nomination of Fritz Müller
for the post of Traveling Naturalist on October 2, 1876, and on his readmission in 1888 – after having
been exonerated due to intrigue in 1884. This influence was highlighted in the necrological text written
by Ernst Haeckel, when Fritz Müller died. After the proclamation of the Republic in 1889, the National
Museum received information from the Minister of Instruction, Post Offices and Telegraphs of the new
Government, determining that the Traveling Naturalists had obligatorily to live in the Federal Capital
City, Rio de Janeiro. As he did not want to abandon his family and his home in Santa Catarina, Fritz
Müller quits the job definitively in 1891. His residence in Blumenau, where he stayed after being dis-
missed from the job of teacher of the Lycée in Desterro, was his live laboratory, "where he collected a
considerable volume of scientific data that have already been incorporated into the collection of zoolo-
gists and botanists all over the world". [5]

The Europeans believed that Fritz Müller's dismissal in 1884 from the post of Traveling Naturalist had a
political connotation. A sympathizer with the monarchy regime and with the influence of the imperial
family on the political directions of the country, Fritz Müller - a follower of *Deuschtum* among many oth-
ers in the colony – had become inconvenient concerning the purposes of the new State, and of the cre-
ation of the nation in the passage from Imperial Brazil, which had brought the division between republi-
cans and federalists.

To take on the post of teacher in a public institution at Desterro, he became naturalized as a Brazilian.
As a teacher of the Provincial Lycée of Santa Catarina, he taught Mathematics between 1857 and 1864
and thought about teaching chemistry and physics, among other disciplines, to the more advanced stu-
dents. This activity kept him "in uninterrupted contact with all branches of the natural sciences and liter-
ature, and this contact was much closer than the one he would be able to keep in the subsequent years
of his life." [5] In parallel with teaching, he researched, in his free time in the shore of Desterro, which is
now Florianópolis, the medusas, the Bryozoa, the polyps, and the crustaceans, which resulted in the
only book he published, *Für Darwin*. The book, concluded in 1863, was published in 1864 by Engelman in
Leipzig, Germany, just five years after the publication of *The Origin of Species*, by Charles Darwin. Since

1861, the year in which he received a copy of this book, his investigative effort derived from his argumentation in favor of the theory of evolution.

Still as a teacher in Desterro, he projects, in one part of the farm where the *Lycée* was built, the creation of a small Botanical Garden. He collaborates with seeds and specimens for this small Botanical Garden and for the National Museum, with replicas that ended up being transplanted to the Botanical Garden of Rio de Janeiro. After the school's renewal, Fritz Müller was prevented from exercising his role of teacher without, however, losing the employment bond. Thus, he could propose to the government the creation of an experimental field on the margins of Itajaí river for planting and cultivating exotic species of the flora that were useful to the country, an activity to which he was designated in 1867. [6] Later on, his collections, scientifically argued and illustrated in detail, enriched the National Museum of Rio de Janeiro. The invitation to the post of Traveling Naturalist of the National Museum of Rio de Janeiro, which Fritz Müller held from 1876 to 1891, was made by Ladislau de Souza Mello e Netto, who was then the director of this Museum.

To contextualize the stage of the equipping process of the cultural and scientific institutions in Brazil, in the passage from colony to Empire, between 1807 – when D. João VI, at the time prince regent of Portugal, abandoned Portugal upon Napoleon's troops' invasion of the Iberian Peninsula, and came to live in Brazil – and 1815, the National Museum was instituted, as well as the National Library, the Fine Arts Academy, the Royal Press, the Bank of Brazil. Three generations of monarchs were necessary so that the Botanical Garden of Rio de Janeiro, also constituted by D. João VI in 1808, could form in 1890 its herbarium, with the donation of a rich collection of dehydrated plants that belonged to D. Pedro II. [7] The herbarium of the National Museum had preceded it – founded in 1831 by the botanist Ludwig Riedel, who participated in the scientific expedition of von Langsdorff from 1825 to 1829 in the country. The job that Fritz Müller had in the Museum between 1876 and 1891 coincides with the advancements of the institutions created in the consolidating Empire and the passage to a new administration of the already republican Brazil.

The conflicting view of nature in the colonization of the South of Brazil can be exemplified by Hoehne's testimony. In the volume dedicated to the coast of Southern Brazil, Frederico Carlos Hoehne [8] highlights the opposition between two words, fields and woods. As the director of the Botanical Institute of São Paulo, which he had founded, a post he held between 1942 and 1952, Hoehne planned to pay homage to Fritz Müller in a singular way, not with a statue to be erected in the urban space, but attributing his name to one of the rough-hewn trails in the lands of the Botanical Institute that still need to be demarcated at the time. He believed this would be a fairer homage than dedicating to him the name of a street or urban square, "in which the completely banished nature cannot establish anymore the relation between the person who has been honored and the reason for the homage." [8] The trails should be "a practical school of botany," [8] immersing the observer and exempting the help of the master.

To Hoehne, the two illustrious figures of the history of colonization of Alto do Vale do Itajaí in Santa Catarina, Dr. Blumenau and Fritz Müller, were opposites. In Dr. Blumenau, Hoehne saw the disciplined obstinacy of a persevering explorer and administrator, an educator, a "man of material initiative." In Fritz Müller, he saw the consolidated scientist who had "the forest as his favorite book", although *The Origin of Species*, by Charles Darwin, was one of the volumes of his extremely reduced library. What determined that his observation became a scientific investigation? What were the implications of having the forest as experimental practice of the observation of phenomena in their complexity? Between the fields and woods, he was thus described: "in the fields, barefoot, wearing a large straw hat, sleeves

rolled up, hoeing weeds from the cornfield, pruning the orange grove, […] by the Itajaí river or in the woods, collecting insects, observing birds, plucking plants." [8]

The interdependence between flora and fauna observed in the forest is different from the one observed in the fields and in the garden. Between the forest, the fields and the garden there are different degrees of nature domination, which reduce the complexity of the relations and show the advance of colonization. Knowledge extracted from these collection places, which were Fritz Müller's laboratory, would have to differ from knowledge produced in the academies' laboratories.

The garden was the live inventory of his correspondence exchange with European scientists. The proximity to Fritz Müller's house enabled the monitoring, at different times and seasons of the year, of the rotation of the stems of climbing plants or of the movement of leaves in the rain, and a more comfortable and speedy transposition of these data to his worktable – where he registered them with indexes and formats that were more reliable to science, and in long-lasting media. The fields, even with the utilization of cultivation methodologies, were, at first, the colonists' subsistence area, with no greater economic ambitions.

The fields, with the felling of the forest and a clearing open in the woods, served the increasing needs of safety and communication of the inhabitants of the colony, which was becoming a city. It was part of the administrative project of domination and rationalization, which saw the native vegetation as a productive force.

In 2010, the REFLORA notice was opened for cataloguing and repatriating the Brazilian native species of the 18th, 19th and 20th centuries that are in two international herbariums. This initiative has strengthened and stimulated the creation of networks of researchers working with the inventory of the remaining flora specimens in the state of Santa Catarina. One of the aims of *Inventário Florístico Florestal de Remanescentes Florestais do Estado de Santa Catarina*, IFFSC – Forest Floristic Inventory of Remaining Forest Species of the State of Santa Catarina, is the update of the list of endangered species. The project expects to conclude, in three years, the mapping of the species that are in the herbarium of Kew Gardens, in England, besides others. Among the species catalogued in this institution, some were collected by Fritz Müller in the 19th century. Of the species planted in Fritz Müller's garden, fruit of his investigation and correspondence with other foreign scientists, nothing is known. With the discussion about the changes in the Forest Code in Brazil, the trajectory of Fritz Müller's life and work becomes of paramount importance for reflection. Transformation networks is the movement of the observation carried out in the periphery that is legitimized, as an abstract datum, in the calculation centers that promote an accumulation of knowledge, the surplus value of information. It is in the transformation network that intellectual control is exercised, and through it the centers are capable of representing phenomena that were previously out of their reach. The paper focused on the science network between the German colony in the south of Brazil and the center, with the European scientists and naturalists with whom Fritz Müller exchanged letters, and tried to map the plant specimens that Fritz Müller sent to Europe. The concept is employed in the paper to refer to the naturalist's procedure in his observation of the phenomena in loco in the forest, and also to highlight that his observations could only be legitimized as science after the screening of the "transformation networks."

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TRAVELOGUE: AUSTRALIAN FORUM PANEL DISCUSSION

MARK GUGLIELMETTI

The focus of my panel discussion centers on Artificial Life, as encoded in three-dimensional computer generated space (3D space), with a specific orientation on the view into the Artificial Life virtual "world"; this view is predominantly mediated through the virtual camera.

Introduction

"A rich history has prepared the way for Artificial Life to make sense" writes Stefan Helmreich, [1 pp.6] reminding us the various dimensions through which to consider the Artificial Life are many. The discursive frameworks that tend to frame Artificial Life include; biology, the genealogy of cybernetics, the history of twentieth century generative art, often economics [2] and, more recently in relation to Islamic Art. [3, 4] It is not without irony then that Artificial Life visualisation *itself* as a specific dimension of the moving image is a somewhat impoverished discursive field with few notable exceptions such as. [5, 6] Reflecting the state of discursive impoverishment is the number of Artificial Life artworks that specifically explore Artificial Life in relation to the grammar of the moving image; *Technosphere* (1995) by Jane Prophet et al and Nemirovsky's et al's *Emonic Environment* (2001-2005) are but two exceptions.

How the view into Artificial Life 'world' frames our perception of the virtual world is the concern of this presentation. Reframing Helmreich I argue, a rich history has prepared the way for us to *view* Artificial Life images; there are many visual grammars and interpretative regimes that inform our capacity to engage with Artificial Life virtual worlds. In a recent response to an abstract I submitted to a media arts history conference I was surprised to read one reviewer's response; "The idea of the "virtual camera" in simulated settings is an interesting hold-over from the filmic world and deserves more exploration". The response was unexpected for a number of reasons, which I address here. Firstly and prosaically, the virtual camera is simply a de-facto protocol in all types of 3D simulation, filmic or not; it is the tool [7] or device through which to frame the image, window or view into 3D modeling software, VR simulation, FPS games, architectural visualisation, engineering simulation or, the artificial life virtual "world". Secondly, I argue there is a ubiquitous regime and protocol in Artificial Life image making that draws from *both* science and cinema even if these normative practices are not explicitly obvious to the practitioners creating Artificial Life images. Finally, I argue Artificial Life image making draws heavily upon the interpretative grammars and strategies developed in the scientific nature film. In summary, this paper outlines provisional research that situates Artificial Life visualisation, science and art, in both; the interrelated genealogies of scientific visualisation and cinema and, within a particular discursive orientation traced to Disney animation and nature films.

Science and the 'long take'

Whilst much research energy has focused on computational techniques to generate lifelike behavior and emergence (Langton) the scopic regime through which to view artificial life "worlds" helps gives rise to the key themes of emergence and "lifelike behavior"; there are interpretive fields through which to *view* Artificial Life worlds. The scopic regime in Artificial Life visualisation is a "hangover" from scientific observation, vis-à-vis devices such as the microscope and telescope, *and* from film/cinema, vis-à-vis Andre Bazin's device "the long take"; the perception of an uninterrupted view of the world underwrites

both the *arts of reality* [8] and Bazin's long take. Scientific objectivity and the long take function to 'record' an unmediated reality; this reality gives rise to the idea that one looks through a window into a 'world', in this context through a window into an Artificial Life world and not and at an image of Artificial Life (albeit there are exceptions).

The idea behind the virtual camera is embedded in the genealogy of analogue devices such as the microscope and telescope'; the virtual camera impassively enframes the 'world' whilst it simultaneously optimizes the credibility or factuality of the 'world'. Moreover, similar to a photochemical camera (still or motion) the virtual camera 'records' or documents a temporal image of the 'world'; in other words the virtual camera approximates Vertov's "microscope or telescope of time." [9 pp.213]

There are a number of ideas at work here worth considering. Firstly, the camera is employed objectively; as we know objectivity forms a tactical and an interpretive regime.

Secondly, similar to analogue telescopes and microscopes, the virtual camera operates in and is operated on in the 'present tense'; Jenna Ng is instructive here observing that the long take also functions not just to record reality but *presentness*; Ng writes, "Pier Paolo Pasolini attributes presentness specifically to the long take as it is the shot which takes in the greatest amount of reality, and "reality seen and heard as it happens is always in the present tense": "the long take, the schematic and primordial element of cinema, is thus in the present tense. Cinema reproduces the present" [10 pp.133-134] or in the words of the film Director Aleksandr Sukorov's in describing his film *Russian Ark*(2002) "the present continuous." [Sukurov in 10 pp.123] This present continuous has special resonance in Artificial Life image making; with few exceptions the key to Artificial life's *emergence* [11] involves evolving *live* to a "global audience" (Scott Draves http://electricsheep.org/).

Thirdly, the virtual camera is routinely considered as a window into a 'world'. Unlike analogue telescopic, microscopic and, photochemical images which are indexical to the physical world, in the case of photography and film they record imprints of light from the world, [10 , 12] Artificial Life 'worlds' are not indexical to the physical world, they are isomorphic to a specific computer model. Moreover, the computational models are mathematical expressions that *interpret* the physical world; they are neither indexical nor isomorphic to the physical world. Like all digital images Artificial Life images don't 'represent' the physical world, digital images encode information and "computers produce tokens of *numbers*." [12 pp.131] That "Images are mediations between the world and human beings" [5 pp.9] is a important reminder that an image is not a window into a world it is an image. This point is critical when framed against the very premise of artificial life, which is predicated on "generating *lifelike* behavior [… and] focuses on the problem of creating *behavior generators*." [11 pp.5] Frequently, the success Artificial Life visualisation is dependent on observing or deciphering emergent patterns in the 'world'; what is perceived in the world or on the screen is what there is to perceive. According to Flusser transposing the act of looking at an image into the act of looking at or into a world is "dangerous" business:

What one sees on them [technical images and by extension images created by the virtual camera] therefore does not appear to be symbols that one has to decode but symptoms of the world through which, even indirectly, it is to be perceived. This objective character of technical images leads whoever looks at them to see them not as images but as windows. Observers thus do not believe them as they do their own eyes. Consequently they do not criticize them as images but as ways of looking at the world … [this] lack of criticism of technical images is potentially dangerous at a time when technical images are in the process of displacing texts – dangerous for the reason that the 'objectivity' of technical images is an illusion. For they are – like all images – not only symbolic but represent even more abstract complexes of

symbols than traditional images. They are metacodes of texts which … signify texts, not the world out there. [5 pp.15]

The problem with technical images, from art or science, is what you see is *not* what there is, what there are, are highly sophisticated models and concepts that require decoding and the virtual camera is strategically organized to impassively enframe these encoded models.

This account of the virtual camera in Artificial Life has particular resonance with the status of photography and film, from science and art, in the late nineteenth and early twentieth century; "Photographic images, according to the skeptic, were the automatic product of a machine, not of a mind" [13 pp.8] that is, the photographic machine "automatically [reproduced] whatever [found it's] way in front of the camera lens." [13 pp.9]The skeptical accounts were later confirmed in the *actualités* or documentary films of the Lumière Brothers [13 pp.9] and exquisitely represented in the photographic work of Karl Blossfeldt, a pioneer of the "New Objectivity" movement in the early 20th century.[14 pp.5-22] As is apparent in the images created by Blossfeldt, the framing of the 'world' is a tactical account of 'reality', an account that does not automatically record the natural landscape but frames it through various apparatus. Blossfeldt's formal grammar is often manifest in artificial life image making, for example in Karl Sim's *Galápagos* (1997) series and in Jon McCormack's elegant study of the "computational sublime" in *Bloom* (2006) see http://www.csse.monash.edu.au/~jonmc/projects/Bloom/Bloom/bloom_-main_page.html.

Disney Animal Animation and the Nature Film

A common feature in Artificial Life research, art and science, is the accompanying publication describing the research. The published material often includes both a description of the target system and a stylized fictional description of the system; the word "world" is such a stylized, rhetorical, descriptor. The beautifully evocative description of the homeostatic simulation *Daisyworld* (1983) suffices as a demonstration; published in the scientific journal *Tellus Series B: Chemical and Physical Meteorology*, the account reads; "Owing to a subtle change of climate, clouds appear on daisyworld. The clouds are light in colour. We will assume that the clouds form only over stands of black daisies because of the rising air generated over these warm spots." [15] Obviously, stylized descriptions have properties that the models don't. [16] These stylized accounts of the 'worlds' that describe 'natural' systems are nature stories, stories that would not appear out of place in David Attenborough's *Life* series (1979-2010) nor in Disney nature stories.

The fictive re-imaginings of Artificial Life 'worlds' have much in common with the nature or wilderness stories popularized by Disney in the 1950s and 1960s and other production units in the 1970s, which retold stories of a mythic "western interior" as natural 'progression' and, anthropomorphized the subject matter. [17 pp.117-120] The similarities between the Disney stories and artificial life narratives, in how they both organize ways of thinking about the world through retelling of 'eternal' stories of birth, death, cycle, pattern and adaptation (progression), are many. Compare, for example, the role of the 1950s Disney filmmaker and Artificial Life practitioner; the filmmaker captures or "shoots" something on film and the Artificial Life practitioner captures life in the computational 'world' using the virtual camera, both are on the metaphorical hunt for the 'novel yet familiar' exotic life form in an 'undiscovered land'. And similar to the Disney stories that did "something far more than reveal "nature's mysteries": [… and] spoke to us of a living and intelligible world beyond the fence of civilization, a world we could enter at will and experience in something like human time" [17 pp.118] Artificial Life proposes a comparable arrangement.

Whilst the reader might find the relationship between the Disney nature film of the 1950s and artificial life unpersuasive consider the 1993 commissioned report by Ars Electronica in which the author of the report, Roy Ascott, details the demarcated exhibition spaces at Ars Electronica. In a provocative gesture "Walt Disney, animal animations" are included as 'artists' in the "Artificial Life" section of the Ars Electronica exhibition. [18 pp.296] My reading of this provocation is twofold and interrelated; Disney animations and nature films attempt to simulate the 'laws of nature' - Disney animation "follows the laws of physics — unless it is funnier otherwise" observed Disney animator Art Babbitt whilst Disney nature films attempt to simulate life as we know it vis-à-vis the moral and political refractions of life as it is and life as it could be. Disneynature, the division of Walt Disney Motion Pictures Group that specifically releases Disney nature documentaries, renders explicit this interrelation between Disney animation and Disney nature film. Disneynature's latest blockbuster African Cats (2011) is "An epic true story set against the backdrop of one of the wildest places on Earth, "African Cats" captures the real-life love, humor and determination of the majestic kings of the savanna [...] the story features Mara, an endearing lion cub who strives to grow up with her mother's strength, spirit and wisdom [...] Fang, a proud leader of the pride who must defend his family from a rival lion and his sons. Disneynature brings "The Lion King" to life in this True Life Adventure... An awe inspiring adventure blending family bonds with the power and cunning of the wild". (http://disney.go.com/disneynature/africancats/#story/

Artificial life 'world building' is located in this trajectory of nature storytelling; cyberbeasts, virtual organisms and, agents are optimized in a similar vein to Mara, Fang and other 'big cats' to fight, breed, and die; moreover we observe them as they carry out the real life drama on the fitness landscape. This relationship between artificial life and the nature film is a theme repeated in artificial life researcher Terzopoulos's conceptual framing of his artificial life work, for example in his paper Artificial Life for Computer Graphics Terzopoulos writes "computer animators can begin to play a role less like that of graphical model puppeteers and more like that of (National Geographic Society) nature cinematographers." [19]

Artist and writer Michael Punt writes, "the gap between science and entertainment is much smaller than imagined. The interaction and exchange might occur not only in shared technologies but in the very imagination that seems necessary to negotiate our consciousness of the world as complex and ultimately unknowable. Science in narrative cinema and the cinematic in scientific research do seem to function reciprocally to help account for difficult things, providing images, metaphors, and useful descriptions for each other." [20] Punt's argument is clearly illustrated in Jon McCormack's *Turbulence*(1995). Described by the artist as "a menagerie of synthesised forms, evolved within the computer using a process of artificial selection. A video laserdisc contains over 30 minutes of computer generated animation" [21] *Turbulence* is a series of pre-rendered animated sequences that are selected and viewed in no particular order. Whilst McCormack wrote the code to "allow certain algorithms and their graphic progeny to flourish through a recursive process of digital "procreation," and to terminate others—a case of survival of the aesthetically fittest" [22] the overall experience is expressed through the conventions of cinema as the user/viewer watches the pre-rendered movie files; the camera shots are composed by the artist director and; the narrative arc, regardless of the viewing order, reworks the story of Genesis creation or a "post-Fantasia reprise." [22]In the words of Michelle Barker "In the end what we see is closer to a narrative cinematic experience complete with sound track." [23]

Closing Remarks

In Artificial Life image making, a constellation of grammars from science and film are assembled as constituent of a particular 'natural order'. Whilst this 'natural order' appears benign it is important to remember the 'natural order' in Artificial Life is neither neutral nor impartial; the capacities required to engage and interact with the metaphors, models and techniques of artificial life are cultural and political, they are recruited, so to speak, into Hayles' posthuman world [24] in which the machine becomes the model for understanding the human.

At stake in Artificial Life screen based 'worlds' or images is agency both in the terms of the Artificial Life-form and being human; instead of looking *at* animats, virtual pets or "cyberbeasts" perhaps we should consider looking *through* the Artificial Life forms point of view. Virilio's somber observation; "Once we are definitively removed from the realm of direct or indirect observation of synthetic images created by the machine for the machine instrumental virtual images will be for us the equivalent of what a foreigner's mental pictures already represent: an enigma" [25] and Cubitts astute observation, "Machine perception and human perception are co-dependant and must co-evolve"[26 pp.108] are nice bookends to this topic.

"AI Life" researcher Margaret Boden argues, "An idea can be "possible" or "impossible" only with respect to a specific conceptual space. It is possible if the rules for generating new structures allow for it; impossible if they do not. The more clearly we can map the conceptual space, the better we can identify a given idea as creative, in this way or that."[27 pp.269] If I understand Boden correctly she argues that an idea (as creative) is possible within a specific "interpretive regime", an idea transmitted through a specific dispositif vis-à-vis structures of knowledge, discourse and power. It is through the institutionalised apparatus that I understand Cubitt when he states "Computers will talk to anyone, but only the wealthy teach them to speak, to define what perception might be and what is interesting." [26 pp.47] The irony is this; in a contemporaneous media saturated landscape in which the "new space of mediated vision is post-Cartesian, postperspectival, postcinematic, and posttelevisual," [28 pp.7] artificial life screen based work tends to orient around a single stationary view into the virtual 'world'.

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TRAVELOGUE: THE EXPRESSIVE POTENTIAL FOR AN A-LIFE FILMMAKER

MARK GUGLIELMETTI & INDAE HWANG

Travelogue: a recording of minute expressions explores the expressive processes of film and A-Life to propose co-evolving an A-Life world with an artificial filmmaker to evolve a documentary of 'interesting things'. The paper frames the research and examines the potential to expand both the grammar of film and A-Life to evolve a new visual syntax and to create new logics for transitions and alternative visual/thematic analogies.
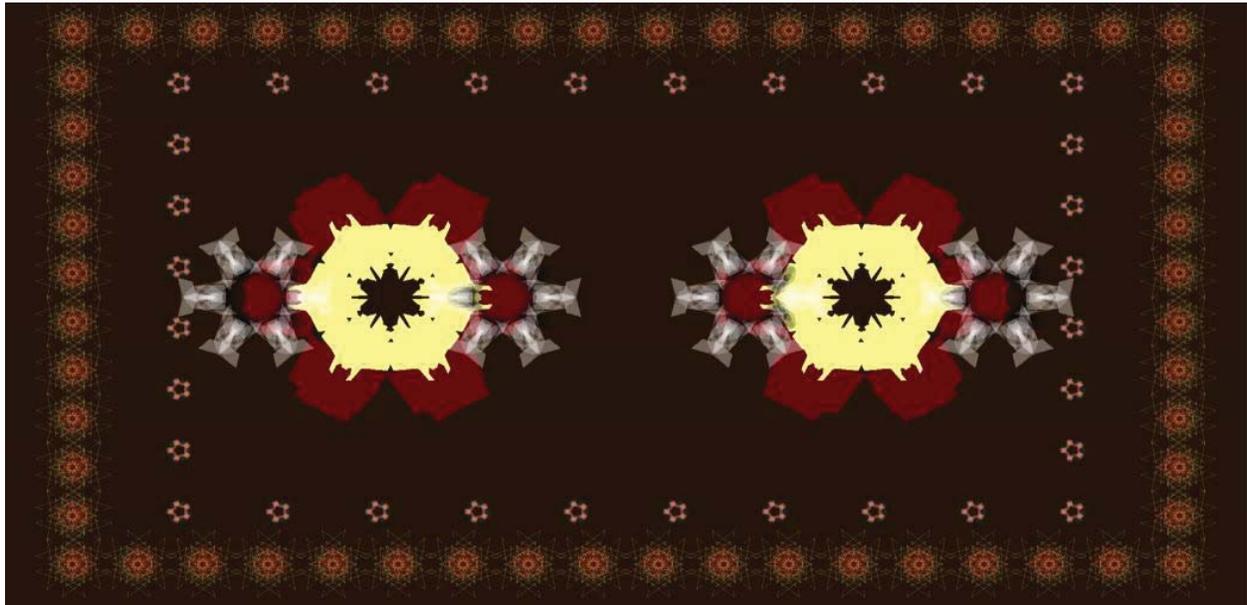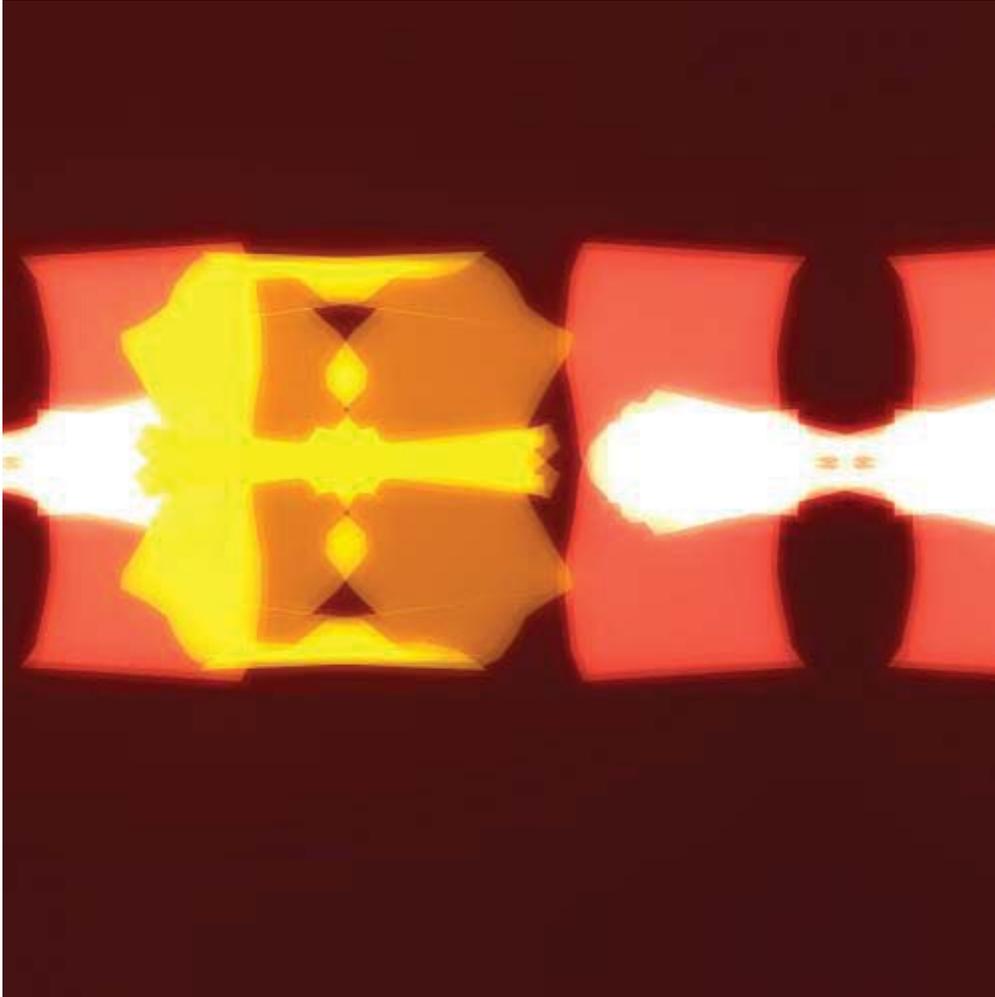
Figure 1-3. Travelogue: a recording of minute expressions, 2011, Mark Guglielmetti in collaboration with Indae Hwang. Software, code. Copyright the artists.

INTRODUCTION

The term 'artificial life' (A-Life) and Langton's often-cited trope to locate "*life-as-we-know-it* within the larger picture of *life-as-it-could-be"* are beautifully evocative and provocative, as are the descriptions of the occupants of these "virtual worlds"; such as Sommerer and Mignonneau's "creatures", Jane Prophet's "cyberbeasts", and Karl Sim's "virtual organisms." These creatures, etcetera, often "live," "fight," "breed," "trade" and "die" in the virtual world; that said, rarely do they "work," "shop," "cook" or afforded a 'point of view'; sticky messy descriptions that, apparently, rarely pervade the imaginative and iterative loop of pattern generation. The anthropomorphic machinations of an A-Life "world" are usually described through the discursive framework and nomenclature of science and occasionally economics, more so than from a personal intimate perspective of life.

This institutionalised orientation is not exclusive to the nomenclature of A-Life as a journalistic enterprise for academic publications and as filter for the artist's press release, but extends to other taxonomies of A-Life such as the interpretive viewing regime of the A-Life world. The normative viewing

protocol through which to view an A-Life world is predominantly through a "window" into the A-Life world; in 3D computational space this window is framed through the virtual camera view into the modeled world. Whilst there are a few notable exceptions, such as *Technosphere* (1995) by Jane Prophet, Gordon Selley et al, I argue there is a ubiquitous approach and standard protocol in A-Life world making that draws from both the practice of science, observation as raison d'être, and expressions from cinema, specifically Bazin's 'long take', even if these normative practices are not explicitly obvious to the practitioners modeling these 'worlds'.

Whilst the A-Life artist's vision centers on a range of poetic investigations and interventions, the aforementioned institutionalised discursive orientations and normative grammars are nonetheless political. Observation as a model occupies a long-standing tradition in the west for a social-cultural controlled search for natural order; how we see what we see as a spectator or user is important. [8] A number of A-Life artist's might dismiss this argument, however as Shanken demonstrates in his brief analysis of the *quadri riportati* and *quadratura*, the view into and of the world is critical; varied representational schemas reconfigure our perception and relation to the world. [10] In the case of the virtual camera, observation vis-à-vis the 'long take' stands in reserve as the de facto protocol which functions to record (shoot) an unmediated reality of the A-Life 'world', perhaps for good strategic reason; when "we abandon the notion of a camera as an adversary to the world … and instead place the accent on its "natural" connection to the world, we reach another, more orthodox version of a camera. This approach stresses the necessary, scientific links among objects, light rays, and film emulsion […] A camera comes the bearer of tokens from the world." [4] A natural order is established in service of scientific method; measurement, classification, documentation and re-presentation arbitrate fact from magic, facts are not man made, as Shapin and Schaffer observe "it is not I [the experimenter] who say this; it is the machine." [11] The apparatus of the scientific optical device, including telescopes, microscopes, the immobilized lens, in other words the *arts of reality*, [9] stand in reserve to observe and reaffirm a natural order; the virtual camera affords a strategic 'world view'.

During the "speculative pre-history of artificial life" [5] cybernetic artist and theorist Roy Ascott openly contested "deterministic vision" in art, writing; "The perception of our own times is more inclusive and panoptic; the simultaneity of events and their endless changeability have called for a depth of field that zooms from the microscopic to the macroscopic." [2] Whilst contemporary new media artists explore the "microscopic to the macroscopic" in an infinite array or indeterminate number (*n*) of expressions in software and hardware, including the virtual camera in A-Life's sibling Artificial Intelligence, the virtual camera in A-Life predominantly remains underexplored; the entire parameter space or *phase space* of the virtual camera in A-Life is up for grabs.

PROJECT DESCRIPTION

The project *Travelogue; a recording of minute expressions* is a hybridized visualization-generative-cinematic system exploring the tension between the microscopic and macroscopic, and it does so to examine a range of cultural grammars including; the scopic regimes of both the 'long take' and montage; representation and aniconism; narrative and visualisation; in other words, grammars of realism (without the ideology that underwrites much in A-Life, the biological metaphor). The work is rendered in real-time in three-dimensional software (3D space) and displayed as a multi-channel installation; at ISEA2011 the work is displayed in two 24" LCD monitors.

The central motif of the work draws inspiration from Islamic art including Turkish and Persian carpet making, see Figure 1. The motif strategically orients both the project and A-Life, including 'emergence' as *de rigueur and practice,* into the longer genealogy of the human enterprise. Whilst much is made of the critical role of emergence in A-Life, [12] the conception of emergence in art precedes A-Life in Islamic art and carpet making; Laura Marks observes, "both Islamic art and algorithmic media enact the emergence of Everything (or, A Lot) from One (or, Not Much)." [7] For Christopher Alexander emergence in A-Life is even more tightly connected to Islamic carpets in that the purpose of the carpet was more than to create a representation of life as it is but moreover to generate life as it could be in the "emergence of a being" or God; "*A carpet is a picture of God.*" [1]

The "world" in *Travelogue: a recording of minute expressions* is seeded or initialized with statistical census data on tourism in Turkey, September 2010; data from the "Monthly number of arriving foreigner visitors" provides the initial 'resources' to populate the work. Other data, such as "$ spent per foreigner" and "Number of foreigners of Nationality and Group of age-gender" populate other variables in the system; these variables are used to mathematically describe 'agents' (expressions). During runtime the expressions "engage" with other expressions; this "engagement" is not visualized, reducing the capacity to anthropomorphize the system. The algorithmic transactions between expressions provide various resources to other expressions, which enable them to change scale, colour, location, number; similar expressions enacted in other A-Life systems without layering the expressions with slippery terms like "fighting" or "breeding". The orthographic view into the work frames and gives context to the system; the resulting moving image might be described as a re-imagination of the *potential* enfolded tourist trade in Turkey but just as well be described as an expression of the system.

The second screen displays a view as expressed from the virtual camera in the "world". The format of the virtual camera expressions draws from a variety of grammars from the moving image, such as montage, zoom, pan etc. but also novel expressions unique to 3D software space such as rewiring the virtual space's *z-buffer* to reorganise the drawing logic of the virtual space in relation to the virtual camera, as discussed in Guglielmetti. [6] The virtual camera/filmmaker shoots or *n*frames what is 'interesting' to it; whatever that interesting is, is unknown to the author. See Figure 2-3.

The virtual camera in *Travelogue; a recording of minute expressions* does not attempt to capture or attempt to construct narrative as it is or narrative as it could be. Moreover, any attempt to reconfigure the project within a user-centered utilitarian approach found in some A-Life art [12] misses the point; this is a process-centered work that self-regulates the microscopic to the macroscopic. The virtual camera expressions resist, to limited degree, the "patterned clichés" enlisted as normative narrative protocols in addition to any claims to "realism." [3] In other words the virtual camera functions as "an eye unruled by man-made laws of perspective, an eye unprejudiced by compositional logic, an eye which does not respond to the name of everything but which must know each object encountered in life through an adventure of perception." [3]

CONCLUSION

Travelogue: a recording of minute expressions is an initial and tentative foray into the potential for artificial life filmmaking with much predicated on the "virtual camera" in 3D space. The virtual camera is critical for this iteration of the project in that it simulates a fully functional *digital* camera; the virtual camera is an array of algorithms, some of which are mapped to functions that have equivalence in physical digital video cameras others specifically used for 'post production' effects, such as motion blur or glow. In

and around these technical constraints have developed various grammars of the moving image; for the purpose of 'simulating' a subjective point of view these grammars persist in *Travelogue*.

However, the virtual camera is host to a range of algorithms, such as the z-buffer, that specifically encode *3D space* and have neither correspondence in the physical world or in other software formats. The challenge for research into the grammar of artificial life filmmaking is to jettison the "camera" itself as the primary metaphor to describe the view into a 3D space; there simply is no camera. Meredith Hoy rightly observes in her ISEA presentation description for *Virtual Resistance: A Genealogy of Digital Abstraction,* "computationally generated pictures analogize and favor the visual qualities of a world seen through a camera lens". Hoy's statement has particular resonance in visualizing 3D space in FPS games, VR, machinema, artificial life, architecture and engineering. Any extended investigation into artificial life filmmaking for the purpose of creating a new syntax and visual grammar must include a closer inspection of the infinite array of views into the world for the purpose of re-compositing these views into a non-photorealistic rendering of the 'world.'

This experiment into an extended range of capacities in A-Life imagemaking is inspired by artist and experimental filmmaker Stan Brakhage who understood what is at stake perhaps better than most:

the increased programming potential of the IBM and other electronic machines [are] now capable of inventing imagery from scratch. Considering then the camera eye as almost obsolete, it can at last be viewed objectively and, perhaps, view-pointed with subjective depth as never before. Its life is truly all before it. The future fabricating machine in performance will invent images as patterned after cliché vision as those of the camera, and its results will suffer a similar claim to "realism." [3]

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THE RHYTHM OF CITY. GEO-LOCATED SOCIAL DATA AS AN ARTISTIC MEDIUM

Varvara Guljajeva & Mar Canet Sola

The paper introduces our approach for applying geo-located social data for artistic purposes, and elaborates on the related artworks. By describing The Rhythm of City we explain an innovative and artistic way for using geo-located data as a score in real-time. At the same time, the data represent a city's pace of life. We stress the malleability of the digital world to the physical one, and the interpretation of social data for artistic purposes.

Fig 1. The Rhythm of City was exhibited at Enter5 in Prague. Copyright Varvara Guljajeva & Mar Canet Sola.
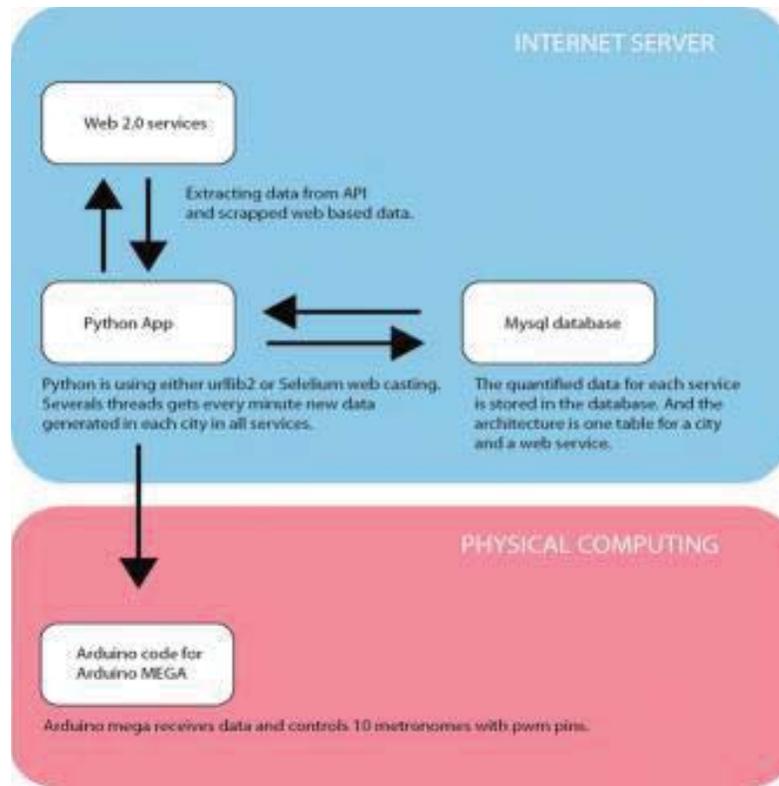
Fig 2. The software architecture of The Rhythm of City. Copyright Varvara Guljajeva & Mar Canet Sola.
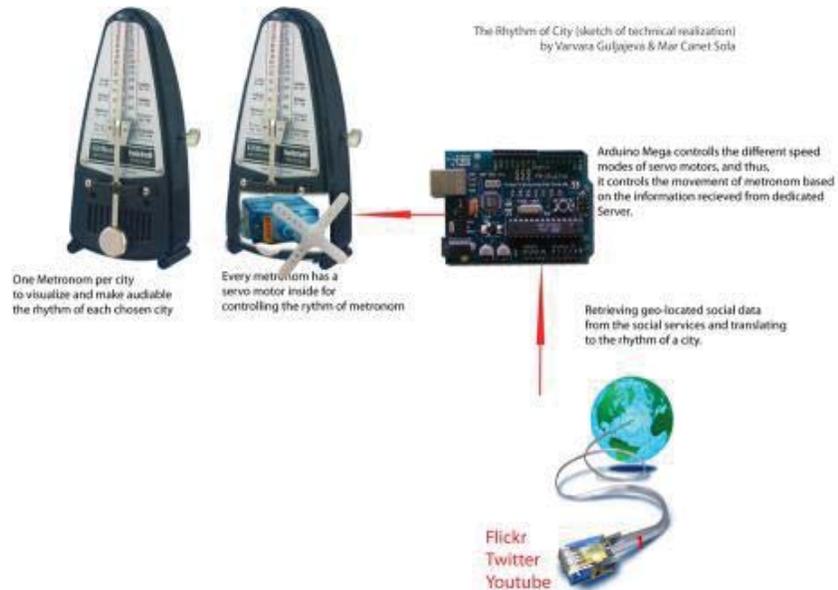
Fig 3. Technical realization. Copyright Varvara Guljajeva & Mar Canet Sola.

INTRODUCTION

Starting with the inspiration for the project, Bornstein & Bornstein discovered a positive correlation between the walking speed of pedestrians and the size of the city. [14] Robert Levine [10] demonstrated the faster pace of life in the northern, economically developed and individualistic countries in his study. In short, the investigations proved that it is possible to describe a city and its' culture by the speed of inhabitants and services, and its location.

Consequently, we assume that the digital geo-located social data can give us similar results: in economically developed countries bigger cities generate more digital social content rather than the cities of undeveloped countries. In other words, we believe that the analyses of geo-located social data will give similar results as have achieved Bornstein & Bornstein and Robert Levine. Thus, the aim is to artistically relate to these studies.

Our assumption is based on numerous facts and writings. First of all, the society is going through the digital revolution and we are living in the information age. Social media has gained an important role in our lives. Kristie Fisher and Scott Counts state in their paper that the relevance of social software is already comparable to the older media like books and television. [5]

In addition to that, location-aware ubiquitous and mobile technologies allow us instant participation in digital social networks. For example, Twitter has announced "182% increase in the number of users tweeting from mobile devices in the past year." [9] That brings us to a conclusion that social media are well received and extremely used by the society. The usage of Internet is much more than the source of information nowadays. Social media are extremely engaging by encouraging socialization and expression of own thoughts, moods, and reporting on the events. Thus, it can be claimed that microblogging and upload of various media is becoming an integral part of social life.

Fujisaka, Lee, and Sumiya state in their paper that a significant part of population is sharing its' daily life and social events through microblogs, like Twitter. Even more, the growing usage of mobile devices makes blogging more popular and accessible. It means people are reporting about happenings, their activities, feelings, etc instantly. [8] The authors refer as well to the fact that it is possible to make sense of the microblogs' data. Although the messages on Twitter are short and have limited information, many researchers are looking for a set of mass movement that allows "discovering interesting and useful patterns such as social/natural events or social customs/culture." [8] All this is possible because of a location and a time-stamp that are involved into many posts in social networks. As well Kristie Fisher and Scott Counts see Twitter as "a very large and rapidly changing information source." [4]

Drawing on these facts, a city's culture, events, and pace of life can be observed by analyzing the geo-located social data. Paul Virilio concludes following: "a virtual reality that dominates the reality while disturbing its own idea of 'reality'." [13] Therefore, it is inspiriting for us as artists to use the data of social media as a material in our artistic practices. Moreover, it allows us to reflect upon the phenomenon of hybrid virtual-physical world and provoke discussion.

CONCEPT

The Rhythm of City has a multifaceted concept. First of all, geo-located data are translated into the mechanical rhythm of a metronome. The same rhythm represents a city's pace of life. Second, there is a twist from digital to physical. The digital data are translated into physical kinetic motion and mechanical sound. Thus, the meaning of information has been altered and applied for totally different purposes. The same has happened with a metronome – the device has been given totally new and unexpected function from its' original one.

And finally, the users of geo-located social media are influencing the rhythm of a metronome in real time. It constitutes that The Rhythm of City is an installation that can be viewed as an open work, which score is dependent on geo-located social data. As well the work goes under real-time art according to Jeffrey Crouse. [6] He states that this kind of genre of art comprises two distinct parts: the information source(s) and the work it self. The art piece on its own gives a new frame for the data source, and at the same time, alters the meaning of it. Hence, the information does not stand for the information anymore, but for something totally different. In the case of The Rhythm of City the geo-located social information of sources are transformed into a rhythm of a metronome in real time. On the other hand, The Rhythm of City can be seen as mixed reality installation because it crosses and blurs the borders of virtual and physical spaces.

In addition to that, the artwork can be viewed as a representation of a city's pace of life. In other words, the tempo of a metronome is an interface of a city. Through observation one is able to make a conclusion on the tempo of life in certain city and compare different locations between each other. Hence, the installation can be perceived as a performance by 10 metronomes representing different cities but also one is able to observe a single metronome and listen to a specific city (Fig 1).

When it comes to our inspiration for using metronomes, we were greatly influenced by György Ligeti, who composed "Poème Symphonique for 100 metronomes" in 1962. [12]

Ligeti's work is a relevant reference in terms of score composition and applying a mechanical object as a musical instrument. In addition to György Ligeti, many other Neo-Dadaists and Fluxus artists, like John Cage, Eric Andersen and many more, were looking for new forms of score and art in general. Chance played a significant role in their works often. Basically they treated an art piece as a field of possibilities that underlined the role of chance and choice. [2] We see a number of parallels between The Rhythm of City and the early works that used chance and choice as an integral part of the composition. It constitutes that the geo-located social data play a role of chance in the composition. The important difference is that the tempo of metronomes goes beyond chance and adds cultural meaning. Moreover, the work builds a bridge between virtual and physical spaces, and thus, is a manifestation of networked society and digital age. As Lazlo Moholy-Nagy puts "art crystallizes the emotions of an age; art is mirror and voice." [1] Hence, we are making use of modern technology in order to explore a new possibilities and forms in contemporary art, and to reflect upon the networked age.

REALIZATION

In order to achieve the most accurate rhythms of cities, multiple social networks as the sources of social data are used. According to the selected cities the recent geo-located social data from Twitter, Flickr,

and Youtube are retrieved every minute. Thus, for each location the score is composed periodically. It is a combination of recent social activities in the three social networks.

In short, the software robot of The Rhythm of City gets the number of posts from the social platforms in the last minute and converts it into the rhythm of a city proportionally based on the current trend. All this is repeated every minute (Fig 2).

Explaining the dedicated software, the application was developed in Python. The specific programming language was chosen because Python is an optimal solution for creating web crawlers. Web crawlers is a software-based search robot, known as well as web-spider that analyses web according to the target. In this case, web crawlers is looking for the social data appeared in the last minute on selected social services and afterwards counts the new input. The query of search robot is location specific. It means the program is looking for the new social data only in the declared cities.

The database was created in MySql for storing the information gained from web crawlers. All location specific values that are used for generating the rhythm of each metronome are placed into the database. The database is used as well for storing the historical data of each city in order to understand the local activity within the social media networks. It means the rhythm of every city is compared to its' historical data periodically. Hence, we are normalizing the data of each location in order to ensure accuracy of the rhythm. The quantified data is then returned to Python application that forwards the rhythm value of each metronome to Arduino every minute.

Continuing with physical part of the project, it consists of modified metronomes and a microcontroller. Arduino (microcontroller) is connected to dedicated computer in order to obtain the scores of the metronomes every minute. The score from 0-255 is translated to the different rhythms by ArduinoMega and forwarded to the servomotors.

The metronomes used in the installation are modified: inside each of them is placed a servomotor that is realizing the tempo of metronome sent by the microcontroller (Fig 3).

LIMITATIONS AND REASONS FOR APPLYING CERTAIN SOCIAL NETWORKS

Twitter, Flickr, and Youtube were selected as data sources for several reasons. First of all, these social services are widely used all over the world and have been applied for describing epidemics and other social events in several studies. [8] Therefore, the score that is a proportional combination of users' activity within these social networks is reliable and realistic for representing the rhythms of cities. Moreover, the project is one of the few ones that apply a combination of data sources and evaluate their importance. Normally just one source, for example Twitter, is applied for extracting and translating social data.

The second reason for selected specific social application was available search by a city. For example, Google provides the geo-located search by country only. Opposite to Google Twitter, Youtube, and Flickr support search by city in real time and therefore were applied in the project. However, it is possible to expand the number of used social networks. For example, Wikipedia could be considered as an additional source for the score calculation.

Concerning further limitation, it is important to point out that certain social networks are banned in some countries. For example, Youtube, Twitter, Facebook, Google and some more web sites are totally or partially blocked in China. It constitutes that it will be difficult to include any Chinese city to the installation.

RELATED WORKS

The explosion of web technology and digital culture continue to be an inspiration for many artists. Moreover, virtual social environment is applied as an artistic medium often. For example, Julian Popp has produced amazing artworks based on his significant exploration of digital culture and real-time web as an artistic medium. Bit.Fall is an installation that displays the most popular keywords of current online news. The words, extracted from digital sources, can be read only for some seconds while the water drops are falling. [11] An art piece from 2003 by Jonah Brucker-Cohen called PoliceState, is another example for applying digital data as a concept and a medium that affects physical matter in real-time. The artwork points out the fact that certain governmental organizations, like FBI, are snooping users on Internet. The artist has developed a software script that makes use of the data being "snooped" by the authorities and turns it into the radio signals that control the toy police cars. [3]

Urban Mood by Mahir M. Yavuz is another project that uses geo-located tweets in order to describe the mood of a city. A single word that is a summery of a post is projected for a minute before displaying the next one. [15] The installation remains in the digital environment. However it demonstrates well how geo-located social data can be used for artistic purposes within the virtual space.

The next related example is News Leak by Timothy Devine, Jamey Cochrane, and Shervin Afshar. In the similar way as The Rhythm of City News Leak brings together virtual and real world by extracting local online activities from Twitter, Flicker, and Google News; and publishing the social data as a kind of instant publication in public space. In short, the authors are collecting geo-located data and giving it a form of publication as soon a person press a button of a dedicated box. [7]

To sum up, there are a huge number of arts, who apply social media as a concept and as well as an artistic medium. Interestingly there are much less artists, who make use of geo-located social data. And even less of creative people are concerned about transforming intangible geo-located social data into a physical form. There might be many reasons for that. First of all, technically it is not trivial tasks to analyze location-based social data and transform it into an artistic material. Second, social media platforms have a number of limitations and not all service providers are eager to share the data, like Facebook.

CONCLUSION

To sum up, The Rhythm of City is an inter-disciplinary artwork that demonstrates creative approach towards emerging social web technology. At the same time, the artwork draws attention to the vanishing border between virtual and physical, and allows perceiving a city's digital pace of life.

In addition to that, the artwork introduces a unique experience to its' audience. Suddenly it is possible to see and hear the cities' pace of life that is performed by mechanical metronomes. The score is unpredictable and unique because the digital inhabitants are the composers of the score in real-time.

In conclusion, a significant amount of artworks that exist in hybrid space constitutes the increasing interests towards digital culture, and possibilities of real-time and location-aware web. Hence, the borders of electronic art are widening rapidly.

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FROM ASSISTANT TO PERFORMER: THE CHANGING ROLES OF TECHNOLOGIES IN DIGITAL DANCE

ZEYNEP GUNDUZ

The aim of this paper is to demonstrate that the integration of technology in the choregraphy of staged digital dance changes the role of technology into a performing element onstage and to a dance partner for the human dancer.

The performance takes place in the venue Fabrica in Brighton. The audience looks down from all sides of the theatre upon a square, white floor, which functions as a stage and as a screen. The performance begins with the appearance of three straight, short white lines on the floor. The lines move horizontally from the left to the right of the stage during which they extend in length. To the right of the stage, the three white lines converge to form a diagonal and then disappear. A moment later, a bright, white light illuminates the theater. The dancer appears on the left of the stage. She is sitting in a curled position. Similar to the lines before her, she too walks horizontally from the left to the right of the dance floor while maintaining her curled position. In the meantime, a white line traverses her body vertically and moves with the dancer to the other side of the stage. During this passage, the line moves forward and backward simultaneously with the dancer as she shifts her body weight forward and backward. Gradually, a second light appears onstage. This time the light forms a silhouette around the dancer's body and contracts and expands together with the dancer's movements. In addition, the silhouette intensifies its amount of light as the dancer intensifies the force of her movements, in particular the movements of her arms and legs. The scene ends with the dancer and the light next to each other. Each in their own way, they perform the same movement phrase (organized movement into units of time and space) while moving simultaneously in the same direction. At a certain point, the dancer stands still and watches as the white light grows to cover the entire dance floor, and then, slowly shrinks back down to a spot in the dark before disappearing.

The above paragraph describes the opening scene of *Glow* (2006), a recent example of a dance practice labeled digital dance. *Glow* is made by the choreographer Gideon Obarzanek and the media artist Frieder Weiss. Weiss's website promotes *Glow* as a "spectacular 27-minute duet for body and technology created with the "latest video-based real-time interactive technologies that operate with sophisticated motion-tracking software." [1]

Watching *Glow* left me feeling disoriented. Although simple, there is something peculiar about Glow's choreography as a result of the replacement of one of the human dancers with interactive technology in its presentation of a 'duet'. To start with, the projected images are present on the stage throughout the entire performance. Therefore, the actions executed by the technology, perceived in the form of projected images, are over-exposed for the perception of the spectator. Second, the projected images play an active role throughout the performance in conjunction with the movements of the dancer. In turn, the movements of the dancer seem to complete the movements of the technology and vice versa. Hence, *Glow* seems to portray two different types of movement to be perceived onstage: human and technological. *Glow*'s choreography raises many questions: How can one dance with computer technologies? What is the role of technologies in this performance? And why do I feel so disoriented by watching *Glow*?

The second viewing of *Glow* made me realize that *Glow*'s choreography is peculiar because it does not fulfill my expectation of a dance performance, which is—in a strict sense—to see dancing bodies on-stage. Technology, however, does not form part of my expectations from a dance performance. Rather, I perceive technology at moments in which technology creates a certain effect on the dancing body: for example, when side-lights add an extra lyrical effect to the movements of the dancer. Hence, there seems to be a certain hierarchy in my perception of a dance performance. In this ordering, the human body is of primary significance while technology seems to be of secondary prominence. Moreover, I realize that until this performance, I have paid little attention to relationships between dancers and technologies.

The integration of technology in *Glow*'s choreography, however, seems to unsettle this primary/secondary positioning of the human dancer and technology to which I am used to. The staging of technology in *Glow* requires a distribution of attention between the human dancer and the projected images provided by the technology. In fact, technology seems to occupy a role equal to the dancer's and it seems to function as a central element of the choreography. Although non-human, the central role played by technology leads to the unconventional idea that technologies may function as performers in the choreography, alongside the human dancer, in the sense of executing an act in front of an audience.

Historically, in theater, technologies have most often functioned to assist the performance and to direct the focus of attention to the performer onstage. An extensive description of the historical role of technology in Western European theatrical presentation is offered in the work of Christopher Baugh (2005). A key observation of Baugh's is that the assisting role played by technologies, in particular in the 19th century, has led to a neat division between the animate and inanimate elements onstage. Interestingly, Baugh uses a rather incidental expression to describe this division. The term he uses is "hierarchy of perceptual importance", and although in his text it operates as an incidental term, it seems to neatly conceptualize the clear division of roles he describes. [2] As such, and because of the relevance to the present paper, the term is adopted as a key-working concept in this presentation.

Baugh locates the roots of the hierarchy of perceptual importance in the changes in artistic values and infrastructural developments in theater in the 19th century. For Baugh, the changes that took place in theater in this era are highly significant because they led to a dominant understanding of the functioning of theater, in which the theater text and its mediation via the actor stands central. Technology, on the other hand, functions to assist the actor onstage or to enhance the dramaturgy of the art work. In fact, Baugh explains that the 19th century functioning of theater was so influential that it designates a paradigm in theater, which remained constant until it was challenged in two different eras in the 20th century. The first challenge came with the onset of modernist and avant-garde approaches at the beginning of the 20th century. The next most significant challenge to the paradigm of theater came in the last three decades of the 20th century, with the shift towards the postdramatic paradigm and continues to grow in strength. Nevertheless, despite these challenges Baugh writes that the paradigm of theater and its associated hierarchies are still widely understood in the domain of theatre and performance.

Artistic and infrastructural developments in the 19th century European theatrical dance presentation show many similarities to the developments in the 19th century theatrical presentation. Also in dance, the 19th century designates an important era in which dance as art form went through major artistic reforms in form and content, accompanied by infrastructural changes. Each in its own way, the shifts in the infrastructure and artistic status of dance as an art form in the 19th century can be seen to contribute to the hierarchy of perceptual importance in dance.

For example, whereas in the 18th century, the dancer had to make great effort to maintain the audience's attention, in the 19th century, the changing value of the dance as a serious art form, and the infrastructural changes in theatres, with a separation of the auditorium and the stage, demanded nothing else but the audience's full attention to the action, and thus, the human dancer onstage. Another strategy to keep hold of the audience's attention to the action onstage was to reduce changes in set design to a minimal level. As Alexander Bland explains (1976), at the start of the 19th century, in dance, stage design showed a tendency for simplicity and was not necessarily designed for tricks and surprise effects, which could distract the attention of the audience from the performance. [3]

In addition, in the 19th century, a shift in the status of the female dancer shaped the audience's perception to what they should be seeing onstage, namely, the dancing body. An important shift in the 19th century is the introduction of a star system and the rise of the female dancer. Although Bland points outs that the star system could not have taken place if it was not for the invention of gas lighting that allowed the dancers to be individually noticeable by the audience, Selma Jeanne Cohen underlines that in the 19th century, "innovations in theme, in technique, costume" accentuated the artistic and physical qualities of the female dancer and they "all centered on her." [4] Moreover, the rise of the star system, with a particular focus on the ballerina indicates that the position of the human body onstage is even more stabilized and centralized, because the evaluation of the choreography is now to a large extent reliant on the performance of the ballerina, meaning the demonstration of her artistic and physical skills in front of an audience. In sum, the staging of dance in the 19th century implies a separation of the roles of the animate and inanimate elements onstage.

Moreover, the influences of the understanding of technology as assisting devices for the human performer, and thus a hierarchy of perceptual importance, can be detected in current studies on the role of stage elements in dance. According to stage designer Rouben Ter-Arutunian (2004), in most cases, technologies simply support the choreography and the physicality of the dancer as elements of stage design, such as lighting, costumes, and scenery. [5] According to this linear working mode of creation, first the choreography is created whilst the supporting elements, such as lighting or costumes, are designed when the choreography is finished. Hence, technology is not a part of the 'dance proper' but is considered as an additional element to give the choreography a final touch.

The division of roles between the human and non-human elements in dance can also be demonstrated by considering the words of dance scholar Selma Jeanne Cohen. Cohen describes the elements of standard theatrical dance as "a performer equipped with movement skills, a role to be played, a stage to lay on, music, costume, and décor to enhance the spectacle, an audience to respond to it." [6] Here, the performer is introduced as the primary focus and the other elements are introduced to enable or enhance the focus in one way or another, which, in most cases, lead to reduce the relationship between dancer and technology to a minimal level. In sum, the hierarchy of perceptual importance leads to the creation of certain roles and relationships amongst the human dancer and technology in the staging of the choreography.

This paper argues that the integration of technology in staged digital dance, [7] exemplified here with *Glow*, may represent a turning point in the understanding of the role of technology in dance as assistant devices to the human performer. The specific integration of interactive technologies in *Glow* cannot simply be seen as an extension of the conventional role of technologies as assisting devices in dance. Rather, this paper argues that, in *Glow*, technology functions on a higher level, as a performer, alongside the human dancer, which leads to certain shifts amongst the roles and relations in the involved parties within the cultural practice of dance. Due to restrictions, in this paper, I will focus only on the shifts roles

and relations amongst four parties during the creation of the choreography in staged digital dance: choreographer, media designer, dancer, and technology. By examining these shifts, I aim to show how technology functions as a performing element onstage and as a dance partner in staged digital dance.

STAGED DIGITAL DANCE

One of the most significant changes resulting from the fundamental role played by technology in staged digital dance is the introduction of the media designer as co-creator to the choreography, in collaboration with the choreographer. It is important to underline that, in staged digital dance, the media designer takes part in the creation of the choreography from the very start of the process. Hence, the introduction of the media designer as co-creator from the very beginning marks a difference of the artistic status of the media designer from that of the supporting staff, such as light designer. Whereas technology and other supporting stage elements are most often created when the choreography is finished, in staged digital dance such a linear and independent mode of working during the creation of the choreography is problematized. Hence, the status of the media designer as co-creator in the artistic process can be understood as a symptom of a change in the understanding of the role of technology in dance: no longer as a supporting device but as a central element in the choreography.

What follows, the introduction of the media designer in digital dance requires a shift in the position of the choreographer, which involves the distribution of the choreographer's creative authority. Richard Povall argues that the emergence of digital dance was possible within the context of a new "paradigm of collaboration." [8] For Povall, this newly emergent art form of digital dance fundamentally changes the distribution of power structures and roles both within the creation and the exhibition of the performance._ Povall argues that digital dance performances require the choreographer to hand over the omnipotent role he or she enjoys in non-digital-technology based dance performances in favor of a more egalitarian, collaborative relationship primarily with a computer programmer. [9] This new paradigm, according to Povall, stands in direct opposition to the conventional working paradigm in which the supporting disciplines, such as the lighting or sound technician, bring their separate pre-designed parts to the table as and when the choreographer requires them to do so. [10] Translating Povall's points to the argument of this paper implies that technology no longer functions as an add-on in the creation of the choreography in staged digital dance. Rather, technology functions on a higher level, as a performing element in the choreography to the extent that it requires the expertise and creativity of the media designer, alongside the creativity of the choreographer.

The crucial role of technology in the creation of the choreography requires new ways of working from the choreographer and also from the dancer. Whereas in choreographic practices in which technology functions as a supporting element a basic knowledge of the effects provided by technology is sufficient, staged digital dance requires a more detailed understanding of the technical system from the choreographer and dancer. In turn, the thorough understanding of the technical system required from the choreographer and dancer signals the dissolution of the staging of technology and the human dancer in a non-relational manner within a hierarchy of perceptual importance.

Johannes Birringer (2008) states that, most often, the understanding of the operations of the technology necessitates additional training from the choreographer and the dancer. [11] The additional training required from the choreographer and dancer usually takes place before the rehearsals. It may take the form of workshops or informal gatherings in which the media designer demonstrates the technology to the choreographer and dancer. In the case of *Glow*, for example, choreographer Obarzanek and media

designer and programmer Frieder Weiss met before the creation of the choreography. This was necessary because it was important for Weiss to understand the choreographic concept that Obarzanek aimed to achieve. In the same manner, Obarzanek needed to understand the way the technical system operates as well as the aesthetic possibilities offered by the technology. For Oberzanek, this was necessary because just as one needs to get acquainted with the strengths and weaknesses of human dancers, one also needs to get to know the strengths and weaknesses of the technical system:

The system has an inherent quality to it and a particular way of existing. For me as a choreographer it was really important to understand that and work with that. For example, the system is never completely still and stable; it always has this little movement to it. […] The technology brings a kind of 'frequency' into the choreography that you'd normally never really have in a dance work. It has an aesthetic-kinetic quality to it that is in the nature of the machine. [11]

Hence, for the choreographer the understanding of the operations of technology—its potentials and limitations—is necessary because it leads to effective collaboration with the technology, as a performing element in the choreography. It also demonstrates that technology is now understood as a dance partner for the human dancer.

In sum, in staged digital dance, it is important for the choreographer and also for the dancer to understand the operations of the technology because the potentials and limitations of technology shape the choreography to a certain extent. Erin Manning (2006) underlines that the use of interactive technology in dance results in a reduction of the quality and tempo of the physical movements of the dancer. [12] She explains that a fully actualized (visible and complete) movement is necessary for software detection, usually by accentuating the extremity of the body (for example, by prolonging the arm or leg movements) or a displacement of the whole body across space. Therefore, technology conditions the choreography because it generates a preference for fully actualized movements rather than small ones. Moreover, Manning underlines that video-based motion-tracking systems require the dancer to slow down the tempo of the dance movements because slow movements can be better tracked by the system.

Certain scholars, such as Manning, are critical of the integration of technology in digital dance because technology conditions the choreography and restricts the physicality of the human performer. Yet this criticism can also be read on a different level—that is how the integration of technology functions as a dance partner on the basis of its influence on the choreography. From this perspective, which is the point of view of this paper, the restrictions brought by the interactive system are useful to understand how technology functions as a dance partner for the human dancer.

Hence, with staged digital dance, the interrelation and interdependence between technology and the human dancer, which has mostly remained hidden from the perception of the audience in the history of dance, is laid bare in the aesthetics of the choreography for the perception of the audience. In digital dance, technology moves to the center of the stage, alongside the human dancer. Moreover, staged digital dance portrays human and technology in a dynamic relationship with each other. This implies that, within the art form of dance, we need to expand the evaluative criteria of performer and performance to include technology and technological performance.

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THE SPECTRE OF ANONYMITY

Seda Gürses

In dystopian debates on digital privacy, it is suggested that privacy can only be protected if we hide our personal information or practice control over it. In my paper I will look at the strengths and weaknesses of anonymity in each case, both as a technology as well as a strategy. I will also delve into its relationship to control, meaning how it evades and replaces different forms of control.

Anonymity is a powerful concept and strategy. It supersedes concepts such as authorship and origin, and manifests itself in our songs, poems, oral histories, urban legends, conspiracy theories, chain mails… For centuries, communities have used anonymity to articulate their collective voices. Anonymously produced statements or artefacts have expressed the cultural practices, beliefs and norms of the past, while creating a space in which to collectively build the future.

Anonymity allows the individual to melt into a body of many, to become a pluralistic one, for which the act of communicating a message is more important than the distinction of individual participation, be it at a demonstration or a football match. Yet, the seemingly unbreakable bond is fragile, since participation in the anonymous is fluid and is organized in a distributed manner. The anonymous perseveres only as long as the common line is held, hence at any point it may experience dissonance and simply dissipate. It is hence the volition of its participants that distinguishes anonymous groups from other types of collective bodies.

Anonymity is a means, never an end in itself, and can be utilized in unexpected ways. For example, in centrally organised forms of anonymity, e.g., military, corporation, participation in the anonymous is mandatory, individual actions are heavily controlled. The objective is still to protect, though the ones being protected are not necessarily the participating individuals but the existing power hierarchies.

The power of anonymity in communications has long been recognised by computer scientists and hackers. Anonymity is hence also a strategy on the Internet. So I ask, how is anonymity implemented, why, and by whom? What are its strengths and limitations?

'Anonymous communications' technologies like TOR, strip messages of any information that could be used to trace them back to their senders, so that a set of individual communication partners are not distinguishable. Observers cannot determine who is communicating with whom, so that individuals are protected against any negative repercussions resulting from such disclosure.

The architecture of the Internet makes it plausible to track the data bodies the users of the Internet leave behind, approximating all actions to their individual authors in physical space and time. These data bodies are open to scrutiny, dissection and re-use by collecting parties. By masking the origin, anonymous communications channels protect the individuals who authored these data bodies.

Despite the diversity of the groups and communities using anonymous communications, such technologies are usually cast in a negative light in policy papers and in the media. Anonymous communication

infrastructures are seen as providing channels for criminal activity or enabling deviant behaviour. But perhaps what bothers authorities most is not the fact of anonymity as such, but rather the user base and the distributed organization it relies on. After all it is obvious that data miners and regulators are keenly interested in systems that generate another type of anonymity, database anonymisation, a technique that is instrumental to the growing data economy.

The ideology behind the current data-driven economic hype suggests that the data collected will make the behaviour of populations more transparent, easier to organise, control and predict. Massive datasets are expected to reveal ways of improving the efficiency of markets and systems of governance, by applying statistical analysis methods to these datasets to infer knowledge. According to behavioural advertisers and service providers, these datasets will become 'placeholders' for understanding populations and allowing organisations to provide them with refined individualised services. In the process, elaborate statistical inferences replace 'subjective' discussions, reflections or processes about societal needs and concerns. The data comes to speak for itself.

However, collecting and processing such massive amounts of data is historically linked with a serious privacy problem. This is where database anonymisation provides a protection. The database can be manipulated in such a way that the link between any data body included in the dataset and its individual 'author' is concealed, while the usefulness of the dataset as a whole is preserved. If this is somehow guaranteed, then the dataset is declared 'anonymised'. Inferences can be made from the dataset as a whole, while ideally no individual participant can be targeted. This approach is endorsed not only by data miners, but also by regulators. The EU Data Protection Directive [1] includes a clause that frees anonymised datasets from regulation.

Once the link between the original author(s) and the message is broken and the message is released, it is likely to be subverted and reclaimed by others. This is one of the charms of the anonymous message: any individual or group can claim it as their own. But when a group subverts the message to negate all other linkages and continuities, monopolising the interpretation of the message's senders, destination and content, the relationship between 'the anonymous' and the message can get lost.

An example of this is given by Adela Peeva in her documentary film "Whose is this song?", [2] where she searches across the Balkans for the origins of an anonymous folk song. In each country or region she visits the song changes, becoming a love song, a song of piety, even a war song. Each variation comes with conflicting claims about the song's 'true' origins, all of which attempt to separate it from its nomadic past. The song is invariably re-shaped to uphold the local collective memory, as well as the community's future identity, in mostly not-so-subtle stereotypes: young Turks, amorous Greeks, proud Albanians, pious Bosnians, debauch Serbs, superstitious Roma, unflinching Bulgarians…

The film captures the dilemma associated with any anonymous action or artefact. Anonymity allows the articulation of a collective message. The message travels, free from the burdens of origin or authorship. However, this freedom is limited when a specific group claims the message as its own, and bends the message to suit its own interpretation of the past or future. The anonymous message can then boomerang to hit its collective authors: the hijacking of popular uprisings by a small group establishing its power, the re-writing of folk songs into chauvinistic hymns, or using anonymous actions as a pretext to introduce draconian security measures, are all examples of such de-contextualised anonymous messages.

In the data economy, the anonymised dataset becomes a digital mirror of the population's activities and tendencies. Organisations that hold a monopoly on these datasets assert their own categories of (un)desirable activities, in order to improve their markets and forms of governance. Since such datasets are anonymised and cannot be linked to individuals, privacy is supposedly intact (though anonymisation techniques provide no formal guarantees) and so the general population is not expected to question the ways in which the anonymised data is used.

We have seen how anonymity can be used to collectively protect individuals against Internet surveillance. But we must also recognise how similar strategies are being used to create discrete, decontextualised (yet linked) datasets that are essential to the data economy. We now have huge databases of 'friends' who rate, tweak and 'like' information which can then be used to guess our interests, desires, passions and weaknesses. The goal of the anonymisation of these databases is not to protect individuals, but to make it impossible for them to understand, scrutinise or question the ways in which these datasets are being used. We must cherish anonymity as a strategy for protecting individuals online, while rejecting its reincarnation as a tool to separate us from datasets being used to manage our lives.

Anonymity will always remain a powerful means of achieving political objectives and spreading collective messages. However, especially in political contexts, the vulnerability of the anonymous means that multiple strategies should be used to create a continuum of anonymously initiated activities. This includes making political statements that are explicit and precise, sometimes anonymously, sometimes not.

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FLOSS CULTURE

Adnan Hadzi

This paper continues the debate raised in the Next 5 Minutes media conference

In 1985 Richard Stallman formulated an alternative to, some might say resistance against, the practice of locking away computer source code through the use of copyright: *The GNU Manifesto* (1985). In *The GNU Manifesto* Stallman advocates four major freedoms for anyone engaging with Free Software:

0) The freedom to run the program for any purpose.

1) The freedom to study how the program works and adapt it to your needs.

2) The freedom to redistribute copies so you can help your neighbour.

3) The freedom to improve the program and release your improvements to the public, so that the whole community benefits (1985)

Stallman went on to write the first 'copyleft' license, the General Public License (GPL), arguing for access to source code as a basic "human right", by paraphrasing the Bill of Rights of the United States stating that "the ethical response to this situation is to proclaim freedom for each user, just as the Bill of Rights was supposed to exercise government power by guaranteeing each citizen's freedoms" (2001). The GPL as well as the Open Source Definition (DiBona et al. 1999, p.171) are often referred as the roots of the 'copyleft' attitude, also applicable to non-software information, which in the hacker lexicon the jargon file (Raymond & Steele 2003) is defined as:

copyleft /kop'ee-left/ /n./ [play on 'copyright']

1. The copyright notice ('General Public License') carried by GNU EMACS and other Free Software Foundation software, granting reuse and reproduction rights to all comers (but see also General Public Virus)

2. By extension, any copyright notice intended to achieve similar aims (Raymond & Steele 2003)

Copyright asserts ownership and attribution to the author. Copyright protects the attribution to the author in relation to his/her work. It also protects the work from being altered by others without the author's consent and restricts the reproduction of the work. Copyleft is not an anti-copyright but rather an extension of copyright: it includes copyright through its regulations for attribution and ownership reference to the author. Nevertheless, it also extends copyright by allowing for free re-distribution of the work and, more controversially, the right to change the work if the altered version attributes the original author and is re-distributed under the same terms. A user can exercise those freedoms provided that s/he complies with the conditions of this license. I would argue that applying such copyleft licenses to media productions is a possible strategy for enabling media and arts practitioners to engage in collaborative production processes.

For the copy-paste generation, copyleft is already the natural propagation of digital information in a society which provides the possibility of interacting through digital networks. In doing so one naturally uses content generated by others, remixing, altering or redistributing it. At the same time the Debian project, an independent decentralised organisation of mainly computer coders, argues for 'copyleft' over 'public domain' as the latter is not a good alternative to copyright, "because some will try to abuse this for profit by depriving others of freedom; as long as we live in a world with a legal system where legal abstractions such as copyright are necessary, as responsible artists or scientists we will need the formal legal abstractions of copyleft that ensure our freedom and the freedom of others" (1997).

It is not only corporate companies who strongly enforce copyrights, but also established artists and writers who are afraid of losing their position: "Plagiarism and piracy, after all, are the monsters we working artists are taught to dread, as they roam the woods surrounding our tiny preserves of regard and remuneration" (Lethem 2007). The fear of copyright infringement often derives, not only from producers and publishers who are making most of the profits from sales of intellectual property, but also from writers and artists fearing their 'bread and butter' will vanish if shared freely. Linda Smith even argues that copyright is an extension of colonialism. Smith explains that the 'project modernity' ended the absolutist society (feudalism), and it signaled the beginning of the 'modern' state. This new state system, being born out of the industrial revolution, had to fulfil the requirements of the ruling economic forces. According to Smith, a system of ideas started to focus on self-interest and on a state system that had to regulate a "public sphere of life" (2006, p.59). With this system being accepted, liberalism and the ideology of individual autonomy and self-interest ideas could be discussed in academia, especially the 'scientific exploration' of the rest of the world by Europeans. The 'modernist project' was born with the systematic exploitation of indigenous people in the 18th and 19th centuries. "The production of knowledge, new knowledge and transformed 'old' knowledge, ideas about the nature of knowledge and the validity of specific forms of knowledge, became as much commodities of colonial exploitation as other natural resources" (Goonatilake 1982). In *The Contestation of Code* Berry argues for an analogy between code and law:

As technology increasingly colonizes and structures more aspects of our lives it is becoming increasingly important that the constitutive nature of technology as socially shaped is recognized (Kesan & Shah 2002). If computer code is analogous to law (Kesan & Shah 2002), then it is clear that without some form of democratic accountability the code-based regulation of human behaviour will continue to lack legitimacy (Habermas 1988). It is ... an important challenge for wider society to recognize that values are being instantiated within technological forms that can and should be contested before they become sedimented. (2004, p.83)

In that regard intellectual property (IP) law seems to be a romantic idea for authors of computer code, but more and more also for authors of texts, as well as media and art productions, because most authors have become nothing other than employees, the profits go to the software and media moguls, and the big moguls lobby for the extension of intellectual property laws. Proprietary software is an exercise in power politics because the IP laws grant firms power and control over the programmers and the users, and only a "few make the basic software decisions for everyone" (Stallman & Kuhn 2001). A possible alternative to this exploitation of authors might be through the principles of attribution and share-alike, meaning "that while creative work may always be copied, modified and synthesised into new works, previous creative work is valued and recognised by the community for its contribution to creativity as a whole" (Berry 2005, p.4)⏎. Furthermore the FLOSS movement could regain control over projects through the use of componentisation which "is the process of atomising (breaking down) resources into separate reusable packages that can be easily recombined" (Walsh 2008). More and more technology shapes our social lives, therefore the discussion around the constitutive nature of technology becomes an issue. "Introducing democratic accountability to code may well be the democratic challenge of the twenty-first century and steering the implementation of technological artefacts will increasingly contribute to our ability to keep our future open and democratic" (Berry 2004)⏎.

This could signify a *Culture Without Commodities* (Stalder 2002). To a certain degree this is already being practised within the fields of music and software programming and some forms of cultural production (such as avant-garde, underground, DIY-movements, parts of academia and Open Source movements) that are not selling objects. The motivation of those groups is not the commerce, but the recognition, often by limited numbers of people, that the exchange between peers is the vital part of a culture without commodities. FLOSS culture, which extends into net culture, is more than about what happens between people and networks. In *Free Software as Collaborative Text* Florian Cramer argues that FLOSS is a "rare example of electronic literature which does not confuse the Internet with web browsers" (2000)⏎. As FLOSS is a non-rival, non-excludable good it cannot be sustained according to conventional market logic. Paradoxically it is being sustained, exceeding often "the capabilities of conventional proprietary, binary-only software" (J. Boyle 2003, p.44)⏎. But for Chris Atton it "seems that the dominant regimes of copyright and intellectual property relations are unlikely to be replaced by a new model based on social authorship. At best, these practices of file sharing on the Internet appear as marginal interventions that can do little more than chip away at the enduring and limiting logic of capital" (2004, p.110). In that sense we might soon be witnessing a disappearance of public spaces in cyberspace, as happened with urban public spaces. Urban public spaces were planned in the form of parks, squares, and promenades. These spaces served for people to meet, communicate, exchange ideas, and expose themselves to diversity. But today urban public spaces frequently do not support this freedom any more because often they are privately owned places, like shopping malls, which can prohibit any action that hinders the consumption of commodities, such as demonstrations.

Remember that a 'boulevard' was originally a walk planted with trees which circled the town and usually occupied the space where the old ramparts had been. (Perec 1974)

On the other hand, digital networks provide new possibilities for participatory media practices, especially through the use of Free Software. Since art and ideas never develop within an art-historical vacuum but always feed on the past, Free Culture promises to make our cultural heritage accessible to everybody to re-read, re-use and re-mix as they like, "without open access to the achievements of the past there would be no culture at all" (Medosch 2003)▯. Participatory culture often ignores or violates copyright restrictions that might apply to media artefacts or software employed; this form of 'piracy' and sharing can be perceived as a cultural statement.

But one ought have a critical stance towards the notion of the 'free', because 'free' is included within the economic system and, as such, file-sharing is part of the economy. Free production, as well as sharing, should be an option, allowing for experimentation, and "producing culture with other economic models, on a global scale" (Lovink & Rossiter 2006). An example is the academic AAAARG file-sharing network: an effective distribution system in terms of its scalability, openness and durability – only made possible, however, as a conglomerate of both human and non-human agency. In fact, file-sharing can not only be used for distribution, but for actual collaboration and production. In that sense a legal system, social contracts, aiming to control the data spheres, needs to be tailored carefully because "sharing" a file is not equal to "sharing" in the physical world, it is rather facilitating the copying of that file (Logie 2006, p.85). *In his research on file-sharing, Jonas Andersson refers to the situation as being controlled by the most driven producers and consumers, and further states that the old distribution model is so impoverished that it chooses the safest route, "the most bland of bets" (2009b). Boyle warns in Guerilla Television Revisited (1997) of the pitfalls of participatory media. For Boyle historically such cultural statements, coming from media and arts collectives and their participatory media practices, have often been absorbed and used by mainstream media, paradoxically the very institutions these collectives resisted and tried to change.*

I further argue that the windows of opportunity emergent digital networks are currently offering might be short lived, especially the potential of decentralised distribution technologies such as file-sharing. Due to current changes in legislation we see the first examples of digital networks being formatted and regulated, for example the blocking, and many argue the censorship, of websites offering access to decentralised distribution technologies. FLOSS culture therefore might allow for a new legislation, as well as alternative licensing schemes and open contracts offering participatory media producers a possible legal framework. Thus applying the notion of 'social contracts,' the notion of open and distributed sharing can be reinforced as an overall heuristic and social ethos.

Seen in the light of media moralities media production for the welfare of others challenges the ideological belief in the 'individual' having to succeed. When sharing code (Himanen 2001), media, art and culture in general, it is ultimately a challenge to one's own ego, and it is also a subversion of selfishness. Arguably our drive to own property, or in the context of FLOSSTV 'intellectual' property, makes us underestimate the difficulty of engendering a greater compassion in ourselves for those we live with and share our lives with– basically the society we are part of:

The purpose of property is to ensure a propertyless class exists to produce the wealth enjoyed by a prop-ertied class. Property is no friend of labour. This is not to say that individual workers cannot become property owners, but rather that to do so means to escape their class. Individual success stories do not change the general case. As Gerald Cohen quipped, 'I want to rise with my class, not above my class!'. (Kleiner 2007)

Everything we consider we own is always dependent on others. Any intellectual property (and indeed all cultural production) is based on others' efforts, dependent on others' labor, dependent on audiences supporting one's own production. Intellectual property becomes interdependent. If we accept that the welfare of others is as or even more important than our own welfare, if we accept that we all have equal rights, we can decide that intellectual property is unjust, or, to paraphrase Pierre-Joseph Proudhon (1840), that *intellectual* property is theft.

Without becoming aware of and challenging one's own greed and selfishness there is no progress to-wards 'social' media. The novelist Norman Mailer stated that "the only way socialism can work is if there is … some larger sense of things. [Otherwise] you just getthe play of egos" (Quoted in Bellos 1997). My view is that any FLOSS practice needs to analyse its motivation in order to overcome ignorance of greed, and that "it is not enough to address ignorance with political argument, because anger and greed are an active form of ignorance - they repel counter-arguments. If we are to open minds, we must also open hearts" (Edwards & Cromwell 2009, p.251). Engaging with FLOSS practices then becomes a virtuous ac-tion, an ethical practice. *A spiritual master, Śāntideva, once wrote in the 8th century: "All those who are unhappy in the world are so as a result of their desire for their own happiness. All those who are happy in the world are so as a result of their desire for the happiness of others. … Note the difference between the fool who seeks his own benefit and the sage who works for the benefit of others" (1997).*

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ARCHIPELAGOS OF ART

PETER HAGERTY

The paper considers the rapidly growing metaverse and it's implications for a post industrial society with particular reference to the new art forms specific to this new medium.

Today the internet is the backbone of the global economy and without it our industrial infrastructure would collapse within hours, but a decade ago people would ask "Why do I need a website?" Today nobody asks that question, they may prefer a Blog or Facebook page but whatever format they choose an online presence is a recognised door which connects to other people. Today the contemporary question is "Why do I need a virtual world?"

During the period the web came to dominate the media landscape there was also a parallel development of virtual environments, commonly seen in the ubiquitous games for the Sony Playstation or Microsoft's X-Box. For most children in the western world these games have come to dominate their leisure time, gone are the toy soldiers and masquerade of 'cowboys and indians' the arena is now a virtual theatre of war where every kill is a point.

There is however a lesser known type of virtual environment which is distinguished from the aforementioned games- which are characterised by agreed movements, a defined outcome and usually in terms of one player or team winning. In contrast these other virtual environments are self authored and initially present an empty world, a *tabula rasa* where an author can create whatever he or she wants and if rules are to be used that is the authors choice.

The example of Second Life (Linden Lab 2005)[1] provides a good introduction to the possibilities of self authored virtual worlds and there are now many similar examples in the rapidly growing worlds of Open Simulator [2] where the term metaverse is used to describe a collection of virtual worlds - rather like continents which are connected to each other with the ultimate goal of creating an internet scale virtual environment network.

The word which most characterises the virtual environment is immersion, virtual environments are immersive environments. When we read a novel we immerse ourselves in the story and empathise with the struggles of the heroine or anti-hero and the dramatic arc of their lives on the page. For the duration we allow ourselves a willing suspension of disbelief in that while we know the events in the story are not real we allow ourselves to believe they are. The same pertains to cinema, particularly in the genres of the thriller and horror, these are ancient pleasures which earlier generations had similarly sought in theatre. opera and epic poetry.

Imagine then that instead of sitting in a comfortable chair, fingers tense with fear, watching and empathising with the on-screen character – that instead you are the character! This experience is already familiar to children in their war gaming where the psychological response to such immersion, the feeling of actually being there is very intense.

The rapid growth of virtual environments has prompted psychologists to ask why? What is the attraction? The evidence from surveys is complex, [3] but anecdotes suggest, for the game players at least

that a common reason is "Because real life sucks", a sad finding perhaps but most of us would recognise some truth to this and further we would not be surprised that a university educated supermarket shelf stacker would, rather than stacking shelves, be a knight on horse back with his damsel avatar by his side leading fellow warriors into battle to defeat a deadly enemy? Oh but that is only fantasy you say, he is dreaming and indeed he is. But isn't escapism the *sine qua non* of the novel and cinema? Recollect the rebuke at the end of the nineteenth century when people remarked of a friend "Oh she is clearly not well, she spends all day at home reading French novels."

Escaping into virtual worlds offer an escape for those who find the real world insufficient to their needs and while living a surrogate life as a medieval knight might not be your choice, a more disturbing onto-logical question is "If you could live in a world that was just the way you wanted it to be, with specifica-tions you'd chosen, customized and personalized to meet your every need and fulfil your fondest de-sires, would you spend all your time there? Or would you prefer to stay here, in the real world?" [4]

Fundamental to this enterprise is that the avatar is an abstraction of it's owner and frequently a per-son's avatar is an idealised visual representation of them self, a remodelling based on vanity but also, with the potential for some, to bring a beneficial change in how they can socially interact.

We discriminate on the basis of sex, race, colour, we judge people on their looks, their able bodied-ness and their age. If the base causes for our prejudice could be removed, to create a more level social play-ing field, would this correspond to an improvement in social well being?

In a virtual world the avatar of an isolated house bound eighty year old person could look like a thirty year old who could – in world, talk and interact as an equal again. A hospital bound patient, a para-plegic, the extremely shy, those without the power of speech anybody who can use a mouse can find in a virtual world a new place for social interaction. Let us be clear, this is not an either or situation; no-body lies in bed reading French novels all the time.

War gaming is the first and seminal example of online role playing, less complex than Aeschylus' rework-ing of Herodotus it is also the simplest because players don't need a 'character', they merely require to know their allowable moves and how to take an opponent out of the game. But if the motivations are not as simple as kill or be killed how is dramatic structure established? Actors in theatre and film are aided by a script describing the actions, plot and characters, in role play these crucial narrative devices, excepting the character, are not available. This is the realm of the highly literate paragraph role players where a loose plot is perhaps agreed in advance but all the dialogue is written on the fly.

Clearly the 'killer app' of virtual worlds is interactions with other people and while the potential for du-plicity is a given we also know that we are in the realm of theatre. As Vernant remarked "In the case of Dionysus, the mask disguises him as much as it proclaims his identity."[5] The avatar is our mask and like the mask in the Baccic rituals and the festivals of Carnival it offers a temporary release from the mun-dane. The mask offers liberation, a device for fiction which explains why role play of a sexual nature is common allowing individuals to explore psychological danger from a safe distance.

Other aspects of virtual worlds offer new opportunities for visual artists particularly photography, ani-mation, machinima and virtual sculpture. The virtual camera presents an entirely new tool for a new subject, the *mise en scène* of virtuality. In parallel with still photography there has been the rapid growth

of machinima, the use of real-time 3D computer graphics rendering engines to create animated cine-matic productions which will in the coming years transform advertising, promotional video and cinema.

There is another genre of art which is unique to virtual worlds, an art of such originality that it rarely reaches the museum visitor. Part of it's description would be virtual sculpture, abstract compositions of prims, textures, particles, transparency, phantoms and physics where space itself is a plastic dimension. One struggles for a language to describe these conceptual and immaterial works in which an amalgam of technical finesse and aesthetic sensibility combine to demonstrate a pure digital craft .

Many virtual world artists use scripted code for contributory effect in abstract works to describe possi-bilities, others embrace the language of virtuality with formal composition and audio while others use virtual art to reflect upon the real world. Social, dramatic, aesthetic and conceptual the virtual worlds are ground breaking, the avant garde is alive and well and living on the archipelagos.

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THAT STRANGE FEELING

IAN HAIG

The uncanny as defined by Freud is that which is uncomfortably strange finds a special kind of resonance with various kinds of technological media. This paper discusses how different kinds of technologies can evoke the uncanny, while tracing the emergence of electricity as a kind of uncanny phenomena to more contemporary instances of the technological uncanny in the work of various artists and other assorted pop cultural references.

Technology has long had the ability to evoke and bring to life notions of the uncanny, the history of electricity itself has been associated with the territory of the inanimate and animate in a variety of ways. A catalyst for a state between that which is living but should be dead, the familiar made unfamiliar, together with providing aesthetic feelings of dread, horror and given to feelings of distress.

Perhaps one of the most striking and memorable experiences of the uncanny and electricity occurred on a personal level on visiting an exhibition with my at the time one year old daughter featuring the work of artist Tony Oursler. On entering the darkened room of the gallery and upon seeing one of Oursler's familiar 'electronic effigies' of projected video onto a small mannequin, all was calm as both myself and my young daughter contemplated Oursler's piece. However once the video started to move and talk, my daughter let out a blood curdling scream of sheer and all consuming terror, which I haven't witnessed since. Clearly she was disturbed by what she believed to be an inanimate object, ie: a doll, suddenly come to life, however the uncanny effect was more so seeing her react in such an extreme and distressing way.

The experience on viewing the Oursler piece with my child, became doubly uncanny, his work was already playing with notions of uncanniness, of the inanimate made animate through the ethereal and ghostly effects of video projection onto anthropomorphized dolls. The intense emotional reaction my daughter had on viewing Oursler's piece was as if she herself were possessed. Such an episode recalls Freud's notion of epileptic seizures and of madness having their origin in the uncanny, of the body being momentarily taken over or possessed, indeed the middle ages saw such behaviors as ascribed to demonic influences. [1] Like the prisoner on death row, their body on the receiving end of 2500 volts, the epileptic seizure is uncanny in its appearance, in recalling the violet surge of the body electrocuted, electricity not as the spark of life, but death. The epileptic fit a kind of uncanny living death, that one recovers from. As the body slips over into another state of being, the nerve cells that transmit electrical impulses of the brain, momentarily disrupted.

For Freud the doll holds a special place in the corridors of the uncanny, in particular when dolls appear alive. [2] Freud has outlined children live in an animistic world, where the line drawn between living things and lifeless toys is a blurry one. Children engage with their dolls as if they were alive, while adults are often unsettled by things that oscillate between life and death, as the doll, or mannequin momentarily appears as a living entity, activating our uncanny senses.

1890 saw the release of one very strange and uncanny doll indeed, known as Edison's talking doll. The doll featured a miniature phonograph embedded inside. These "talking" baby dolls were possibly the

first attempt at using sound technology in toys. As Gaby Wood has pointed out, the capturing and reproduction of speech in the early phonograph was integrally linked to finding a casing for it in human form. [3]

Edison's talking doll however was a disaster for the inventor, production delays and poor recording technology and damages to the toys when they were distributed. Combined with a recording of a voice that sounded entirely strange and other worldly, which did more to creep children out. Edison would later refer to the dolls as his "little monsters".

Erik Davis too has pointed out today's realistic "Real Baby" dolls are a weird mix of servo motors, electronics, and that imaginative zone of the uncanny. [4] Programmed to simulate real infants, The Real baby doll, can poop its pants and fart, as basic bodily functions take on a strange, electronically mediated life for their attentive real life baby mothers.

Mark Dery sees "The Home Shopping Network's Gallery of Dolls as a televised infomercial for Freud's uncanny", featuring an array of disturbing, lifelike collectible porcelain dolls. Their transfixing gazes frozen for all time in a "queasy mix of sentimentality and side show grotesquery" [5] glaring at us through televisions unflinching electronic stare.

From televised transmissions of the uncanny doll and uncanny sound technology to the uncanny phenomena of electricity itself. In 18th century England electricity was an ongoing preoccupation with many. Benjamin Franklin the American politician and inventor, presented a paper in 1751 at the Royal Society putting forward the idea that lightning was an electrical force. As the new world was being discovered, so too was the discovery of various new and exotic animals, one of which was shipped to London in 1774: The electric eel. Combining the absorbing preoccupation of the uncanny wonder of electricity together with the strange, and almost other worldly new species which could emit an electric charge. The electrical eel also saw the bizarre and popular craze in London of 1775 of electric eel parties, which saw gatherings to see how many people could feel the electrical eel charge, as people joined hands shocks would be felt by all. [6]

The technological uncanny too finds it's home in medical equipment, devices for keeping the body from slipping over into death. The medical machine infused with a high degree of uncanniness and certainly downright creepiness as Bruce Grenville has pointed out is the iron lung. [7] The machine embrace of the iron lung, once the only way to assist individuals whose chest muscles has become progressively damaged by polio. The Iron lung has many connections to the uncanny, the undead body being kept alive by the assistance of a machine designed to expand and contract the chest. Not to mention the associations of the machine and its relationship to the unsettling fear of a horrific and devastating infectious disease, as if somehow the iron lung embodied the disease of polio within itself. However perhaps it is the notion of the iron lung as a kind of perverse cyborgian architecture, the notion of the body being controlled by a force outside of itself.

Andy Warhol's Big Electric Chair from 1967, also understands the idea of a technology that can embody an unsettling quality and provides us with an aesthetic quality that arouses a feeling of absolute dread. Warhol's' iconic image revealed that aspect of the uncanny, where something is seen which is normally hidden from view: Death by electrocution, planting the seed of the electric chair in the popular consciousness as a technological object imbued with a devastating fear.

Electricity can create life, as easily as it can destroy it, capable of transforming the inanimate into the animate and back again. For some time too it was believed it could also heal the sick and the diseased. Electrotherapy has a long history in early 20th century medical practices, in particular the galvanic bath, of soaking in electricity infused bath water for a cure all. To electro shock therapy, now renamed as Electroconvulsive therapy, a psychiatric treatment in which seizures are electrically induced into the patients brain. Early electro shock therapy often resulted in extreme side effects, of seizures, and turning patients into a vegative state, as consciousness slipped over into that uncanny space between being alive and dead.

It is the Alternative Health fraternity that have carried the torch for electrotherapy in recent years. Which puts forward the belief that the human body is composed of negative and possitive electrical energy, indeed all living matter carries with it an electrical charge. The appearance of the electrical zapper, for the user to wear, which literally zaps the users body with an electrical current to rid the body's internal organs of pathogens and disease, renders the body as an uncanny conduit for electrical impulses.

I sing the body electric and electricity as that life-force which one takes for granted, as a bringer of death, life, re-animation and health and perhaps most of all as an activator of that mysterious terrain of the imagination known as the uncanny.

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SEAMLESSNESS IN THE ANALOGUE AND DIGITAL

Sigune Hamann

Sigune Hamann will discuss work on representation of movement, time and narrative structure through image manipulation with a focus on her process of capturing and reading the dynamics of urban environments in panoramic film-strips.

Introduction

As consumers and producers of contemporary visual culture, we are in an era of high-resolution photographic realism. Continuous hardware and software development simulate close up sharpness in images and hyper-real movement through zoom and panning-actions and enhanced playback technology. In counterpoint to this, I develop analogue film-strip imagery using a still camera in the manner of a movie camera that offers a different representation and a deconstruction of the way we see rather than the objects to be seen.

Reflecting on ideas of data disinformation, this paper will look at the representation of movement, time and narrative structure in film-strips, and examine shifts of information and overlapping, repetition and blurring of images as part of the analogue and digital process of production. It will reflect on ideas of seamlessness and continuity at a time dominated by fragmentation and layering.

Film-strips

PHOTOGRAPHY

In photographic film-strips I capture the energy of urban environments and the movement of people. This process of 'tracing' in film-strips involves using an analogue photographic camera like a movie camera. A whole roll of 35mm film is exposed in a continuous rewinding movement while I am also moving in relation to the subject. The celluloid moves past the lens in a cinematic movement, although unlike film exposed in a cine camera, time is not separated frame by frame but flows in a continuous exposure over minutes to produce one long panoramic image. Although the images are static, they contain the indexical traces of movement – of the film, the camera and myself moving within the optical field.

The hand held camera as an extension of my body and the performative process allow for elements of chance within the work. I intuitively respond to each situation, varying the speed of my own movement and of rewinding the film. Moving elements such as people register more clearly than static backgrounds, which dissolve into ambiguity. The movement of the camera parallel to the movement of the objects let them appear in repetition.

The speed of the rewind is un-even. Moments of slowing reveal the analogue photographic process; vertical lines due to momentary framing become visible. Accelerating the turning results in extensive movement blur. However the level of layering, abstraction and focus cannot be planned, only performed.

INSTALLATION

Digital technology allows the film to be scanned and seamlessly printed in large segments. Viewers can re-enact the time sequences chronologically in video animations or by moving along the images of large-scale photographs, from segments to 360-degree installations relating to the situation in which they were taken. Like fleeting mental images they are at the same time linked and freed from the event, the environment and action that they record.

The film-strip showing at this year's ISEA exhibition Uncontainable: Broken Stillness is a segment of a photograph taken in Whitehall in London last year, during a protest march against the increased student tuition fees. As a demonstrator at the march I captured the dynamics of students and fellow staff moving through Whitehall, chanting and waving banners and flags in a unified expression of protest. For the duration of the exposure the film is rewound past the lens in the hand-held camera, following the movement of the crowd. This process abstracts and compresses the action revealing both chaos and order, yet details are enough to fix the image as an indexical record of the actual event.

The imagery captures the moment described by Götz Großklaus referring to Elias Canetti, when multi directional movement becomes homogenous and when a common goal directs crowds in a common movement, physical and psychological — the moment when we are no longer in a crowd of strangers but in a crowd of 'equals': The movement of the crowd appears in short time stops and starts, in stagnation and continuation. [1] These rhythms and the compression and expansion in transit find their correspondence in the mechanical process of rewinding the film, hesitating and accelerating, and by the fluid density of the resulting imagery.

SEEING AND READING IMAGES

Film-strips are a result of a direct, perhaps pre-cognitive form of seeing and an experience of the duration of time, produced through mechanical and chemical processing. The images are referential and real with a clear pictorial definition within them while showing a general degree of motion blur.

An absence of language is suggested, while objects are present that refer to something apparently quite concrete. As conventional ways of seeing and reading images become less applicable, the representation of visual information in the film-strips becomes closer to the physiological process of seeing than the information itself.

We have learned to see and to understand visual data, to make sense of images in a subconscious process. It is part of an evolutionary development, processing visual input to concentrate on what's vital to us and builds images in our minds. The brain constructs images and seeks order to establish correlations, consistency and continuity. Images change with rapid technical developments, and our perception tries to adjust correspondingly. I think however that the discrepancy between reading an image as a form as it used to be and now experiencing it as an event, fragmented, layered and changing over time needs to be addressed, and that the change of conventions of processing this information is not quite as fluid as it might seem.

The construction of movement and seamless images in the brain depends on our sense of space. According to Wolf Singer the clarity of inner spatial images stems from an evolutionary development, defining the long-term memory mainly as a memory of places and their relationships. [2]

TIME AND CONTINUITY

The length of time represented in the film-strips is determined by its physical length. In terms of mathematical, continuously moving time a couple of minutes of an event are captured. Film-strips don't have beginnings and ends in terms of narrative; they are segments of an ongoing experienced time, the long format suggesting continuity before and after. These segments become like fragmented memories that represent situations or narratives within them.

Film-strips represent a unique sequence of time, but there is a sense of eternity also through repetition of movement, one film-strip written in panning movement over another, images and activities being replaced by others continuing an ongoing narrative. "In life we are accidental witnesses of certain events and images, whose duration in time we cannot control. That's why all art begins with the wish to fix a moment, and to make it last for a long or even infinite time. Only then will the viewers have endless time, that they need to determine duration and rhythm of their observation autonomously." [3] Time is embedded in the film-strips in a curious way relating equally to sequential moving images, sequential still images and single photographs. Although time is stopped, a moment is extended. As Andy Warhol described it in connection with his 8-hour projection Empire one can "see time go by."

The film-strips are loops, particularly in panning animations or 360 degree installations. Loops create new meaning through fragmentation and seamless repetition of original data. As with patterns or a motif in music, the brain registers repeated elements. Loops are generators of form; they offer the possibility of infinite extension, continuity and the evasion of an ending.

"The art of today seems to have discovered a new endlessness. However we are not dealing with a renewal of a romantic aesthetic of the sublime, but the endlessness of the continuation of the always similar in small variations, the endlessness of a project of Continued-Life, that cannot be completed, but only left behind." [4]

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BIOCYBRID ECOLOGY: ART, TECHNOSCIENCE AND LIVING SYSTEMS

CAMILA HAMDAN

The article is about two transdisciplinary art projects, developed in Brazil. These works were made by the augmented reality technology. In the frist, the body tattooed with AR code, in performance art was connected in network for modelling winds. The second, an object modelling - 14BIS-, Santos Dumont's aeroplane was in the sky. Theses artistics works describe the reinvention of the environment by physical space and cyber data.
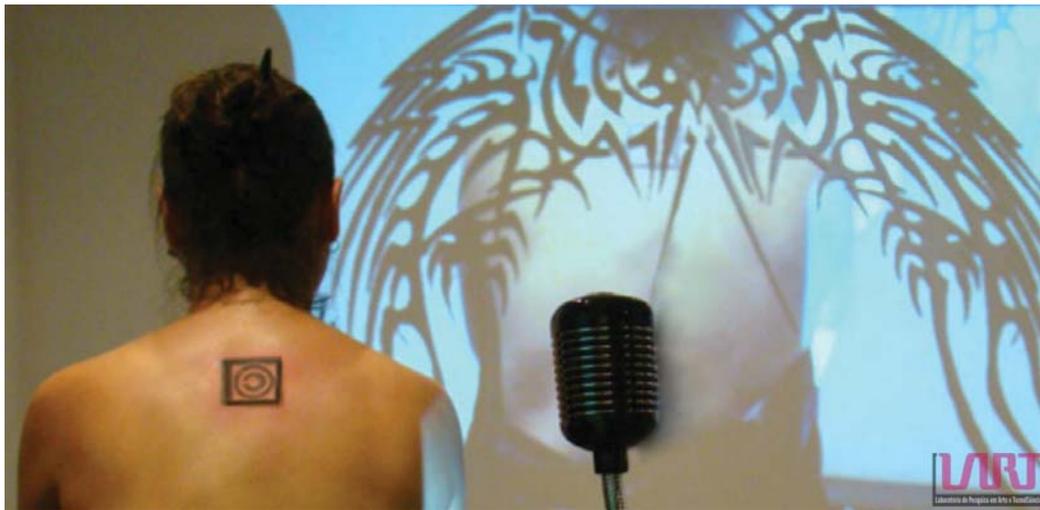
Image 1. Opened Body Connection. Computer vision system and projection of the wing actually increased from the tattoo.

Image 2: Opened Body Connection. Cyberperformance held at the Museum of Image and Sound/MIS during the IV International Festival of Mobile Creativity - Mobilefest on November 14, 2009, in São Paulo-SP, Brazil.

Image 3: 14 Bis airplane. Latin America Memorial, São Paulo, Brazil. September 2010.

Our goal in this paper is to describe the theoretical-practical context of our current production, developed in Brazil, in the Laboratory of Research in Art and Technoscience, that from a transdisciplinary approach offers us a new vision of nature and reality integrating concepts of Philosophy, Biology, Physics, Art, Computing and Engineering, as systemic parts of knowledge, in which 'all disciplines investigate the same issues, all sciences become a single science.' [2]

Thus, we find in Art and Technoscience a way that allows us to contribute with the reflections about the contemporary human being in the environment in which he/she lives. The challenge of relating art and software engineering, automotive, electronics and biomedical research at the Faculty of Gama, Brazil, is unprecedented in Latin America. To guarantee this, we rely on national agencies to foster scientific and technology research that enable the formation of human resources for research in the country. The partnership between the Government, companies and universities in which it begins, allows us to generate new ideas and suggestions that can contribute to our common goal of expanding knowledge of human possibilities.

The current scientific world has unveiled a new condition of life on the planet. We are increasingly concerned with the nature and the human being, thus, innovative possibilities of artistic creation emerge.

Studies that approach art, biology and technology research of artists and precursor scientists of the body dialogue as support, manipulation, speech, expression, and biological view and that overturned or challenged the physical, emotional and sensitivity limits of the human being concurrently with technologic developments of his/her time, have been of great importance for our research.

Assumptions of body art: visible and invisible imagination

The body in motion as a proposal to challenge the physical limits of the human being can be seen in the 'Manifest of Futurism' by Fillippo Marinetti (1909), which explores the notion of speed and strength in sculpture at the beginning of the twentieth century. The body that is represented there, craws, fighting against an 'invisible' force which introduces the concept of time as the fourth dimension represented in a sculpture. The 'invisible' forces grounded in technological developments of this time, for example, the work *Unique Forms of Continuity in Space* (1913) by Humberto Boccioni, suggests the viewing and the tactility of informational data from an unseen force, where perception is not only in the hand, but on the whole body/mind complex that it touches.

Gestural actions are also noted in Pollock's *Action Painting* (1947), in which the visceral motion of his action, allowed to record information of the violence of his muscular body gestures through the paint on panels. Abstract art emerges then, as a painting from hand signals of the body as expressive means.

The paintings and conceptual objects of the 60s start the dialogue of the moving body, which soon become ephemeral artistic actions experienced in performances, *happenings* as social and conceptual criticism that relate the aesthetic art of the event and the human condition of the time. Yves Klein's (1960) female bodies as 'living brushes' contribute to the visual record of biological images, in a process of stamping anthropometry.

The principle of using the body as support and artistic expression also comes from the conceptual physiology of the *Body Art* (1960) movement, in which performing creations are developed with public participation, in places related to the concept of the presentation. Artists experience bodily limits of sensitivity and affection: pain, pleasure, discomfort, intimacy and happiness in intuitive, cognitive, basic and complex emotions in the performing actions.

Thus, the set of logical operations of the possibilities of human actions are considered as natural languages used in the analog art (op art and kinetic art, Fluxus, *happening*) with the intuitive use of the concept of algorithm (instructions to perform a certain task) leading to an explicit integration with the public. [10]

In parallel with the artistic manifestations, technological advances in programming languages, artificial languages or digital codes created sequences of signs in the form of letters of intuitive instructions from control systems, instruction and game rules. [10] It was with the mathematical, logical and cryptanalyst Alan Turing, in 1937, that the concept of algorithm and the area of Computer Science were created, by the *Turing Machine* through the computing devices designed to help investigate the extent and limits of what can be computed.

There are many trials and artistic provocations that test the limits of the human body and assign in experiential character, in performing and objectual actions, the visible and invisible imaginary, involving questions about life itself.

Today, seven decades after Alan Turing and much artistic experimentation, proposals for computing the sensitivity and affectivity of information through human body emerge. In this sense, we consider the concept of 'biocybrid ecology' we have proposed as a perspective of a systemic view of interaction, perception and cognition through practice and theory of techno-artistic that allows reengineering life.

Reframing of consciousness attained in the post-biological era, lived in the 'Cybrid Architecture.' [1] proposed by Peter Anders, where the properties of the informational data of the cyberspace are entered into the physical world we know, in which a new quality emerges, the cybrid, composed of contents added to the hybrid world of cyber data.

These are systems that allow a co-existence in a continuum between the virtual and physical reality endowed by an interface for vision and interaction. They hybridize the physical and digital spaces, simultaneously, overlapping them in a hybrid that becomes cybrid. [5]

In this sense, the important technological change, proposed by Mark Weiser, [9] is the one that fundamentally changes our lives from the place of technology. In this way, what really matters is not the technology itself, but its relationship with us. According to the author, in the last fifty years there has been in computing major investments in research on the relation of bodies with the technologies.

Today the Internet is taking us through an era of widespread distributed computing for the relationship of ubiquitous computing. It is the relationships and interrelationships of technology in our lives, in the environment and in our bodies, when shared between each one of us and the things of the world, everywhere, that ubiquitous computing has aimed to make the use of computers emotionally invisible to the user, making it available throughout the physical environment, subtly, characterized by the spread of properties that make the cybrid emerges.

The bonding of synthetic data to the real world creates scenarios by inserting the virtual to the real. This is the mixed urban life or mixed reality whose actions mix spaces that aggregate and paste information to specific locations. Mobile and locative technologies are used, pasting data on the reality to be viewed through devices such as webcams and/or cellphone cameras.

In this sense, we are going to describe the work *Opened Body Connection* as an artwork that uses the technology of augmented reality (AR), approximates the human body of the desire for ubiquitous technologies and contributes to new perceptions of reality, for the production, awareness and interaction of natural and artificial feelings as an integrated whole of the body in interaction with the environment.

For two hours, three-dimensional animations ranged the body being tattooed in a ritualistic moment experienced in the interstitial space between flesh and the cyber of data. On the back, the figure of the tattooed copyleft, as a marker of augmented reality that allows the machine to enter on it three-dimensional animated wings. In this sense, the marker makes a pun on the concept of copywriter, which is commonly used in reference to copyright, the intellectual works and their authors. Thus, copy-

left opens a new thinking that enables the copyright as a way to subvert the rules of copyright protection and remove barriers to the use, distribution and modification, in this case, of a creative work, demanding the same freedoms to be preserved in modified versions.

Opened Body Connection is an artistic proposal that alludes to the body without authorship, copyright, collective and artistic production with the use of free software and open source for the continued process. In this sense, the body is not unique, but open, built by multiple senses of the connection. They are cyber data flowing through it and beyond it in direct contact, invisible, tangible by the network sensations. A freedom to bend boundaries that transforms the organic into a cyborg body. Skin with a data cloud that are seen and experienced by the sharing of information. A cyber performance configured in the relationship between humans and the environment, a mixture of information, transmitted in real time by the Internet through streaming of sounds, images and texts in an interaction channel composed of social networks.

Another artwork that uses augmented mobile reality and geo tagness for mixed landscapes is *The 14 Bis Air Plane*. Expanded interactions and mixed landscape generated the *14 Bis* cybrid system, to celebrate Brasilia's 50th birthday, in a public event that explored mobile and locative interface in mixed reality. LART creative practice put in the Brazilian capital's sky the historical plane *14 Bis*, invented by the pioneer of aerospatial engineering, Santos Dumont. The virtual plane in real scale (with a length of 15 meters) is geolocated in augmented reality, with the tag code placed in the satellite exploring the Global Positioning System and results into the data visualization apparition of the historical plane flying in the city sky.

Perception and cognition in the new human condition

Thus, the phenomenon of behavior and perception is, according to Merleau-Ponty, the first contact with the world that takes as its starting point the existential facticity, human phenomenal, doing a transformation of subjectivity, making the body the subject of perception. Similarly, ubiquitous computing presents a new approach to appropriate technology for our lives, called 'calm technology' [9] involving the center and periphery of human attention.

It is in the periphery that things are tuned by a large portion of our brain devoted to processing sensory peripheral to the notion of ecological perceptual possibilities [4] applied to the psychology of things. [7] It is the mixed environments that people are surrounded by intuitive interfaces embedded in everyday objects and around them.

The perception, according to Alva Noe [6], is not something that happens to us or in us, it is something we do. Consciousness of perception depends on the capacity of action in a physiological process of brain thinking, on the ability of the body as a whole. To perceive, according to this enactive approach of perception, is not only to have feelings, but it is to have the sensations that we understand. According to the author, the content of perception is not like the content of an image; the world is not given to consciousness at once, but it is gradually acquired through active perceptive exploration of the knowledge of the body.

According to the biologists Humberto Maturana and Francisco Varela, enaction is guided by the understanding of perception through the actions of the subject in space. 'To the extent that these local situa-

tions are constantly changing due to the activity of the individual perceiver, the necessary point of refer-ence for understanding the perception is no longer a world previously given, regardless of the subject of perception, but the sensory-motor structure of the subject.' [8]

Cognition, in its structures, emerges from the sensory-motor experienced schemas that allow the action to be built and guided by perception. It is the experiential sensorimotor contextualized structure, 'the way the subject perceiver is written in a body, [...] determines how the subject can act and be modu-lated by the events of the environment.' [8]

By taking a creative capacity of operational intervention upon life on manipulations of its concep-tion and procreation, the human being participates actively, in the perspective of evolution, of a process which could alter its nature.

The construction of techniques and production of tools have always followed the human phenomenon. The formation of man – anthropogenesis – coincides symbiotically withthe technogenesis that the first tool of man was his own body. In this context, nature reflects the interdependence between anthropo-genesis and technogenesis in an ecological way in a new human condition.

Oliver Dyens [3] examines the convergence of computing, communication and biotechnology into a new paradigm of information as a very important thing of what is happening with the 'human condi-tion', that was thought to be essentially unchanged.

Physiology of the Emotions in biocybrid feel

Physiological data, image processing in expert systems are the basis of Biomedical Engineering, thus, a new concept of biocybrid emerges [2], reaffirming the body/environment biology in the cultural scene of existence in Cyberculture, in sensorimotor experiences in ubiquitous computing, differs from the connections and evasions of virtual environments for the mixed bioconnected spaces.

For these reflections, the James-Lange theories (the actions perceive the emotions and the brain inter-prets them), Cannon-Bard (emotion is felt first and then follows the cognitive actions, the thalamus and amygdala plays a central role, interpreting an emotional situation and, simultaneously, triggering the sending of signals to the Autonomic Nervous System and to the cerebral cortex, which interprets the situation cognitively)and Shachter-Singer (contributes with differences in emotion and self-perception), areextremely important for the 'Physiology of Emotions' in the aspect of a Biocybrid Ecology, of an emo-tion in a dynamic state of physical events, cognitive, and cyber data with the use of ECG, EMG, Gal-vanic Skin Resistance – GSR and NTC thermistor for creative, artistic purposes in human edges for expan-sion interfaces and perceptual and affective supplementation.

Environments and smart objects, augmented reality, ubiquitous computing, pervasive and tangi-ble, make it possible to understand the body experiences in human-computer interaction, of emotions, cognition and perception through the body, physiology and behavior.

We give voice to human free will, by monitoring and detection of biological motion signals produced as a result of conscious choice or not, measured by technology. For this interaction, the LART Research Group adds the research of physicians, therapists, computer programmers and engineers with the

aim of detecting emotional expression, turning it into sounds and images projected on the environment, in a process called Data Visualization in which we contribute to the propose of the New Abstraction construction.

Featuring biosensors, one can detect tension and intentional movements of any person during an action, in a daily performance from or even in rituals that transcend one's own body, as part of a complex ecology of the cosmos.

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PERFORMING STRUCTURE: FINE ART AS A PROTOTYPE FOR PARTICIPATION

Karin Hansson, Love Ekenberg, Johanna Gustafsson Fürst & Thomas Liljenberg

The art project *Performing Structure* (www.performingstructure.se) deals with the performance of organizational systems like democracy in a place structured by globalization. An art exhibition in the public space is employed as a way to better understand the conditions for democratic participation. In this work-in-progress, artists work in relation to research regarding e-democracy using the concept of art as a method to explore the context.

Fig 1. Stage. Scene 1, 2011, Johanna Gustafsson Furst & Kista Theatre, documentation of installation detail, Copyright 2011 Johanna Gustafsson Fürst.

Fig 2. Reconciliation, 2011, Shiva Anoushirvani, still from video. Copyright Shiva Anoushirvani.

Fig 3. Mapping Falun, 2007, Åsa Andersson Broms, documentation of process, Copyright Per Eriksson

1. Introduction

In a recent overview of the research on e-participation, Macintosh, Coleman and Schneeberger [1] show that a more informed discussion regarding the importance of form and structure in democracy is needed in the technological development in the field. As, e.g., Sæbø, Rose, and Skiftenesflak [2] point out; current research on e-participation lacks innovation in the sense that most software is adaptations of existing technologies. Furthermore, the Internet is treated as a distinct artifact and technological solutions are mostly taken for granted. These approaches have seldom been successful regarding broad and representative citizen involvement, and in particular not in more socially complex areas. Moreover, Dahlberg [3] notes that a belief in the ability of technology to shape a neutral place for deliberative discussions is omnipresent in the discourse on Internet and democracy.

We are skeptical against a technology strongly influenced by a liberal notion of democracy as an egalitarian sphere for reasoning, rather than, e.g., a Foucauldian notion of hegemonic discourse shaped by power relations. The question then arises whether there are other complementary approaches to the field. Our approach is more along the line with Nowotny, Scott, and Gibbons [4] suggesting that socially embedded research could give way to more robust forms of knowledge production.

Therefore, we have recently started an art and research project exploring how an unconditional conversation about the common and socially shared space can take place in practice. In contrast to a technology driven approach, the argument is that art projects can be used as forms for both investigating and creating multimodal mediated participation. Furthermore, thematic art projects can be used as a way of prototyping for participatory democracy. Artists' actions, installations and role-playing create a direct

confrontation and interaction with a specific place and its inhabitants to explore the dynamic relation-ships that constitute its context. The notion of art creates a certain focus and expectation of seeing something beyond the everyday perception. We would like to see art as what Metzger [5] calls a "demo-cratic technology" – an informal context that provides an unconditional opportunity to try different posi-tions and opinions.

Since the participatory turn in the 1960's, art that more directly includes the audience in the perfor-mance or the process has been thoroughly investigated. [6-7] Today, participation as an aesthetic com-ponent is common in the nomadic context of contemporary art. However, we think that too often, the critical potential in participatory art is reduced to symbolic gestures. We want to overcome this by situ-ating a participatory art project in a local context and connect it with research on e-democracy, and thereby create a possibility for the art project to inform the research and vice versa. The conceptual starting point for Performing Structure is the recognition of the need to examine the norms and beliefs forming the basis of the structures and communication patterns that current technologies co-create. We are interested in the "doing" of democracy within science, and what the bases for democracy looks like. The focus is on the daily conversations in small and large groups and the mechanisms that shape these conversations.

2. The concepts of art as techniques

In participatory design, a multitude of art genres are used as a way of involving users in the process, such as probes, scenarios and role-playing. Here we won't emphasize any particular artistic genre; in-stead we use different concepts of art as a way of exploring the conditions for a participatory democracy grounded in a particular context. Ourtechniques for exploring different perspectives on e-democracy include:

1. Subjectivity – to compare the site with other global nodes through artists' personal experiences.
2. Conflict – to emphasize diversity and conflict rather then consensus.
3. Pain – to use the artwork as a memory-work, a technique for understanding underlying conflicts and detecting norms and behaviors.

2.1 A SUBJECTIVE COMPARISON BETWEEN KISTA-RINKEBY AND OTHER GLOBAL NODES IN PROCESSES OF RESTRUCTURING

The notion of subjectivity is strong in the avant-garde concept of art. We can reach a contextual under-standing beyond statistic generalizations by departing from the individual artist's subjective understand-ing of a certain situation. We situate the art project at Kista-Rinkeby, which is the home location for the e-democracy researchers. This is one of Stockholm's more expansive suburbs, and a central location for global companies primarily in the information industry, and both Stockholm University and the Royal Institute of Technology in Stockholm have chosen to place parts of their operations here. It is also home for programs, such as the government-funded Spider (The Swedish Program for ICT in Developing Re-gions) which, among other things "exports" e-democracy to developing countries. Kista-Rinkeby is char-acterized by extreme local segregation, and those living there are not generally the same ones working there. The unemployment rate among the local residents is high as well as the proportion of immigrants. The place illustrates the new divisions created by globalization, where diverse socio-economic worlds become wrapped up in each other and where the state's ability to balance differences has declined.

Here, technology has not decreased but increased disparities as the importance of social and cultural capital has increased in the networked economy in general. The latter is not unique to Kista–Rinkeby and in order to compare the site with other global nodes through artists' personal experiences, we invite artist from different peripheral nodes heavily restructured by the global system. One participating group is The Khoj International Artists' Association in Delhi, an arts organization where artists work in dialogue with the space at the intersection between art, society and urban development. The Moldavian artist Stefan Rusu uses art as a way to talk about social and political phenomena. He is also the leader of KSAK Center for Contemporary Art in Chisinau, Moldova, and has developed art projects throughout Europe, the Middle East and Asia, focusing on processes and changes in post-socialist societies. The Lithuanian artists Nomeda & Gedimina Urbonas also explore post-Soviet notions of changing national identity, and the conflicts and contradictions caused by the new economic and political conditions. They started JUTEMPUS interdisciplinary program for art in Vilnius, and VOICE, an online publication on media culture. In Kista-Rinkeby these artists will work in close relation to local Swedish artists and local organizations.

2.2 CONFLICT AND DIVERSITY AS A TOOL

Unsurprisingly, and as various social media has demonstrated, communication technology, is not necessarily alienating. It can instead support previously fragmented groups to keep together and provide the means for new communities with a shared interest to form and interact. Technically, it seams to be easier to lump together similarities rather than differences, and to design services that offer us new products and friends based on our previous choices. The technology thus niches us, shatters us, and makes the common areas of understanding lesser and easier to avoid. It is difficult to get along with "the other." But in order to develop an understanding of the common it is not enough to talk only to people who think and act like us. A technique that is not based on combining equals but different varieties appears here as a discursive democratic utopia. In the choice of artists, we have therefore tried to see beyond our own aesthetic practices while creating a heterogeneous group of artists. By bringing together artists with different experiences and modes of expression, we are promoting a situation of conflict where the individual artists' subject positions are questioned.

Conflict is also a recurrent theme in art, where the individual artist is supposed to be in conflict with the collective system. An avant-garde artist breaks with the norms and differentiates himself from ordinary men and previous art. Standard in these settings is that an artist's role is created through a differentiation process, where an outsider is opposed to the norm; Avant-garde in contrast to the conventional; painting in contrast to performance, and so on. We take another direction in this project and depart from our different perspectives; deconstructing the norms that create a difference while looking for a common denominator. To avoid locking into just one perspective, ten invited artists and artists groups approach the subject from a multitude of angels such as community art, urban installation art and activist art. The artists are using locative and interactive media, as well as more traditional artistic techniques. The particular art genre is not important here; a common denominator is that the artists work with situation-specific emancipatory art projects that in various ways relate to the physical and mediated public sphere. Therefore, we do not emphasize a particular artistic method, but rather the *actual meeting* between the artists and the procedures for dealing with differences. Using the thematic exhibition as a framework, different artistic perspectives create a triangulation of methods where a more diverse and complex picture of the situation can emerge.

2.3 THE COLLABORATIVE DEVELOPMENT OF THE EXHIBITION AS A MEMORY-WORK

Through the joint development of a theme, the group exhibition works as a special form of knowledge building. This has similarities with Frigga Haug and others' method of *memory-work*, [7] i.e., a qualitative method that uses the memories of a group of researchers to investigate norms and social structures. This use of personal experience as a tool for academic analysis is based on Husserl's systematic attempt to examine the subjective unconscious where he argues that we can reach a general understanding of a phenomenon by understanding the individual's experiences. [8] The idea behind the memory-work method is that memories often derive from situations where we have experienced a taboo or a cultural constraint that caused a conflict. But to get to the underlying experience that caused the memory, one must see through cultural norms and behavioral patterns. The memory-work method is specifically intended to reach to the underlying experience. To achieve this, one begins by describing the individual's own conscious memories. The collective analysis of each memory is then intended to identify the underlying conflicts and to detect the cultural norms and behaviors involved, i.e., the very reason for why the memory has become a memory.

In the project, we consider the similarities between the memory work approach and the thematic group exhibition and develop our own method of collective knowledge production. Within the framework of the arts organization *Association for Temporary Art [a: t]* Åsa Andersson Broms , Nils Claesson and Karin Hansson previously carried out a series of thematic art projects and exhibitions related to the information society and the changing conditions for democracy: *Best before - on the Information Society*, Tensta Konsthall (1999), *The Art of Organizing*, Gallery Enkehuset (2000), *Money - a commentary on the new economy and Public Opinion* at the Kulturhuset in Stockholm (2001, 2002). Central for the work is the collaboration between the artists and the ambition to create something beyond the multiplication of the single parts. This way of working with a thematic art exhibition has many similarities with the qualitative research method of memory-work. The artist most often departs from his or her subjective experience of the chosen theme and focuses on the elements that he/she thinks are interesting. What is interesting most often means some form of unresolved conflict that chafe at the individual or societal level. The motivation for making art is to a great extent about the need to express a subjective experience/interest on a structural level where others can read it. The collective process in a group exhibition, where artists share their ideas and reflections with each other, works at its best as a collective memory-work where the discussion of ideas creates an understanding of underlying conflicts and detects the inclusion of norms and behaviors; the very reason that the art has become an art work.

The planed exhibition is developed in the group of artist trough a collective memory-work.

3. Artists and art projects in process

Most important in the project is the invited artists personal engagement in the theme and interest in a joint development of the underlying ideas. To reach beyond symbolic gestures of community the privileges of the artist as well as researcher are examined and questioned.

To mention some of the ongoing and planed art works within the project: A project that already takes place in the Kista-Rinkeby area is Thomas Liljenbergs' *Kista Art City*, where a joint art project creates a starting point for a wider discussion about community participation and notions of belonging among the citizens of Kista. Shiva Anoushirvani's work takes place at the intersection between art, activism and performance. As part of the artist group RAR: Rapid Art Response she develops the project *Dear Citizen*in

collaboration with Husby Arthall. Here acts of democracy are taught through performance and role-playing.

One aspect of the theme is how technology can (or cannot) demonstrate and change social structures, and thus operate in an emancipatory direction and to broaden democratic participation. The artist Johanna Gustafsson Fürst, together with Kista Theatre explores communication technology applications related to a specific location. In the project *I'm Your Body* they use mobile GPS technology to create a parallel public place within Kista-Rinkeby.

Mass-distributed collaborative processes such as crowd-sourcing and open source are also an aspect of the technology that is interesting from a democratic participatory perspective. This is the field of Karin Hansson's work, *Actory*, a collaborative groupware based on the sociology of the art world, developed together with students at the Royal Institute of Art in Stockholm and researchers at Stockholm University.

4. Art as Prototypes for Participation

To conclude, this project contributes to the discussion about artistic research by showing how situation-specific art can be viewed as a qualitative method for highlighting and exploring discursive practices. Through a triangulation of different artistic perspectives the themed and collectively generated art exhibition creates a diverse and complex picture of notions such as participation and democracy. The artistic work is an iterative process where concrete images, scenarios and situations create a direct communication with the site. We want to see the project as a construction of prototypes for alternative societies as well as a laboratory for participation. Following a rich tradition of participatory art, we empasize the artists' capacity to listen, interact and respond. Art is not something that comes in from above or outside. Instead it should be grounded in the activities at the site, creating meaning beyond the context of contemporary art.

An important practical input into the project, is achieved through the activities undertaken by local organizations such as Kista Residential College for Adult Education, Husby Association for Arts & Crafts, Husby Yard and Rinkeby People's House. The artists within the project are working in direct relation to existing activities. During the spring and summer of 2012, a number of art projects will be carried out in the public and semi-public space in Kista-Rinkeby.

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CAN DIGITAL OBJECTS BEHAVE WELL (IF WE LET THEM)?

Dew Harrison

The *Shift-Life* Installation. Dew Harrison.

 Within my practice I have an interest in how computer technology can augment our thinking and elucidate deeper understandings of issues and positions within the art field (see Tamblyn). In particular I have been investigating the work and ideas of Marcel Duchamp as the instigator of Conceptual Art practice and how new technologies are best suited to enable a re-articulation of them (see Blais, Gere, Manovich, Rush, Shanken, and Harrison 1999). Early works transposed his Large Glass across the internet, and inter-related Duchampian images with his notes (Duchamp 1934, 1966) into discreet offline systems. These pieces were made using hypermedia software as this enables the linking of multimedia items by semantic association rather than by indexing or alphabetic ordering (Harrison 1997). This connectivity by semantic association is paralleled in Conceptual Art where ideas are semantically linked by the artist into one concept – often presented as a visual statement, an object.

As technology advances, the interactive interfaces, which are signatures of digital artwork, can become less visible and taxing to the viewer. My work reflects this in its move towards engaging participants through intuitive interfaces with less machine-like ways of access. From mouse, keyboard and screen - to sensors, projections in physical spaces and material objects. In order to achieve more organic means of semantic association, I am now incorporating Artificial Intelligent (AI) behaviours into my Duchampian art systems to animate data objects. Recent works have bestowed the digitized Duchampian items with flocking behaviours in order to interrelate them into families of meaning, the result being more akin to a

projected animated painting in that they are not interactive and require contemplation in considering their shifting positions.

 'Flocking' is more usually associated with the collective animal behaviours exhibited by many living beings such as birds, fish, bacteria and insects, but can be more largely understood as the motion of a large number of self-propelled entities (see Reynolds). It is considered an 'emergent' behaviour arising from simple rules that are followed by individuals and does not involve any central coordination. Flocking behaviours can be applied to animal-like and non-animal-like entities and the first experiments with Duchampian items are simple rather than complex, using 'Flash' to animate them. The intent is to show the criticality of oscillation required in determining the Bride/Bachelor families and shifting relationships within the Duchampian universe of objects. These are image only objects at present but when texts are added they might provide a meta-language of semantic understanding concerning Duchampian ideas, with the object/behaviour patterns lying underneath and of less interest to the viewer. They could illustrate the flux and flow of his ideas and if emergent behaviours arise may enable new discourses within the system.

It is these Duchampian experiments which have led to the hands-on installation, 'Shift-Life', by directly influencing the approach to an exploration of Darwin's 'big idea'. Instead of Duchampian objects, AI behaviours were attached to a virtual world of animated objects featured as creatures and plants that adapt to Darwinian principles for survival. These 'families' were grouped by their form and colour, and it is the changes in these identifiers that are of interest when observed by viewers who can cause physical upheavals in their world, to which the artificial families of life-forms then have to respond. The *Shift-Life* project entailed a fantasy biological life-form, 'bugs-in-a-box', existing in conditions analogous to Darwinian evolution. Interfering with the stability of their ecosystem was done through real world actions directly affecting the virtual one. The work relied heavily on the 'animal intelligences' programmed in to display accelerated Darwinian principles by allowing them survival strategies (Ch'ng).

In attempting to both respond to the idea of a young Darwin and to elucidate his adult thinking in an holistic hands-on way, the bug-like creatures in the box reflected his childhood interest in natural life-forms by taking the form of beetle-like jelly sweets and allsorts. These virtual creatures existed in a nutritional (trophic) relationship of prey/predator and vegetation with both rooted (sessile) and free ranging (vagile) organisms. They were short-lived (60 seconds minimum and 150 seconds maximum) graphically represented as 2D and brightly coloured cartoon animals. Each plant and animal type had distinct behaviours, for instance the herbivores were big, slow and lumbering, they reproduced by laying jelly bean-like eggs and could survive the toxic plants if they didn't eat too many of them. The Carnivores were quick with a scuttling gait, they could only see straight ahead and reproduced by cloning, they would die if they ate a herbivore who in turn had nibbled on a toxic plant.

In order to allow people to interact with the Darwinian 'sweet' bugs the virtual world was projected down into a real wooden box arrayed with sensors. These sensors relayed data from the visitors actions directly to the virtual ecosystem where the animals and plants would react accordingly and in real-time. As someone used a watering can to pour liquid into the box, for instance, the planet humidity altered and some plants die back, this meant less food for the herbivore green jelly sweet bugs, and consequently less bugs to eat for the pink carnivores. Switching a lamp on would dry out the atmosphere and enable the plants to grow again, however too much 'sun' might be detrimental to the point of scorching the planet surface dry and wiping out the carnivores entirely with no water and no trees for protection. The carnivores could become extinct due to their reproduction method of cloning, unlike the egg laying

herbivores. Pouring vinegar (poison) from a watering can would 'feed' the red bushes, toxic to all the creatures, but this could be remedied by pouring baking soda liquid (plant food) and restoring the plant balance, the herbivores' main food source. Banging on the edge of the box with a toy hammer caused earthquakes, which sent the carnivores into panic mode and they would spin around and run for cover under the trees. (Harrison, Ch'ng et al)

The low-tech approach to a hi-tech installation encouraged active participation but also a state of contemplation and reflection in passively observing other people's actions and watching the subsequent life-form changes taking place. The jelly bug world was set at a self-sustainable and stable level without the intervention from human meddling and as such was visually mesmerising, it was essentially a sugar-coated version of 'nature red in tooth and claw'. Through listening to the participants' conversations it was evident that there was room for deep thought, where the virtual world could be understood as an analogy for human activity and it's effect on global climate change within our own real world. The animal behaviours, although quite complex with around 15,000 lines of code, were still fairly basic, but the question remains whether if given more sophisticated behaviours and left longer between the human interventions, would emergent behaviours become apparent within the social groupings of the creatures as they adapt to survive.

Both the Duchamp and Shift-Life projects await their next stages, visitors may need to view passively, observe and contemplate following any interaction with these 'live' systems, as unpredictable behaviours arise from digital objects.

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IDOLS AND ART: THE COGNITIVE FETISH

WILLIAM HART

Drawing upon theories of embodied cognition and the extended mind and the writings of maverick psychologist Julian Jaynes, this paper speculates on the function and roles of anthropomorphism and idolatory in our relationship with technology.

Objects and Anthropomorphism

In her abstract for this panel Nancy Mauro Flude concludes with the question:

"Anthropomorphism continually haunts us, and our machines – have we always been and will we fundamentally remain idolaters?"

From religion to Barbie dolls and the family pet, anthropomorphism is fundamental to the way that humans relate to the world and objects around us. We make god in our own image, and he generally shares our political beliefs and social prejudices. With dolls we can explore our social fears, frustrations and interactions with others, safe from the emotional holocaust of the playground. If we didn't anthropomorphise our pets, we wouldn't empathise with them, and they would cease to be pets.

It is through anthropomorphism that we relate to entities that we see as separate to ourselves, it is a prerequisite for empathy.   However a cursory consideration for the history of human interaction with our fellow creatures makes it quite clear we are capable of being selective in our anthropomorphism.

But is it useful to anthropomorphise my toaster and worry that it may be getting bored from cooking too much toast, or fret that my bicycle is feeling rejected because I haven't taken it for a ride recently. Or that my laptop is impatient because of the time I wasted in looking at pictures of robots while avoiding writing this talk.

So the question is, with what and when should we anthropomorphise? To gain some insight into this I'd like to mash up two theories that lie outside the mainstream.

The hypothesis of the Extended Mind

The first is the hypothesis of the Extended Mind, first put forward by philosophers Andy Clark and David Chalmers in 1999. [1] Clark and Chalmers argue that cognition is not confined to the brain or even the body. As humans we have evolved to co-opt aspects of our environment to augment our thought processes. For instance we can count larger numbers using our fingers, codify abstract information using dirt and a stick, or enhance memory by writing things down on a notepad. Clark and Chalmers argue that by learning to use and rely on these external objects they become equivalent to the internal processes they augment or replace.

Under this view, my laptop is not something that I anthropomorphise, it is actually a part of me, it augments my ability to write, to remember, to visualise and to know. I don't ascribe feelings to it; in the

same way I don't ascribe feelings to a limb or organ. Before I can anthropomorphise a technological other, it has to be an automaton – an independent machine entity.

Julian Jaynes and the ability to Anthropromorphise

The second and somewhat more radical theory I'd like to discuss is by maverick 20C century psychologist Julian Jaynes. Jaynes in his 1977 book "The origin of consciousness in the break down of the bicameral mind" proposes that the structure and organisation of the human mind has continued to evolve since Palaeolithic times. [2] Our modern conscious self-awareness, the introspecting 'I', emerged only 2000 years ago under the pressures of increasingly large and complex societies punctuated by natural disasters and war.

Before then Jaynes believed that our minds were bicameral in organisation, that the two hemispheres operated independently, the left-brain dealing with the routine details of the present. The right brain would communicate with the left through auditory hallucinations in the form of commands apparently from authority figures. At first the authoritative voices were those of the chief or king, and when the chief died his would continue to be heard, and became the first gods. In their left-brain state the people were caught in the moment; lacking introspection they were capable only of dealing with normal routine. When faced with stressful situations or problems outside the norm the voices from the right would provide advice or command a course of action. Jaynes paints a picture of a peaceful ordered society where everybody knew their place, where people literally walked and talked with their personal gods.

It is impossible to do justice to Jayne's theory in a few sentences, and perhaps it sounds a bit like something from the pen of L Ron Hubbard or Eric Von Daniken, but Jaynes's scholarship is impressive and he uses his theory to describe one of the most intriguing explanations for the development of religion that follows the gradual breakdown of the bicameral mind. As the individual sense of self-awareness grew, the hallucinated voices began to fade. The insecurity and loss of certainty that this created drove humans to find ways to try and recapture the direction and wisdom of the gods, and so developed increasingly complex and desperate ways to recapture this connection. Idols, prophets, oracles, seers, prayer, divination, auguries, poetry and art were all at different times used as ways to invoke the lost voices.

For instance the idols of the early first millennium BCE had large exaggerated eyes which command attention, and Jaynes hypothesised that the large eyes of the idols aided the people in entering states where they could again hear the auditory hallucinations. It is hard not to wonder if we still see vestiges of this in the large eyes of anime characters, or in the power of television to captivate us.

Neuroscience and thinking through objects

The insight and knowledge gained from neuroscience over the past twenty years tends to support some of Jayne's ideas. Cognition in the view of Neuroscientist Antionio Damasio involves emotion and physical sensation as much as it does logic or mental reasoning. [3] We say that cognition is embodied, that we use our body and intuition as much as reason to make sense of the world. We all know as artists, that you don't make art through normal verbal consciousness, and while we no longer wait to be possessed by the Muses, we do make use of non-conscious understanding and intuition. A part of the art making process for many is an almost trance like engagement with materials as we think through our work.

Art historian Barbara Stafford talks about the power of art to construct analogy and develops a theory of art where artefacts are cognitive objects that communicate through analogical thinking. [4] In a similar way that Clark describes the way we use objects in our environment to extend our mental capacity, it is hard not to conjecture that when we engage with an artwork we participate in an act of communion or communication with it, it becomes part of our thoughts. In this view the idols of the ancient world are cognitive aids that helped them to enter a mental state where the right side of the brain could direct and advise the 'everyday' left via aural hallucinations.

Idolatry is a contemptuous term, it implies an unreasoning worship, an unfounded abasement before inanimate objects – and so it must have seemed to those who no longer entered the trance and were cut off from the voices. Did the Idolaters anthropomorphise their idols? Their relationship would have been too literal for the metaphorical anthropomorphism that later developed.

Conclusions

In pondering the perspectives that the theories of Clark and Jaynes provide, I've come to the conclusion that we need a different category to describe our relationship with our digital artefacts. They are not inanimate objects, yet neither are they in their current form alive and worthy of empathy. They are the new idols, and we engage in idolatry that extends from the naive to the sophisticated.

At the naive extreme we may anthropomorphise these artefacts and ascribe authority to what they tell us. For example television is the ultimate Idol for the naive, it places us in a trance like state of passivity as it informs and commands.

At the other extreme they are thinking tools, augmentations that we have co-opted and incorporated into our cognitive frameworks, they become part of what we are, not some other. We think with these artefacts and not so much about them.

As technological humans we are idolaters, but that doesn't mean that idolatry is unquestioning worship from those in thrall to the idols, it could be the sign of a fruitful cognitive engagement that can extend our thinking and understanding of the world to places and states that haven't been possible before.

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THE NEURO-LOGIC OF SOFTWARE ART

WILLIAM HART

This paper considers programming in relation to the International linguistics of Roy Harris and the Expanded Mind hypothesis of Andy Clark. It is argued that the use of the term 'language' when referring to programming is a category error that has implications for the practice of Software Art. Developing a practice of Software Art requires an open-ended and heterogeneous approach to coding involving a range of cognitive states.

"*The computer is a kind of wishful self-portrait... a compendium of abilities we have as humans aspired to but are not very gifted at. We need a much clearer understanding of this complex relationship. Without this understanding we will be unable to find an appropriate partnership with our creations.*" [1]

Introduction

Over ten years ago I undertook my first software art project entitled The Writing Machine. At the time it had been some years since I had engaged in a serious programming project, and this was the first time aside from some scripting that I had undertaken programming with the object of an 'art' outcome, but I had had considerable previous experience in large and small experimental software projects. An initial prototype written in C for the artwork that had the essential behaviours was produced quite quickly, but then the project stalled - and failed to reach an aesthetic resolution. It was as though the material of the project became heavy, brittle, and eventually unworkable. I've since spent a considerable amount of time considering why. It would be easy to say that this failure was due to a poor software engineering methodology, but while making an artwork sometimes generates engineering problems, engineering does not describe the methodologies that an artist uses. Artworks rarely address a problem or provide functionality, in the way that engineering processes do. This has led me to explore the qualities of different programming languages, looking at processes for rapid development and flexible refinement, but that also allow for diversity of expression.

As part of this exploration I have looked closely at the relationship between humans and machines, between the formal constructs of programming and human language, and ask, what is relationship we have with the machine and what are the constraints on using it as a creative medium. I contend, that in considering programming as an expressive medium it is necessary to consider the types of cognitive states artists engage in and examine the concept of language as it relates to the domains of human discourse and computer programming. In contemporary times we are very comfortable with computing devices, with the idea that these devices occupy an intimate part of our lives, and the mainstream view is developing that it is valid for artists to be involved with, programming, hacking, tinkering - making and unmaking this machinery, as part of a creative practice that results in an experience called art.

The Artist Programmer

There appears to be a consensus that the artist engaged with programming as a creative medium should, as their skills develop, move from conceptually simpler to more rigorous (in a software engineering sense) programming environments. For instance from a visual programming with node based

metaphors such as Max/MSP or Quartz Composer, through customised IDE's (Integrated Development Environment) with scaffolded programming support such as Processing graduating to C++ using API's (Application Programming Interface) such as OpenFrameworks or Cinder. A common rationale is that C++ applications are faster, more extensible, capable of increased complexity and have greater robustness. In this paper I argue that software art is not software engineering, that a different approach is required, to achieve the flexibility, richness and ease of comprehension that expressive software art requires.

It isn't necessary to look too far back beyond the past decade to find a general unease with the possibility of the coexistence of technical proficiency in computer technology and creative expression. Current histories of software art often claim a heritage from the conceptual art movement of the 1960s, but few are enthusiastic in claiming a lineage from the Computer Art movement of the 60s, 70s and 80s, a movement which many would still claim failed to produce art worthy of consideration. [2]

The Program as *Art*efact

Perhaps this is partially because the concept of what art is has changed since these times. We have seen a move from the emphasis upon the art object to an emphasis upon relation or process. I remember reading an article and looking at images produced by Harold Cohen's drawing software AARON in the early 1980s and being disturbed and slightly enraged. Partially my discomfort was due to the article (and Cohen) ascribing intelligence and creativity to the software - whereas all I could see was software that produced pictures with recognisable forms, but that were always the somehow the same. Years later as I pondered the problems of writing software and creativity I began to realise that while it is true to say that AARON failed to produce engaging art objects or to display 'creativity'; it is the project in its entirety and the knowledge it represents which is the artwork.

Throughout the history of artists' engagement with computers, there has been recognition that something 'new' or novel is happening, a new medium, a novel approach to making and disseminating art - a different mode of expression than had been seen before.

The Computer Art of the 1970s and 80s suffered the disregard of the mainstream art establishment as much because of its inability to demonstrate the value of this 'newness' in ways other than novelty, and because of its association with the dehumanising program of hard AI and the military industrial complex. With the advent of the personal computer revolution and development of desktop publishing and image editing, the computer demonstrated an ability to simulate processes of traditional media (at first quite crudely and was met with a degree of scepticism by practitioners skilled in traditional analogue media). It was this ability to firstly approximate through simulation the processes of traditional media and then such as with the case of video quite quickly surpass the processes of analogue media that led to the general acceptance of the computer as a tool for artists - not its capacity for novelty.

The novelty of Computer Art?

What is this new thing though? Dominic Lopes in "A philosophy of computer art" makes a distinction between Computer Art and Digital Art, the latter he defines as art which rely upon the ability of the computer to encode and manipulate data, and is not a new art form - a digital image is still an image, digital music is still a kind of music. [3]Computer Art he defines as art works, which when run on a computer have a quality of interactivity. So for Lopes the 'new' thing is the quality of being interactive. Interactivity

as the prerequisite of difference alone seems to hark back to the new media of the 1990s as a way of distinguishing the 'newness' of art made with the computer. For the purposes of this paper I would like to instead explore this idea of 'newness' as being a cognitive loop between artist and computer, rather than as a dialogue the artist has with the computer or something that the artist expresses through the computer. Digital Art is now the mainstream, it is ubiquitous and its tools of production are invisible. There are numerous social and political problems with the solely media centric approach of digital art, but they are not what I want to address here. Instead I want to look more closely at the processes and context of the engagement between human and computer we call programming, and how it could result in a thing we call art, particularly where the artist and programmer are the same person.

I would assert that this activity we call programming is more than a utilitarian or instrumental one, that the requirements for a programming environment are different for an art activity than for an engineering one. An art project may have non-specific goals and will certainly have different criteria for determining points of completion. Art historian Barbara Stafford places analogy at the heart of the art experience, in making, as much as receiving art we are engaging in 'analogical thinking', satisfying art experiences generally engage through either an unstable and shifting meanings, or in a richly nuanced web of correspondences. [4]

Analogy, Language and Programming

Analogy / Metaphor is very powerful, it is arguably the essence of cognitive process, it gives the power to create and manipulate complex abstractions. Where analogy is in constant use it becomes invisible, and we cease to be aware of the underlying assumptions. We all know that programming languages are not the same as human 'natural' languages, but implicit in almost all theoretical discussion is the idea that on some level that it is. We talk about codes, and encoding interchangeably between analogue and digital, between organic and machine systems. But what if there is no correspondence between language and programming dialects.

There have been a long history of technological metaphors used to describe aspects of human cognition; many have become deeply embedded in consensual language and understandings. For instance the telegraph and telephone exchange were common metaphors for brain function in the early 20th Century, the photographic image as an analogue for visual perception is still a widely held naive conception. The computer as an analogue for the brain, and software for the mind, has been widely used for the past 50 years, although it is also a metaphor that is violently rejected by many. Sometimes terminologies that have been analogised from one discipline of thought to another create a further implicit confusion. Take for instance the term 'ontology' it has distinct (but analogous) meanings, whether you are discussing philosophy, cognitive science or computing. In philosophy ontology is concerned with the existence and relationships of categories of being, whereas in information science ontology is a representation of a domain of knowledge based on a formal description of concepts and relationships, taxonomy and properties. So in one discipline ontology is metaphysical; open to interpretation and in the other it is formal; precise and closed. When we discuss ontologies in terms of art and programming there is naturally a bleed from one conception to the other, a confusion between metaphysical and material modes of expression.

CHOMSKY'S UNIVERSAL GRAMMAR AND ARTIFICAL INTELLIGENCE

In the early 1950s, at a similar time to the development of the first computer programming languages such as FORTRAN and LISP, Noam Chomsky developed his linguistic theory of Universal Grammar, that is, there is a universal structure of grammar hardwired into the brain, with the implication that all human languages share a common set of fundamental rules, a formal description. Programming languages are 'Turing Complete', that is formally a logical construction in one language can also be represented in another, even though the code and logical structures of the programming languages may be quite different. Chomsky also constructed a hierarchy of formal languages, with Turing complete formal languages at the lowest level, and several levels of more complex formal grammars above that. The implications from Chomsky's theories were clear; all human languages were syntactically equivalent to each other, as were all programming languages, with programming languages being a simplified version of the languages of humans. So the idea that we think and communicate through code entered the public consciousness and was firmly embedded through the use of terms like programming 'language'.

To understand how prevalent was this assumption it is instructive to look at the history of machine language translation, the optimism in the field in the 1950s repeatedly asserted that machine translation was a problem that would be solved in the near future. [5]

Cognitive Psychologist and author Steven Pinker currently champions the idea of a Universal Human grammar, and popularised Chomsky's theories widely in his 1994 book "The Language Instinct." [6] But the theories and debates around the acquisition and representation of language in the mind are complex and vigorous, and there are a number of opposing theories to this idea that language is in someway hardwired into the brain.

BUT IF LANGUAGE IS NOT A CODE...

One of the theories that Chomsky's Universal Grammar displaced was the Saphir-Whorf hypothesis or linguistic relativity. The hypothesis, briefly stated, is that the language you speak with determines what and how you think; the form and structure of different languages can be unique, which lead to different conceptions and understanding of the world. In recent years the credibility of the Saphir-Whorf hypothesis has been revived by the work of Cognitive Psychologist Lera Boroditsky. Boroditsky looks at indigenous peoples and their languages, and how constructs available in the language they use affect the way they interact with each other and their environment. For instance she describes how some languages such as Kuuk Thaayorre spoken by indigenous people in Northern Australia, do not have concepts for relative spatial location such as left and right, but instead always use absolute directions, for instance they would not say you are in front of me, they would say you are to the north. Consequently people who natively speak this language always know where they are orientated, a characteristic not shared by people who use languages with concepts of relative location. [7]

AND COMMUNICATION IS MORE THAN LANGUAGE...

Integrational Linguistics is a branch of linguistics that was developed by oxford scholar Roy Harris during the 1980s. Harris criticises what he denotes as the "language myth" that dominates Western linguistics. Integrational Linguistics rejects several implicit assumptions in conventional linguistics, particularly the idea of communication occurring through a system of signs that have a meaning and existence separate from the context in which the communication is occurring, or that human communication occurs through a mechanistic process of mental formulation – the idea that meaning is encoded into speech

where is it transmitted to the listener who decodes it into a mental representation. Consider an example of integrated communication, if I am carrying a load of heavy boxes, and I ask you for help, you assess my difficulty and take a box from me, to which I respond 'thanks'. We have engaged in an integrated act of communication involving spoken word, gesture and physical action. For the Integrationist, communication is always a collaborative creative act steeped in the context of the participants, it relies as much on physical acts or responses as it does on verbal or signs. [8]

Cyborgs: thinking through objects

Embodied cognition is the theory that a body is essential for thought, that physicality, sensation and emotion are essential components of mind. Philosopher Andy Clark takes this a step further with the theory of the Extended Mind. In the extended mind hypothesis the mind can extend beyond the brain and body into the external environment through objects such as notebooks as part of the cognitive process. In the original paper Clark and Chalmers argued that if a person, Otto, has Alzheimer's disease and routinely relies on a notebook to act as his memory, the notebook is not merely an instrument, but under Clark's parity principle is cognitively equivalent to a normally functioning memory. As Otto's cognition extends to his notebook, it is effectively his memory. Clark contends that humans are naturally cyborgs, creatures who routinely cognitively co-opt artefacts. [9] Interviewed on Australian radio Clark relates a story about how once when he lost his laptop it was the cyborg equivalent of having a stroke, which left him shaken, dazed and confused, its impact was worse than when he had an actual mild stroke several years later. Most people who have lost a laptop and through it engage with the world of ideas will relate to Clark's anecdote.

After pondering the idea of the dynamic and creative process of communication that Integrational Linguistics describes, which relies little on the transmission of coded signals but upon body, environment, history and context to develop understanding, or the way that the Extended Mind hypothesis argues that we use the environment around us, it is hard to continue to think of artworks as static objects, but as dynamic cognitive systems which draw us into a dialogue of analogy and sensation, or as Barbara Stafford describes them, "echo objects." [10]

Software art is interesting philosophically and cognitively not just because of its potential 'newness', but because it sits at such a distinct interface between formal logic and fuzzy expression.

Conclusions

When we engage in programming, although we use terms like 'language' and 'writing' we are not engaged in discourse with or through the computer, but are engaging in an act of cognition. This extended cognitive state involves a variety of different modes as the software develops through; inspiration, discovery and exploration, experimentation, play, construction, reflection, analysis and intuitive modelling. When engaging in a creative process through crafting software, it is not enough to just string a sequence of function calls together, or to solve a complex technical problem, or to demonstrate the capabilities of an algorithm. It is the engagement with the full spectrum of cognitive modes that leads to a resolved creative outcome.

Many of these cognitive modes are common to all forms of art practice, some like the one I have labelled discovery and exploration are more specific to software art. To move a project beyond its initial

inspiration may require lengthy exploration to find a way to proceed or a form to follow. Intuitive modelling or tweaking is unique to technical processes, as a program is developed there are often a large number of arbitrary variables that control behaviour and other qualities. Mathematicians refer to this as a parametric phase space, the multidimensional space describing the range of possible behaviours the program has. A key (and often very time consuming) aspect of the development of the program as an artwork is exploring and experimenting with different values and combinations of parameters. It is through this play that an intuitive sense of the shape and form of this phase space develops which leads to the final selection of values and consequent behaviours.

As an artist-programmer I advocate adopting hybrid approaches mixing languages with high levels of abstraction with low level high performance code based on the type of cognitive engagement being undertaken. I am not trying to engineer an application or create aesthetic code. I am struggling to enact a process of communication with the viewer.

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SUSTAINABLE PRESERVATION PRACTICES AND THE RHIZOME ARTBASE

Nick Hasty

Founded in 1999, the Rhizome ArtBase is an online archive of new media art containing around 2508 art works, and growing. The ArtBase encompasses a vast range of projects by artists from all over the world that employ materials such as software, codes, websites, moving images, games and browsers to aesthetics and critical ends. The paper documents the past, present and future preservation practices of the Rhizome ArtBase.

As laid out in our mission statement, Rhizome supports "artists working at the furthest reaches of technological experimentation." A major part of this mission is the preservation of works of art, through our online archive, the ArtBase. There are two fundamental threats to this preservation: diffusivity, and digital obsolescence. We will explore these risks respective to works by artists JODI and Golan Levin, as a basis for approaching solutions that may mitigate these risks.

INHERENT VICE & ARCHIVAL MATERIALS

Diffusivity is a term that refers to works whose content is not contained within one digital object. In some instances this can refer to works that reference external databases, or dynamic and real-time data sources but also refers to works that exist primarily as a series of actions over a variety of locations and platforms. [1] These works present a structural complexity that creates new problems for the archive. An early example of a static, non-diffuse work is Olia Lialina's My Boyfriend Came Home from the War (1996). The piece consists entirely of HTML documents and GIF images contained in directory that could be easily duplicated and stored in the ArtBase. A work that is diffuse presents a structure that is diametrically opposed to objectification and ownership. Globalmove.us, by seminal net.art duo JODI, is a glitch website that implements HTML, Javascript, and the Google Maps API. Through the combination of the API and home-brew Javascript, the artists have created a website that negates user interaction, and creates frenetic, drawings using Google Maps interface elements. Here, the functionality of the art object entirely hinges on an external element - the Maps API. Sooner or later, JODI's Javascript will be rendered ineffective as a result of further development of the Google Maps API. What steps might be taken in order to mitigate this?

The primary mission of the archive is to stabilize the unstable/external element (the Google Maps API). Here, a need emerges for institutions such as Rhizome to collaborate with private sector institutions such as Google. It is simply a reality that corporations and other third parties create and control much of the materials that are used by the artists we support. While it would be unthinkable for Rhizome to host an archived instance of the entirety of Google Maps, a truncated version including the functions and data called by JODI's piece could be created. With this action taken, the API is no longer an external element and it's fixity is ensured.

Next, we will explore the inherent vice of digital obsolescence as illustrated by Floccus by Golan Levin. Digital Obsolescence is perhaps the most pervasive threat to digital works. New media at its very core is built, and manifested with tools and technology that are interdependent – no element of software is autonomous. There is no artist or programmer who is not dependent on (or limited by) infrastructure built by other programmers. An artist who writes software, relies on running within a specific

(or at least a finite range of) operating system(s), and therefore on specific hardware. A recent case of obsolescence was illustrated by Golan Levin's *Floccus*. This piece created in 1999, has to date witnessed two generations of obsolescence. Levin originally created the piece using the C++ programming language and OpenGL (Open Graphics Library). It was then compiled as a java applet capable of running either as a "stand alone" piece of software, or as an element embedded in a web page. In the intervening seven years after its creation in 1999, computer systems evolved and support for the applet began to disappear. In 2006, the artist found that the applet began to fail, and would no longer run on many contemporary systems. Levin remedied this by recreating the piece using Processing (a tool that emerged after the works first iteration). This process also rendered an applet, which Levin embedded on a page of his website.

Floccus was once more rendered obsolete; until recently the web-based applet would not run, and visitors to Levin's site or the ArtBase would be presented with only a blank white box and error message. After investigating the issue, Levin found the problem to be that the applet was compiled to run on now obsolete 32 bit systems. Today, 64 bit systems are the predominant norm, and prior to it's repair, the applet was likely unusable for the majority of visitors to his website. This particular case is a perfect example of the recurrent nature of obsolescence; once an obsolete art object is restored, it is only a matter of time before the solution is rendered obsolete. The most evident repercussion is the work of art no longer exists from the viewer's perspective. Without action, obsolescence creates an air of mythology – an inaccessible history. Levin's Floccus presents material gathering needs specific to compiled software. Unlike a web page's uncompiled markup language, readable by both machines and humans, once compiled source code forms a stand-alone applet or other form of software, accurate human analysis of the work is made impossible. Compiled applications do not allow for the ability to understand the artist's programming logic, structure, and style. In a restoration scenario, this information is integral. In the case of Floccus, there are five primary entities that must be gathered to form the archival package: the Processing source code, a font file that is used in the piece, the compiled Java applet, the compiled P3D Processing Applet, the original 1999 C++ source code, and the compiled software of the C++ version. With the description of the work, the images of its documentation, and analysis of the various formats of source code, there is ample information to inform accurate reinterpretation in a restoration scenario.

STRATEGIES AND METHODS OF RESTORATION

Beyond gathering of archival materials for the stabilization of works, there are three commonly acknowledged forms of restoration: emulation, migration, and reinterpretation. This section will explore these established methods within the context of the previously discussed works. Through this theoretical exploration, and the findings of the Variable Media Network's case studies, an analysis of how relevant these methods are to the ArtBase will be provided.

Emulation is the simulation of the architecture and behaviors of an old computer system, within a contemporary system. [2] For instance, if an art object will no longer run on contemporary operating systems, a piece of software may be written that emulates the environment of the work's original operating system. This strategy is efficient insofar that the emulation of one operating system creates a solution for accessing all works that originally ran on that system. Still, it is only a temporary solution – with time the emulator itself will become obsolete and unusable on contemporary computer systems. While case studies have shown that emulation is effective at producing an aesthetically authentic iteration of art objects, these studies have also shown that it is fact quite a in-depth process best suited for circumstances that justify a high level of investment in a short-term solution. [3]

Thus it follows that the prerequisite for restoration efforts is not simply for a work to function outside of its original format, but to a broad base of rapidly evolving web browsers and operating systems. Deprecation and obsolescence is a necessary evil for an evolving Internet. Yet, software efficiency and the politics of emergent web standards is a concern secondary to our goal of having the ability to properly support a chronological legacy of internet based culture and creativity. This establishes the need for a "museum quality browser" – one that runs on contemporary infrastructures and provides legacy support for archaic protocols and markup of the early days of Internet art. Rather than adopting a policy of deprecation, such a browser would be built on a development philosophy that is additive, providing native support for emergent standards and preserving support for the old. Building upon open-source frameworks such as WebKit, or Gecko would be ideal as they come from a rich discourse and community of developers. This model is flawed however, in the sense that it would require the user to download and install an entirely new browser. As nearly all commonly used web browsers (i.e. Google's Chrome, Apple's Safari, Mozilla's Firefox) are built upon the aforementioned open source frameworks, it would be ideal to initiate collaborations with these parties, so as to aid in the development of more preservation-friendly development practices. The realization of this model as a browser extension or feature native to these browsers would be a more sustainable model, as it asks less of the visitor, while theoretically offering the same result. While emulation is a term not often used when speaking of web content, that is essentially what the model proposes – an environment that will provide support and access to art objects that are otherwise inaccessible on contemporary systems. However, while previously it was posited that emulation was not a viable solution for the ArtBase, this model is feasible and sustainable, as it is provide a singular solution for the majority of the collection.

Migration is the practice of converting digital objects from obsolete formats, to contemporary formats. For example, if the .JPG image format was in the beginning stages of deprecation, works in the ArtBase that employed use of this image format would be identified, and their .JPG assets would be converted to a more stable format. While migration does present a viable solution for the management of digital assets, it assumes a high level of access and interoperability. For example, migrating a format such as .JPG is viable only because it is a format that is interoperable with many different forms of image editing tools. Lossless migration from .JPG to a new standard does not require access to any sort of source code, so long as there are tools that can interpret it. This approach becomes more challenging when considering the whole of the ArtBase, as many works include less interoperable proprietary compiled formats, such as Shockwave Flash files (.SWF), and require access to specific editing software (Adobe Flash) and original source files (.FLA, Actionscript) in order to approach migration. While migration is a fundamental component of preservation, within the context of the ArtBase, it will over the long-term be best suited for application to simple digital objects such as images, sound, and video.

Where migration offers a simple process of continual upgrade, works whose primary form is a compiled piece of software, such as Levin's Flocuss, require a more involved process – referred to as reinterpretation. [4] When a piece of software no longer runs on contemporary infrastructures, one cannot simply convert it. Reinterpretation calls for delving into the uncompiled source of the software, and repairing whatever is the root cause of its obsolescence. In some cases this may be as simple as altering the format of the compiled software, while in others it may call for a fundamental re-write of the software's source code. In such cases, this is only made possible by having access to the software in its uncompiled format. In the most drastic of situations, documentation of the functional work, along with analysis of the work's source can offer a path to creating a faithful reinterpretation. The sense in which emulation is not feasible for the ArtBase is applicable here – the thought of distributing emulators for visitors to the ArtBase to download in order to run the various software based works asks much effort on the users part.

MONITORING A GROWING COLLECTION

With a rapidly growing collection currently containing over 2,500 works, each consisting of complex digital objects, an automated system for monitoring obsolescence is crucial. Although the ArtBase recently adopted a new collection policy that accepts only archival objects, it continues to suffer from the past acceptance of "linked objects." These works exist solely as records, which link to the actual digital art object hosted by the artist, or third party such as a museum. In such cases, Rhizome has no control of the sustained access to these works; they exist in the ArtBase solely as catalog entries. If the artist removes the work from their server, stops paying for web hosting, or modifies the URL, access to the work from it's ArtBase record is eliminated. Efforts are underway to transition these works to full archival records hosted by Rhizome. Fortunately, verifying a URL can be fully automated, yet monitoring anything more complex than a dead URL requires a more nuanced approach. Rhizome is currently researching the implementation of a tool (such as the UK National Archive's DROID and PRONOM) that will allow for reports to be automatically generated on the digital object representation formats present in a work, which will in turn allow for the identification of works which implement an obsolescent format. The problem remains however that issues of browser support and obsolescence most often do not manifest themselves in a discrete manner that can be identified through automation; there is no way to write an algorithm that asks to search for anything that "doesn't look right". In the context of the ArtBase, the most effective means of identifying these complex problems is a human one. Providing users of the ArtBase with a simple and helpful means to report problems with an art object offers an effective means for identifying dysfunctional works. Once a user has reported a work as being in some state of dysfunction, it can be investigated for the root of the issue.

FUTURE INITIATIVES

A major wealth of material not collected by the ArtBase is the ephemera produced by the artist. Whereas the artist working with physical materials produces ephemera such as sketches, plans, notes, unfinished works, and studies, these materials are typically not collected until after an artist passes, or late in their career. For the artist working in an entirely digital environment, what is the likelihood of these peripheral documents surviving? During the life of one artist, many computers will come under their command, and while their finished works may persist in archives, what is to come of the ephemera contained on the studio environment of their hard drive? By definition, ephemera fall outside of the scope of most collecting institution's immediate interests. It simply constitutes far too much material when considering the sheer quantity and the inability to predict what will be worthwhile. It is undeniable that some day this material will be valued. A unique example where this was executed successfully (through a combination of good fortune, and expert digital forensics) is the Rushdie archive at Emory University's Manuscript and Rare Books Library (MARBL). Here they preserved and emulated the personal computer of author Salman Rushdie. While Rushdie was not a digital artist per se, the computer was in fact his studio environment. MARBL preserved the ability to observe Rushdie's digital manuscripts, drafts, notes, sketches, and correspondence. This is a teachable moment in the value of digital ephemera. What provisions can be made to ensure that future generations will have access to not only preserved art objects from our time, but the ephemera produced by these artists? It is in the best interest of stakeholders to strive for developing tools for the artist that will allow for some form of self-preservation, as well as integrating these materials into the scope of interest.

A DEMAND FOR COLLABORATION

For Rhizome and other collecting institutions and repositories, the path forward is clear: interdisciplinary collaboration. Institutional and disciplinary boundaries often keep innovation and progress within their respective silos of knowledge. Within the field of technology there are powerful stakeholders far outside of the art world and museum community, who have made advances and built tools incredibly useful to collecting institutions such as the ArtBase. It is vital to expand collaboration and communication, and for institutions such as Rhizome to seek consultation from such fields. The model of collaboration forged by the Variable Media Initiative is a scalable one. The VMI was intentionally composed of diverse institutions at the top of their respective domains, be it Internet art, performance art, or collections of variable new media. Each institution offered their field specific knowledge, resources, tools, innovation, and research. This aggregation of wisdom is necessary on a broader scale, spanning public and private sector communities of computer science, digital forensics, software development, open source communities, information scientists, archivists and museums. In 2002, Richard Rinehart concluded his paper "Preserving the Rhizome ArtBase" with the following statement, "Rhizome will make a unique, significant and feasible contribution to digital preservation efforts by proposing and testing solutions for metadata and policy as outlined above." In a moment that sees the ArtBase transitioning to a truly standards based archive, this statement remains to be true. Rhizome continues to devote itself to the sustained preservation and universal access to the cultural history reflected by the intersection of art and technology.

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ZEUGMA

ANNA HATZIYIANNAKI

«Zeugma» is the title of the New Media and Mixed Media Art Project, inspired from the Hellenistic twin city Zeugma, now covered by the river of Euphrates. So, six Greek young Artists, traveled to Istanbul, also a twin city built on the two banks of Bosporus to experience a cultural zeugma, in such a way, that to implement it in contemporary artworks.

Introduction

Zeugma was an important Hellenistic city on the opposing banks of Euphrates, in the area of the contemporary South - Eastern Turkey, comprised of the twin cities Seleukia and Apamea.

In 2004, six young Greek Artists, being aware of the Zeugma project, traveled to Istanbul to live in situ the experience of a "zeugma", in such a way as to allow them to implement the knowledge in contemporary artworks. In the Greek language, "zeugma" means "link". The term, or word, can be applied to any place where dissimilar elements meet, co-exist and are bridged together in harmony.

They were searching in modern Istanbul for a "zeugma" of Ancient and Modern times, for an intercultural node of East and West. Though the idea to transform the concept of "zeugma" in contemporary artworks was started from the twin Hellenistic city, the workshop finally took place in Istanbul which is also a twin city built on two sides of the Bosporus.
Istanbul was the apple of Eris among many claimants in the old times, but also the cultural meeting point of ethnicities that were living around the no-border areas of East-Roman, Byzantine and Ottoman Empires. It remains a hub for Balkan – Mediterranean and Eastern areas, a kind of a timeless Cultural Capital. The goal of the Greek artists was to bridge through their artworks concepts like: "Diversities", "Past and Modern Times", "Local Culture and Intercultural Digital World".

Brief Analysis of the Project

Key Notions: The artworks that emerged from that journey - workshop, carry the following key notions: "Twin Elements", "Vis–a-vis in a Mutual Axis", "Contra Position", "Nodal Point", "Joint", "Sacred and Profane in a Dialogue", "Intercultural", "Inter Religion".

ART "GLOSSARIES":

They have investigated art "glossaries" to conclude that they may be links among all kinds of cultural diversities.

MEDIA:

They used mixed techniques and media. Techniques like constructions and installations out of Metal, Electric Light and Plexiglas. Media like, Video Installations, Interactive Multimedia Installations, Video Performance and readymade.

THE AESTHETIC IDEA:

Avoid to undermine the autonomy of diversities, but rather link them, building a horizontal network without any hierarchy, like a kind of cultural rhizome. Is this perhaps the bet of the 21st century?

The Artworks

"PRAYER"

By Constantine Tiligadis, Multimedia Interactive Installation, 2006.
Jesus and Allah meet each other harmoniously, into the interactive work "Prayer" of Constantine Tiligadis. It is a Π shaped installation. In its central side, a digital picture is projected displaying two hands in prayer. An audible environment is activated by the visitor's presence. It is either a Byzantine or a Muslim prayer, depending on where the visitor stands, while it is possible to hear a symphony combining both prayers. Tiligadis ponders on the everlasting subject of Truth. In Istanbul, which is full of temples and mosques, he focalizes on the meaning of the word "faith", the backbone of every religion according to Emmanuel Kant.

"THE MEMORY OF POLIS"

By Andreas Sitorego, 3D Animation, 2006.
The geographical and urban structure of Istanbul, as seen from Galatas' bridge, inspired Andreas Sitorego the idea for the digital work "The memory of Polis". Using a 3D animation technique, he presents three interlocking bones moving very slowly around their common joint, and allowing through their transparent material on their imaginary axis of abutment to slowly emerge a faint kaleidoscope effect. A note of the artist in Istanbul states:

Spirit and matter have been kneaded by the experienced hands of time, offering unsparingly to the next generation the magical remnants of the faiths gone by, etched into the material.

"BORDER"

By Andreas Sitorego, Video Art, 2006.
The artist sets a double projection (on the floor and on the ceiling on the same vertical axis) of a nautical cork that floats on the surface of the water. The viewer becomes a bridge between the elements of air and water, elements that he perceives from two opposing sides. The viewer stands in the middle of the two worlds the aquatic and the ethereal. While on the ceiling, the image of the cork in the water is like someone is watching it from underwater. The other projection, on the floor, shows the cork as it floats on the surface of the sea.

"FEEDBACK"

By Ioanna Myrka, In situ installation, readymade, electric light.
It is an in situ installation, made of used empty carton boxes and electric light. It is the disposable pack-aging of Today's Consumer Society with standard decals for evaluation and information about the content, identity, distinctiveness and evaluation. For Ioanna, this is

the leftover traces of a civilization that we throw away and in which the air is now stored in those cart boxes. It is garbage, collage and pieces of Time, the image of Polis from afar, a puzzle that is somehow dirty, somehow arbitrary, anarchic and random.

"SPHINX"

By Yannis Melanitis, Video Art, 2006.
The lens focuses on the face of a woman which is stone like. She portrays the new Sphinx. The theme derives from the ancient Greek Sphinx, a hybrid of a triple nature – with the head of a woman, the body of a lion, and the wings of an eagle, a treacherous and merciless creature. Those who were unable to answer the riddle of this mythical creature were killed and eaten by her. The contemporary Sphinx, while talking to herself, places a new riddle:

My definition of Man is not a riddle.... every word I say comes out of my despair about language... Language is my greatest problem.

"THE HOLY LIQUID"

By Andreas Lyberatos, Installation of 2 sculptures, 1 painting, electric light and readymade objects, 2006. These three works have been fitted in such a way as to create the impression of a sacred place. The central composition is the figure of a human head that insinuates its shape and receive a kind of Holy Communion from the electric light. The other two wall-mounted works are facing each other. One is sculptured while the other is a painted composition which consist of variants of the central figure. The human head opens into two profiles looking at each other while they are connected with thin tubes, representing aquifers that end between the faces in a composition of transparent water glasses. The correlation between the human body and the holy place arises from artist's state:

The body as a building, the face as a whole city, the whole body-city, shaped as a church, fallen on its knees, praying. The shape of the cross on my face.

"VIDEO PERFORMANCE"

By Helena Poca, White dress with hook mechanisms, everyday objects and video projection.

Conclusion

 The first presentation of the artworks that emerged from the journey – workshop in Istanbul in 2004 with the collaboration of the Centre for Contemporary Art of Rethymnon, took place in 2006 with a

group exhibition at the archaeological site of artillery tower at Rethymnon, Crete. The project remains open with the same or an enriched form at other cultural zeugmas.

We can say that this project applies not only to the lost Hellenistic city and to contemporary Istanbul, but also to all Mediterranean areas because this exceptional Sea is a kind of liquid zeugma among Asia, Africa and Europe.

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A PAINTERLY APPROACH TO 3D COMPUTER GRAPHICS

ANTHONY HEAD

This paper is a review and exploration of the work over the last ten years of Light Years Projects, a collaboration between Jeremy Gardiner and myself. It covers in particular how I have explored the notion of a painterly approach to real-time 3D computer graphics. It deals with the tensions, temptations and opportunities that lie in the area where landscape painting crosses with technology, concluding with some of the lessons I have learnt.
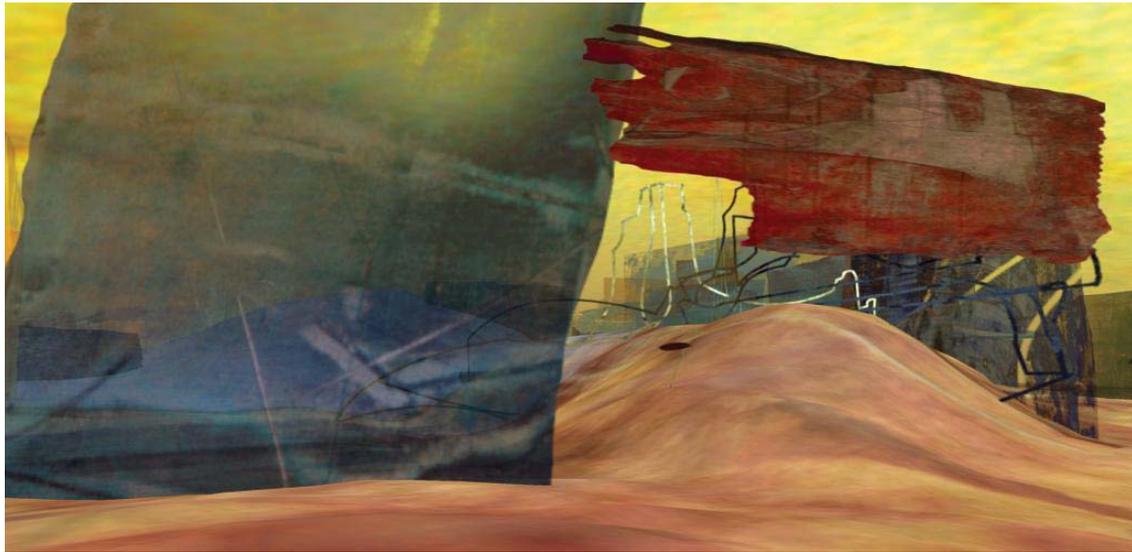
Fig 1. Purbeck Light Years. Still image from digital artwork. Copyright Light Years Projects (2002).
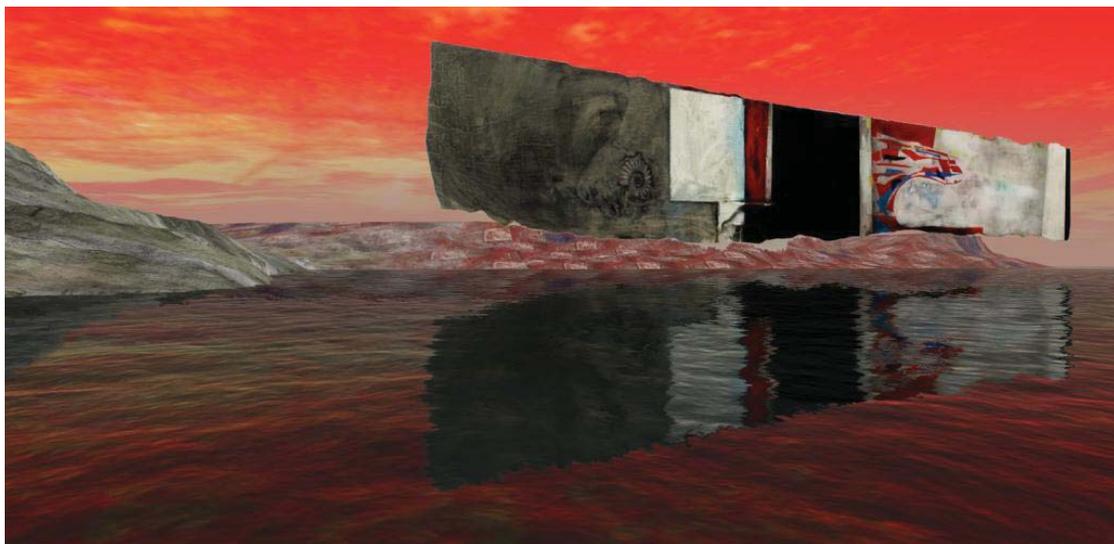
Fig 2. Light Years: Coast. Still image from digital artwork. Copyright Light Years Projects (2010).
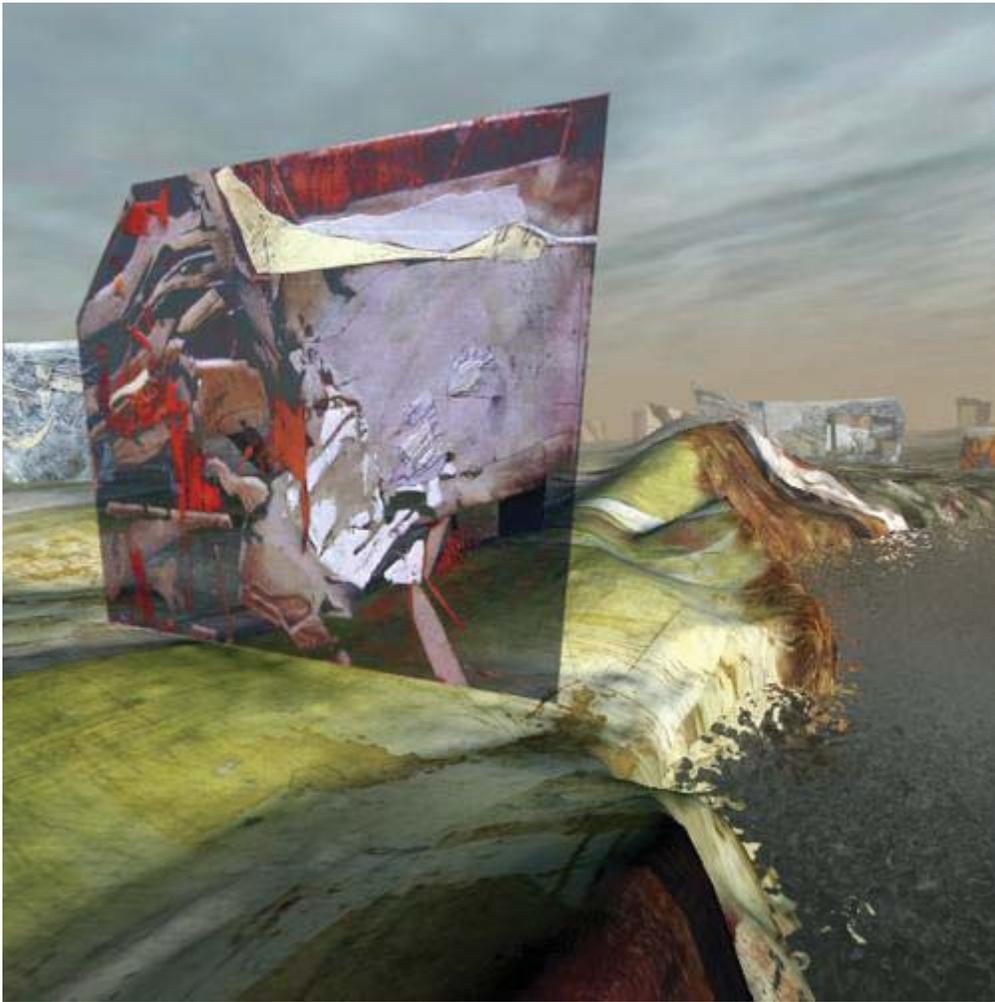
Fig 3. Jurassic Light Years. Still image from digital artwork. Copyright Light Years Projects (2009).

INTRODUCTION

For the last 10 years I have worked in the field of digital landscape painting with Jeremy Gardiner, forming the partnership Light Years Projects (www.lightyearprojects.org). Our work starts with the landscape paintings created by Gardiner, and evolves into virtual digital landscapes, through the addition of my programming. During this time we have explored new techniques alongside the development of technology relating to 3D computer graphics but we have taken care to maintain a painterly approach to our work. The opportunities and limitations provided by technology can sometime lead to tensions and influence decisions that we, as artists make, but that is not always a bad thing. This paper explores our projects in terms of a painterly approach and the role of technology in our work.

A PAINTERLY APPROACH

The term painterly generally has two meanings. The first is related to 'having the quality of expertly brushed workmanship.' [1] The second meaning comes from the German word term *malerisch* and relates to the use of juxtaposition of colour and tone, as opposed to the use of line, to create form. Wöfflin in *Principles of Art History*, pointed out that "the outlines and forms of some paintings, such as Rembrandt, are indistinct, and as such the viewer's eye wanders freely over the painting, giving a sense of movement. [2] In a painterly painting, brush strokes may not represent a life-like reproduction, but a deliberate choice by the artist, where they have consideration of shape, colour, texture, light and expression are all used are used to provide more than a photographic-like result. The term equally applies to modernist landscape artists such as Paul Nash, whose work overtly interprets the landscape through the eyes, mind and hand of the artist.

The paintings of Jeremy Gardiner reside in the painterly and modernist approach. [3] The abstraction of landscape, through shapes, lines and colour represent many perspectives of the landscape and also seasons, times, and eras. The physical approach to creating the paintings includes impasto, cutting, sanding, painting, rubbing and scoring. These combine to form the experience of the painting, not just as a flat picture, but also as a three-dimensional object.

The opposite of a painterly approach is a linear approach, attributed by Wöfflin to the paintings of Botticelli and Vermeer, paintings where the outlines of objects and people are clearly defined, brush strokes smoothed and (in the case of Vermeer) an attempt to create a realistic-looking image.

So why did we choose the medium of 3D computer graphics that has, for the last 20-30 years, been taking a decidedly linear approach to image making, from pre-rendered animations to real-time computer game graphics? The answer is partly because of the challenge, but particularly because of the opportunity to explore this medium in a different way. We wanted to adopt a painterly approach to 3D computer graphics and to try to avoid the goal of realism.

NON-PHOTOREALISTIC RENDERING

The strand of computer graphics known as non-photorealistic rendering has been achieving a *painterly effect*, a simulation of paint-strokes applied a 3D graphics or video scene, for over a decade ([4][5][6][7] for example). However, this is not what I would describe as being a painterly approach. Computer graphic techniques are becoming more sophisticated in being able to analyse scenes and simulate the application of brush strokes to them. But it is apparent that the emphasis found in the literature is mainly on the technical achievement, and underestimates the intention of any artist in taking a painterly approach. Hays and Essa, in their 2004 paper wrote "a need for non-photorealistic rendering and animation is obvious to anyone who has marveled at artistic works where complex scenes and objects are rendered using pen and brush strokes, using lines, colors, and etches." [4] In 2008, Bhattacharjee and Narayana wrote "The intentions of an artist come out as the aesthetics and expressiveness of the painting. The accurate rendering done by computers fails to provide images with a such a feeling … Painterly rendering … can bring artistic abstraction to the rendering and thus mix the computer generated scenes with the hand drawn elements." [7] These descriptions, and others, seem to simplify the artistic or painterly approach as being something that is reproducible via algorithmic methods. I would argue that this is not the case. A simplified artistic effect is achievable through these methods, but this is not the same as each stroke being deliberately made as part of the creative process, and each part of the composition being considered (sometimes sub-consciously).

I'm not saying that algorithms can't be used intentionally by an artist, in Algorithmic Art, screen, print and plotter based computer art, artists set up the rules that create the subject and content of the picture. But the above papers, take away the role of the artist in the creation of 'painterly' images, in much the same way as I wouldn't claim to have created a watercolour painting by applying the watercolour filter in Adobe PhotoShop.

LIGHT YEARS PROJECTS PROCESS

In the work of Light Years Project's we have a two-stage process. The first stage is the creation of drawing and paintings by Jeremy Gardiner. Because of this, I have not felt the need or desire to simulate brush strokes in the 3D graphics stage, and instead use scans from the paintings mixed with 3D graphical components and events for the second stage. The intention has been to show the actual paint strokes and textures within the finished digital work, and create an infinitely varied painting and an experience.

We started creating our initial project *Purbeck Light Years*, in 2001. We layered cutouts of scanned paintings within a 3D landscape mesh that had been created from satellite data. The terrain itself was of limited resolution and hence all small features were smoothed out, only the hills showed, including the hill of the focal subject, Corfe Castle. Technology forced our hand on the detail shown on the landscape, but the result was agreeable to us. Gardiner's hand drawn representations of the castle, formed overlapping outlines as the viewer roamed across the landscape. We made deliberate decisions about the positioning and texturing of the line drawings. By observing the results of the interplay of the line planes, we decided upon the outcome that we wanted.

Each of the cutouts from paintings had varying transparency. These planes encircled the line drawn Castle focal point and as the viewer moved, the planes overlapped each other. This enabled the image to be viewed in two ways simultaneously; as the illusion of three dimensions, but also, as a two-dimensional dissected image of shape and colour. We selected a number of planes and positioned them randomly around the castle. We did this partly to convert our aesthetics to a rule based composition and also to enable the piece to be co-creative with the audience (as well as being a co-creative partnership between us, as the artists). [8] The audience was able to interact with the piece to create the compositions that satisfy them aesthetically.

Another aspect of our painterly approach to the project was in capturing the visual essence of being in the location. In Gardiner's paintings, colour and light are used to portray the atmospheric changes brought on by the seasons. These variations appeared in the interactive work; the sky and ground was covered in changing textures that subtly evoke different seasons and weather conditions. The light and colour in the virtual work changed, hinting at day and night. The mist would come in and the sound of rain heard. Other natural sounds (e.g. birdsong, wind, crickets) were also audible, some specifically located in the landscape (co-creative audio composition) and other sounds that occurred at programmed intervals. So in *Purbeck Light Years* we applied a painterly approach to audio media as well as visual media, in terms of composition, blurring one sound into another.

LIMITATIONS OF TECHNOLOGY

Our view when working on this project was to use a painterly approach to many aspects of composition across this virtual landscape. However, there was one aspect of painterliness that we were not able to

portray, due to the limitations of the platform, Macromedia Director, that I used to program the project in, which didn't allow bump mapping or shadowing. We couldn't show the physical texture that the original paint had, and thus revealing the painter's marks, clearly. But also, as we mentioned earlier, we didn't want to create an effect to achieve this either. Once this work was completed in 2002 we exhibited it over a period of five years. [9]

By 2008 technology had moved on and so had our knowledge of 3D graphics, we now chose to use a new platform, Unity Technologies' Unity3D, which allowed bump-mapping and was easier to use for our work. Graphics cards had and still are improving, enabling us to have more detail, larger textures. Processing power had increased allowing for more computational options. We started thinking about a new project where we would be able to take advantage of newer 3D graphics technologies, in hope that it would open up more possibilities in our work. We wanted to maintain our painterly approach. But likewise, we wanted to be more ambitious.

DEVELOPING A NEW PROJECT

Thus we began an eighteen month long development period for our second project. New paintings were created and new programming techniques and ideas were explored. The resulting work has had several permutations since its premiere in March 2009, Jurassic Light Years (Chelsea Art Museum, New York, USA, March 2009), Light Years: Jurassic Coast (Electronic Visualisation and the Arts Conference, London, July 2009) and Light Years: Coast (Lighthouse Centre the Arts, Poole, UK, June 2010).

In terms of ambition, we were keen to expand the scale of the project, increasing the size of the landscape that it deals with, in order to create a larger experience. Whereas *Purbeck Light Years* dealt with a mile radius around Corfe Castle, *Jurassic Light Years* dealt with four miles of coastline and *Light Years: Coast* with fifteen miles of coast. The terrain we used was more detailed, and we were now using two-metre resolution Lidar data to create the landscape, instead of lower resolution satellite data. This meant that rough forms of trees and buildings were visible and could be lit-up and shadowed. These new projects featured the added dimension of English Channel, leading to a quest to explore different ways to represent water. The idea of moving waves and reflections was attractive, as it meant that the reflections distorted the imagery above the water. I used algorithms that fairly realistically mimicked real ocean waves. These waves were connected to an Internet data feed of local weather information. The wave heights and tides were affected directly by the information fed into it, which provided an interesting direct link to the real world.

In Jurassic Light Years, I improved the rain system from what I had used in *Purbeck Light Years* by using particles to simulate rain. This gave a more dramatic representation of rain, but too many particles affected the frame rate. Keeping a high frame rate was an important factor in making the experience immersive, as a stuttering image, was uncomfortable to watch. There was considerably more landscape mesh detail as well, and bump mapping on the cutouts of paintings, which showed the texture that appears in paint strokes of the original paintings.

TENSIONS WITH TECHNOLOGY

I spent a lot of time developing these techniques, and this led to a tension. Not so much in what the technology could do, but rather in the result of what it enabled me to do.

As I have mentioned, we had taken on an increasingly ambitious project by representing an experience of a much larger area of landscape. Our painterly concept, of using overlapping planes to create a tension between the 2D and the 3D required approximately 50 planes in *Purbeck Light Years* but to achieve the same density of planes in *Jurassic Light Years*, we would have had to use thousands. Although this was technically possible, it was not artistically feasible. As a result of this issue we ended up with a much sparser landscape in *Jurassic Light Years.*

Light Years: Coast, set in an even larger area of land, had planes that rarely intersected each other, but showed larger sections of paintings, roughly aligning with their viewpoint in the landscape. This meant that the work was part interpreted simulation and part painterly experience. The viewer took a virtual boat ride along the coast, but the visual features were elements of paint suggesting the geology of the land.

Another point about these newer projects is to do with interactivity. They are deliberately passive, less co-creative experiences. This was a decision we made based on audience observation of *Purbeck Light Years*; that many people just stood and watched, instead of using the joystick to interact with the piece. The more passive viewing approach meant that we directed the viewer more. However, this was more akin to being on a boat journey. The co-creative element was reduced and the opportunity to question the two-dimensions versus three-dimensions happened less frequently, but I believe with more anticipation.

Overall *Light Years: Coast* has developed into a virtual landscape experience, where the weather is more clearly defined than in *Purbeck Light Years*, where there is greater contrast between calm and stormy conditions, enhancing the emotional impact.

CONCLUSION

The improving technology, and my own learning on how to harness it through programming methods such as Shader programming, have had a prominent influence on the *Light Years: Coast* work. Technology, or rather the excitement and opportunities of it, *has* affected our painterly approach, by drawing me into wanting to do something bigger (and hence better). The result was, however, different to our original project, it was more 'linear' on the whole. Technology had broadened and challenged our work and also created new possibilities.

The steep technical learning curve I went through has left me with a new knowledge, and control of the medium, that we as Light Years Projects can now apply to new work. By manipulating the language of 3D used in computer games, we can keep true to our original aims of applying a painterly approach to a virtual artwork, to a digital landscape painting. Our next landscape project does not need to be bigger, in terms of the landscape it explores, but will be more focused, and enable us to use the knowledge we have gained of the technology to apply a painterly approach to the work.

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BODY AS A WEAPON AIMED AT YOU

Marta Heberle

The body transformed to data serves as a powerful weapon of the state. It becomes a biocapital, a carrier spreading the disease at the same time entangling itself in the network of politics, medical services, information distribution, transport, databases etc. The war is being fought via biopolitical body, a gun pointed at you.

The functioning of today's state oscillates around the bodies, the population, the life itself. Life is included into the domain of politics, it is an arm of discipline and control, and it drives biopolitics. The currency of biopolitical state is bioinformation. This data is a universally traded commodity. It is of great value to the security state as it allows for the management, supervision regulation and control of population. A valid comparison can be drawn between the attitude expressed towards bioinformation in modern security state and the Marxist notion of "commodity fetish". Different types of bioinformation are extracted, gathered, accumulated and globally exchanged; from various forms of individual identification, all types of health data, health insurance, through consumer information, to the surveillance of bodies in the public space.

However, it should be pointed out that this information is of a very specific character. In the context of contemporary biopolitics, Eugene Thacker observes, that the information of which we're speaking, the main focus of modern biopolitical state is not only immaterial: "Biopolitics mediates between genetics and informatics. (…) In biopolitics (…) information is not exclusively immaterial or disembodied; information in biopolitics is precisely that which can account for the material and embodied and, furthermore, that which can produce the material, the embodied, the biological, the living - <<life itself>>. Information is the point of mediation through which biopolitics regulates genetics and informatics into a sophisticated mode of governmentality and control." [1] So, one might say, that we're dealing with a unique situation in which flesh is made data and data is made flesh. Thacker delivers examples of this duality of bioinformation: "Genome databases, biological<<libraries>> of cell lines, patient databases at hospitals and clinics, prescription databases, insurance databases, online medical services, and a host of other innovations are transforming the understanding of <<life itself>> into the understanding of informatics. (…) The pills, therapies, test results, diagnostic measures, insurance rates and foods are the material output of this informatic view. In rarer cases, cell therapies, in vitro fertilization, genetic screening, and tissue engineering are a literal instances of this biopolitical condition, in which data is made flesh." [2]

Nevertheless, despite the materiality being an intrinsic feature of bioinformation, once the data is extracted from our bodies, in most cases it becomes inorganic and extraneous. It becomes an abstract code with which we're unable to identify anymore. Our bioinformatic patterns evoke a feeling of estrangement and uncanny unease; what once was homogenous and coherent becomes fragmented, translated into numbers or organic samples and processed to the point when we cannot perceive it any other way but as an abject, which gives rise to rejection. We seem to have reached a point, of which Foucault was speaking in the context of utopian body: "Utopia is a place outside all places where I will have a body without a body." [3] It's not the case that our moist intestines have dried to bytes. Their materiality exists, but as they become incorporated in the intertwining networks of medical services, economy, politics, culture, media and third-party companies, they become owned. Whether in a material or immaterial form, they are absorbed by interlaced networks and then exchanged, circulated and

distributed. In the constant fluid flow of biological exchange, different subjects, different power vectors, appropriate the value of biological information, be they hospitals, pharmaceutical companies, security services, government agencies, independent individuals etc. In biological exchange, this networked, mobile bioinformation is both the input and the product.

Yet since it was directly stated that in the constant process of bioexchange, bioinformation becomes appropriated, fundamental questions remain to linger: Do we own our bodies at all? Do we have the right to trade them, to sell the bioinformation derived from them? Why does my body exist more in the banks, databases than it exists for me? Why has my essential data been converted into commodity and why do influential companies, pharmaceutical moguls, ruling elites, security services freely use and trade it without even bothering to ask for my consent? How is it possible that once it has been extracted from me I am unaware of what my samples are used for and unable to decide about them, although they are my very property? Perhaps we should raise these objections at the level, where biodata is being collected, before it's incorporated into the circulation of the global networks.

Consciousness of ways of gathering bioinformation is of great importance. For are we aware that our every step, every credit card transaction, every email are watched, tracked, filtered and thrown into the fluid information networks? One of the "terminals" that constantly monitors the activity of biopolitical bodies in public spaces turning it into data, are surveillance cameras. They're almost everywhere; the ruthless gaze watches the streets, workplaces, means of public transport, offices, institutions, parks etc. Unfortunately, there are little chances of avoiding their omnipresent eyes. Since they cannot be eluded, they become naturalized and grow into the city's landscape, at the same time abolishing the uneasy feeling of being watched and also, our alertness. Another restrictive branch commonly utilized by security services are biometrics. These are technologies, which allow for the recognition and identification of humans upon their measurable physical or behavioural features. As Emilio Mordini and Sonia Massari indicate: "Current biometrics include fingerprints, ultrasound fingerprinting, iris scans, hand geometry, facial recognition, ear shape, signature dynamics, voice recognition, computer keystroke dynamics, skin patterns, foot dynamics. Future biometrics (second generation biometrics) include neural wave analysis, skin luminescence, remote iris scan, advanced facial recognition, body odour, and so on (…) Also behavioral biometrics – which measure behavioral characteristics such as signature, voice, keystroke pattern and gait – is becoming increasingly important." [4] These systems are becoming commonly used, consequently every time we cross a border, undergo a routine medical check up, visit a bank, or even try to enter a public institution, our intrinsic, innate characteristics are being gathered and included in a database as well as in a global stream of interconnected networks. This biodata may serve commercial institutions, pharmaceutical companies, statistical bureau, and passport control services at the airport just to name a few. They prove useful in cases of profiling people, they may decide upon inclusion or exclusion facilitate human segregation alike eugenics, reveal weak points in human constitution thus delivering instructions where to strike to crash our bare systems or even providing formulas for creating a bioweapon capable of exterminating particular ethnical groups due to their slight DNA differences.

What has to be necessarily highlighted is that these biometrical technologies don't only gather one type of information at a time, relevant for the identification of biocitizens. To use a simple example, when a person is having his or her iris scan taken, additional data such as eye colour, the complexion, which may give some hints as to the ethnic origin, and other signs revealing for instance certain health problems are being collected. Then this data is dispersed and perhaps it doesn't serve only the purpose it was primarily destined for. Situations of this kind are spoken of in terms of "function creep". "Function creep' is the term used to describe the expansion of a process or system, where data collected for one specific purpose is subsequently used for another unintended or unauthorized purpose" [5] This feature cannot

be expelled though, as it is a result of the ways biometrical systems operate and also a characteristic of our fleshy envelopes.

What Mordini and Massari also observe is that article 7 of the EU Data Protection Directive firmly states, "No data collection can go unnoticed by the subject that is being monitored. The goal is that the individual is aware of all types of data about him/her that are collected." [6] Perhaps this could be a solution to the oppression and terror experienced in almost any dimension of life by biopolitical bodies if it wasn't for the second part of this article which abolishes binding force of the first paragraph predicating, that it is not applied in cases of 'processing of data relating to offences, criminal convictions or security measures.' [7] The law collapses into itself.

Where state reenacts the spectacle of evil, biopolitical bodies choose to accept the ever increasing strengthening of defenses, regulations, as well as terror and hysteria that accompanies them, supporting the conviction that it's all being done for their protection and safety. Roberto Esposito, in his analysis of the thought on immunization brought by Niklas Luhmann underlines, that "systems function not by rejecting conflicts, but by producing them as necessary antigens for reactivating their own antibodies." [8] The metaphor of vaccination seems exceptionally accurate when applied to the mechanisms that constitute the roots of security state. Humans intoxicate themselves with a substance which is in a relation with the disease and which may procure some of its symptoms claiming, that this treatment increases their chances to last. But is it vital that we accept and, what is even worse, rationalise this violation, constraint and terror? Are we truly condemned to this destructive constellation of power?

As I have emphasized earlier, the consciousness of mechanisms driving security, or shall we rather say terror state, is of crucial importance, and to some extent it may help to limit the participation of biobodies in the superiorly induced social hysteria. If we remain unaware of these processes, and, what's even more important, if we don't realize the position in which we are put, we become pawns in the game. What's especially important is to simply think for ourselves instead of commissioning this task to the power. Otherwise, choosing ignorance and randomly accepting the arguments delivered by the authorities, we, our biodata, will become a commodity sucked into, and traded via a global network as we perform simple routine activities of everyday life.

Slavoj Žižek suggests that "The problem is not terror as such - our task today is precisely to reinvent emancipatory terror." [9] Assuming that emancipation is the action of freeing oneself from restraint, I understand this thought as an expression of a necessity of a quest for smart ways enabling biocitizens to limit the destructive impact of security state functioning. But what exactly could these ways be in practice? Firstly I would like to underline what I have stated above, that consciousness is the key stage in directing the guns aimed at biopolitical bodies the other way. It's a weapon, and, to some extent, also a remedy. To give a simple example: in an outbreak of influenza caused by a new, not thoroughly recognized mutation of a virus, one may refuse to "protect" himself with a vaccination from a questionable source, prepared quickly by some influential pharmaceutical mogul, as an answer for the threat to the body politic, thus eluding the participation in the mass societal panic. On the other hand, there are also other, more radical and drastic possibilities of intervening in the mechanisms of security state, such as adopting its own methods, which, in this case means responding to terror with terror. However, the most common reaction - traditional attacks, be they plane kidnappings, booby-traps or assassinations of people from the pedestal of power, hardly ever prove successful and reach the goal of terrorism which is, as we know, not the military victory, but a change in sociopolitical structures. At the same time, it has to be acknowledged that such operations may easily turn against their originators. As Chomsky says:

"React with extreme violence and expect to escalate the cycle of violence, leading to still further atrocities, such as that is inciting the call for revenge." [10] Thus, it has to be remembered that, to paraphrase Jack Parsons "Terror is a two edged sword".

It's particularly for this reason that I see a great potential in utilizing bioweapons for the purpose of counterrorism, understood here as reacting to the oppressive actions undertaken by state. Although it's a common persuasion, expressed by great number of experts dealing with the subject of bioterrorism, that bioweapons are completely useless, I find it hard to agree with this perspective. Steve Kurz, in his profound study on the possibilities of bioterrorism, underestimates the effectiveness of bioweapons directly stating that "biological weapons are only what they are—useless junk." [11] However, I attribute the attitude expressed by Kurz to the fact that he focuses mainly on old, exhaustively researched viruses and bacteria and also examines bioterrorism in terms of military victory and statistics of casualties, not in the symbolic sense. In my opinion, in the conditions of easy accessibility of biodata gathered in databases (for instance open databases facilitated by academic environments or individual scientists), possibilities of intercepting information exchanged in various networks, and a great amount of know-how available at every terminal capable of connecting with the Internet, the chances of producing a new, unknown, transgenic supravirus able to decimate populations, are very high. After all, benefiting from the databases is nothing but getting our biodata back. "In the future, terrorists will be individuals or likeminded people working in very smallgroups, on the pattern of the technology-hating Unabomber, who apparently worked alone sending out parcel bombs over two decades, or the perpetrators of the 1995 bombing of the federal building in Oklahoma. An individual may possess the technical competence to steal, buy, or manufacture the weapons he or she needs for a terrorist purpose; he or she may or may not require help from one or two others in delivering these weapons to the designated target. The ideologies such individuals and mini-groups espouse are likely to be even more aberrant than those of larger groups. And terrorists working alone or in very small groups will be more difficult to detect unless they make a major mistake or are discovered by accident." [12] Taking into account the context of bioterror, I fully agree with Laquer's opinion, especially on the easy accessibility of materials needed for a terrorist attack and the possibility of operating alone, yet for me, the future is now. It is precisely now that biocitizens may produce subtle, invisible, odourless, undetectable lethal microbes. It is now that they may use their bodies as incubators for viral replication and as carriers spreading the disease at the same time. The disease may be distributed easily and at a great speed through many channels, as a matter of fact, through all places of human flow like transport network, shopping malls, public institutions, schools, workplaces etc. The infection may also occur on a global scale. The only condition is to create yet unknown, unfathomable organism precluding the attacked side from defending. The surprise itself works here as a weapon.

Another option of addressing the issue of unjust practices of security state is interpreting them through the domain of art. Artists may strike various attitudes and one of the commonly used to engage in a critical judgment is "parasitical" feeding upon found sociopolitical structures in order to subvert them and blow their foundations up from the inside. Interesting examples are delivered by Institute for Applied Autonomy in the project *iSee,* which is a web-based application enabling users to move freely around the city space avoiding the gaze of CCTV cameras, by BIOTEKNICA collective, whose interventionist art project raises the issue of commodification of live and of generating and trading organisms on demand, or the *Molecular Invasion* by Critical Art Ensemble, which takes up the form of scientific theatre of participation intended to reverse the process of genetic modification of groceries through experiments with non-toxic, widely available substances.

These are only few examples among a great number of artworks devoted to the issues of various implications of the mechanisms, which drive security state. Unfortunately, the scope of this publication is too limited to elaborate on this point. However, I would like to point to the fact that such artworks not only function in the domain of art, but also effectively intervene in the social order. They make open what was obscured, they uncover what was meant to remain secret and exclusive, thus abolishing the hierarchy present in security state, and moreover, they deliver practical methods of opposing detrimental methods. Since works as such don't confine to the aestheticization of life, rather overcome the distinction between the two dimensions and cause factual changes in the hyperrelity of security state, then, perhaps, avant-garde hasn't, as some art critics have claimed, suffered defeat, but right now is at its triumphant position.

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THE ART OF LIVING SYSTEMS

Marta Heberle

The notion of life is difficult to define, thus one, universally adopted definition simply doesn't exist. Where does life start? Is it on the level of cells, tissues, the organism? Where can we draw a line separating that what's living from the dead matter?In my paper I would like to reflect upon a group of artworks which literally utilize ephemeral cases of life.

Definition of life is blurred by its nature [1]

 The notion of life is difficult to define, thus one, universally adopted definition simply doesn't exist. However, it may be assumed that the most important characteristic of life is a constant exchange of matter and energy between living organism and its environment and the ability to replicate or reproduce. Such dim explanations, questioning the ability of creating one homogenous answer to what exactly the term "life" means, are delivered by many popular encyclopaedias as well as scientific publications. The basic feature of life mentioned by those definitions, also doesn't entirely solve this highly problematic issue. For, is it possible to speak of life in the case of cultured tissue, in the same way as we speak of a living organism from which it was extracted? Where does life start? Is it on the level of cells, tissues, the organism? Where can we draw a line separating that what's living from the dead matter? There are many different definitions of life, which perceive this compound phenomenon from different angles, which take into the account its various aspects. Among many, we can mention reductionist definition, termodynamic definition, cybernetic one, or a definition founded on the life functions of organisms. The answer to the question whether a given phenomenon can be perceived in the category of life, depends in prevailing degree on the definition we adopt, as well as on the arbitrary decision of a person reflecting on this subject. This ambiguity and indeterminacy of methods we use to research this matter are problematic and raises doubts, whereas crucial decisions often have to be made by means of precedent. Where paralogy is the best methodology available, questions still remain to linger: on what level of cell/ tissue complexity can we speak of life? What do we perceive as an entity? Can life be reduced to numbers, codes, or algorithms? Having these issues in mind, I would like to reflect upon a group of chosen art works, which literally utilize ephemeral cases of life.

For the art works into which I will take a deeper insight, I proposed a term "the art of living systems" serving as a common denominator. These artistic projects focus on particularly problematic cases of life, on the life that is liminal, ephemerical and eludes definition.

A-volve is an installation created by Christa Sommerer and Laurent Mignonneau, which enables the generation of artificial ecosystem inhabited by creatures which are forms of artificial life. Users design their 3D beings which cohabit the simulated environment, by means of defining their shape and look via a touch screen. Then their image is being projected onto a mirror placed in the bottom of a water-filled pool. The artificial habitat is ruled by the brutal principle that the strongest will survive. Artificial creatures manifest activities characteristic for those observed in the animal kingdom; they compete with each other trying to accumulate as much energy as possible. The predators kill the weaker and take over their energy. The creatures, which survive for a long time, are capable of reproduction and their offspring's carry their genetic code.

The notion of artificial life (*A-life*), was first introduced by Christopher Langton during the conference in Santa Fe in 1988. "It is the name given to a new discipline that studies "natural" life by attempting to recreate biological phenomena from scratch within computers and other "artificial" media. *A-life* complements the traditional analytic approach of traditional biology with a synthetic approach in which, rather than studying biological phenomena by taking apart living organisms to see how they work, one attempts to put together systems that behave like living organisms." [2] In this extension of the empirical foundations of biology beyond the carbon chains of earth-based organisms, artificial life can contribute to the theoretical biology by situating life as we know it in the broader context of life as it might be." [3]

The substantial value of A-volve is blurring the line, which separates the two worlds, the real, and the artificial one. It is achieved mostly through the interference of interactors into the artificial ecosystem and also through the fact of reconstructing the natural laws in artificial ecosystem. The authors suggest, that "the visitor becomes a part of the evolution system, a partner to virtual organisms, he gives and promotes «artificial life»." [4] Although the above-mentioned definition gives an answer as to what artificial life is, some doubts are raised as to its very nature. Is artificial life only a simulation of the real one? Is it a reconstruction of thoroughly investigated properties of life? Or maybe it is, in a sense, and independent creation that not only imitates certain pattern but also at some point escapes control and governs itself with its own laws? We may ask: is there in artificial life actually anything that we, in common terms understand as living? This notion itself is an antithesis. Lou Bec states, that "artificial life is only a construct that accommodates a tensorial space." [5] The words "construct" reminds us of the fact, that *a-life* is only a creation that exists upon a certain agreement. And although in the case of *A-volve* we are dealing with behaviours and processes similar to those occurring in real life, it is yet only a similarity, whereas the life lived by the creatures is only…artificial.

Carnivorous Domestic Entertainment Robots is a project, which consists of a number of works, which, being themselves artificial forms life, make use of the life of other organisms. The artwork created by James Auger, Jimmy Loizeau and Aleksandar Zivanovic, is a series of carnivorous robots, which manifest similarity to exclusive furniture or luxurious objects of everyday use. Yet, they're not as nice as they appear. In fact, by the use of microbial fuel cell, they imitate the strategies of predatory insects, reptiles and plants. Some of the dangerous devices were created upon the rule of mimicry. For instance the *Lampshade robot* is a lampshade whose form is similar to that of a carnivorous plant. Through the holes in its spherical construction, a light, which attracts insects, is being emitted. Once the insect falls onto the other side of porous surface, its unable to free itself. The treacherous ambush makes use of its death, transforming it into the energy which fuels led lamps at the bottom of the lampshade.

The functioning of carnivorous robots may be described as a recycling of life. For they use the existence of small, fragile and short-lasting creatures that would sooner or later be destroyed anyway, such as moths attracted to light. The architecture of the devices as well as the use of microbial fuel cell solve the issue of the corpses of little animals, which die unable to escape from our houses. Silent murders committed by the machines give rise to a peculiar chain of alimentary dependences in which the robots feed upon real life that becomes their driving force. In this merciless system, the biological life is literally transformed into energy, which then is used to support some simple mechanism. At the same time an important fact is being brought up; that the energy is pulsating in every living organism and that there is also a possibility of extracting it.

On one hand, we may assume, that the technology subjected in this artwork to biologization offers the subjects that are caught in the deadly trap a kind of afterlife, or the extension of life. The time of light

emission of a little led lamp, most probably exceeds the length of their existence. The death of little organisms is in a specific way productive, thus we can think of it as of a sacrifice of real life for the behalf of the artificial. However on the other hand this project places its audience, or the owners who decide to buy such utensils in an uncomfortable position, making them the viewers of a brutal show. Carnivorous, cruel *biobots* take away the right of living organisms to natural death, literally extracting the energy from them. This work raises questions as to whether such life recycling, and instrumental approach towards it, not only for utility purposes but also for entertainment is moral? Is there any justification to dispassionate observation of a transformation of life resembling the position of audience during bloody fights of the gladiators?

Another artwork focuses on a highly controversial and problematic issue - the *semi* life. It explores the issue of semi life thoroughly, which results in art projects founded upon tissue cultures. Oron Catts and Ionat Zurr, artists cooperating with the centre for research as a *Tissue Culture & Art Project* (*TC&A*), proposed a series of artworks under the name *Victimless Utopia.* In my paper I would like to focus on one of them, entitled *Disembodied Cuisine*.

The authors decided to deal with the hypocrisy surrounding the discourse of ethical food, which allegedly causes no victims. For this purpose the gallery space has been transformed into a laboratory. Inside it, extracted muscle cells of frogs were turned into half- living sculptures, destined for consumption purposes. The animals that were the cell donors weren't harmed in the experiment. The material collected from them via biopsy was placed onto biodegradable polymer construction and placed in a bioreactor. Then, the tissue cultures were „growing" in the conditions resembling those of the donor's body. The project culminated in a ritual feast, during which the visitors consumed the cultivated steaks, at the same time killing half-living entities.

Tissue is generally described as a collection of similar, organised cells, which perform a definite function, whereas tissue culture is a technique, which consists in isolating little fragments of tissue from the body and cultivating it in a dish containing appropriate nutritious substances. While the body is unable to do without organs and tissues, they can fairly well do without it at the same time fulfilling their specific function. Catts and Zurr suggest that it is a new type of living, thus it needs a new ontology and new taxonomy of life. [6] It is then a sort of a part life, a kind of half- living entities. „When cells and tissues are removed from the context of the body and kept alive, they are also stripped of many aspects characteristic of what is assumed to be a living entity. They are kept alive and raised in a technological environment, which serves as a surrogate of the body. But in the very basic sense they represent the bare life." [7] Then what precisely are those half-living entities? How should they be perceived? What is the point at which we can speak of life? Can the level between the cell and an organism be described as life? The tissues extracted from the body are situated between that what is living and that what is devoid of life, they are new entities, liminal, ephemerical and undefined, and they completely elude both the biological and cultural classifications. The notions defining body as a whole are inadequate to speak of these phenomena. If we try to describe them in traditional terms, then we will come to a conclusion that they are neither alive nor dead.

The works I would like to turn to next, are similar to *Disembodied Cuisine* in the aim of creating a system providing incubatory conditions, which would protect life and ensure its development. Whereas in the former project the simulation of natural conditions prevailing in the organisms of donors was only one of the conditions necessary to maintain fragile entities alive, creating a biological habitat, a system in which life is possible determines the direction of artistic research of Zbigniew Oksiuta. Their final goal is, as the artist claims, the creation of „autonomous, biological, self-replicating system for one person. Such

system could be the size of a cell, a pill, a fruit a house, or even a biosphere. It could also exist in different environment: on earth, underwater and in the outer space." [8] The project on which Oksiuta was working between 2003-2007, entitled *Space Garden,* was supposed to create a see-through polymer bubble filled with air in cosmos. Inside this isolated biosphere, a garden would bloom. On Earth there are prototypes of Space Garden simulating the parameters and the evolution of this process. They are appropriately miniaturised and they use a klinostat – a tool used for the research of the force of gravity on the growth of plants. Another project, *Plasmalema,* was an attempt of creating a habitat, which would provide conditions allowing humans to live underwater. This work, as most in Oksiuta's output has a shape of a transparent bubble. It was made with the use of *Spatium Gellatum* method, which enables the creation of space structures from biological polymers : soft, permeable membranes, that at the same time protect the life inside. The space enclosed by this elastic cover was filled with *perfuoro-carbon*, a substance allowing humans to breathe underwater with liquid.

The peculiar works of Oksiuta remind independent planets on which, or maybe it should be said, inside which – a life exists. They resemble a separate world, functioning on its own rules. A world that is autonomous and closed, as if in a crystal ball. They inspire to reflect upon questions such as where else and on what scale can life exist. The artist declares that for him the most important thing is the ability of living systems to self- organize, thus he tries, on the rule of analogy, utilize this rule in his projects. Those, and other artworks of Zbigniew Okasiuta, which explore the subject of biological habitat, raise several questions regarding life, for instance: how and where can it exist? The spherical micro worlds are like small, safe rooms, incubators, which export life into inaccessible, dangerous or potentially lethal territories. Bringing the life space of organisms to a tiny sphere can be also seen in terms of looking for an answer to ever pervasive questions: on what scale can life exist, can it function as an isolated, self-sufficient sector. We should also reflect upon the question what kind of life could inhabit the miniaturised ecosystem compounded by the artist. Although the transfer of a human being into such conditions, given the account of its complexity, seems completely impossible for now, the hermetic systems can serve as a living space for autotrophic plants and also tiny organisms such as bacteria. Sometimes, the bubble space structure itself is also being described as living thing. It undergoes transformations and reacts to stimuli from the outside. Perceiving a frozen, motionless architectonical object, whose activity is not fully noticeable and clear, as living, seems like not particularly adequate and accurate. But I have no doubts that the works aiming to create a *Biological habitat* can equally well be called systems for life.

The last art project, at which I would like to look closely, focuses on displaying one aspect of human life, one of the indications of human physiology. There are some circumstances, upon which this project can be compared to the living sculptures of Oksiuta. For both *Cloaca* created by Wim Delvoye, of which I want to talk about and the works of polish artist conduct an experiment, which consists in the idea of transforming the natural scale of phenomena and exporting it outside its natural context. The project of controversial, Belgian artist is a synthetic digestive system extracted from the primary source of the body and shown in a multiple enlargement. The scandalous installation simulates one of the processes occurring in the insides of the living organism, and in a sense it refers to the famous Vaucanson mechanical duck, which was an attempt of creating an equivalent of digestive system. The contemporary *Cloaca*, synchronized with technology, simulates the activity of human digestive system with great precision. Artificial organs perform different functions. There is the oral part, the stomach, and the anus. Into the artificial organs, acids and enzymes are being introduced, enabling the digestion of food. Whereas the human organism aims to fulfil the need of supplying the nutrients to survive, the only aim of *Cloaca* is the production of excrements, the waste products of metabolism. Some specimens resemble a row of containers, while others look like washing machines connected with a net of cables and tubes. Although the machines simulate transformations occurring in the fleshy, moist human body, they do not resemble

human being at all. „ The shocking thing is that it doesn't look like a human being. The shocking thing is that it's like a wheel. The wheel isn't trying to look like your feet, but it does the same thing as all feet do. [...] It's a robot in a way, but it's not trying to look like the gastrointestinal system. It's not trying to be anthropomorphic. It doesn't try to look like a human being. It's a live thing...” [9] But do containers, tubes and filters connected into a whole imitating human digestive system in any way remind the living entity? The metal parts, despite the ability to produce substances universal for human beings, seem to be devoid of life. Yet the author of this peculiar installation arrives with an important argument: „Once the machine is installed in a museum, it is a live thing. Even when the museum is closed the machine is fed everyday, because in the organs, there is real human stomach bacteria.” [10] It is then precisely the system of different bacteria enabling the decomposition of nutrients that is alive. The regular feeding of the machine equals supporting the ephemerical life of weak strains of beneficial bacteria.

The *Cloaca,* like every living thing, is sometimes capricious when it comes to some kinds of food. In contrast to the Vaucanson duck, it not only simulates the functioning of digestive system, but it also precisely simulates digestive processes, making their final product almost impossible to distinguish from the one produced by the human organism.

The substantial issue in the context of this installation is also the biologization of technology; what in normal conditions is being performed by the moist machinery of the organism, can be equally well conducted outside the context of the body by a cold metal mechanism. The aspect of care, which is manifested in the need of feeding the *Cloaca* regularly, as well as the impossibility of turning the power supply off the reminds us of the fact that we're dealing with a living system, or rather a biological system of bacteria strains, which support the artificial system.

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THE DISTURBED DIALECTIC OF LITERARY CRITICISM

DAVIN HECKMAN

This paper discusses the relevance of database projects like the Electronic Literature Directory. It is a call for criticism that is technologically appropriate, ethically engaged, and culturally vital.

In *The Phenomenology of Spirit*, Hegel describes the dialectical process:

"The bud disappears in the bursting-forth of the blossom, and one might say the former is refuted by the latter; similarly, when the fruit appears, the blossom is shown up in its turn as a false manifestation of the plant, and the fruit now emerges as the truth of it instead. These forms are not just distinguished from one another, they also supplant one another as mutually incompatible. Yet at the same time their fluid nature makes them moments of an organic unity in which they not only do not conflict, but in which each is as necessary as the other; and this mutual necessity alone constitutes the life of the whole." [1]

Viewed from within the Hegelian process, the Real is positioned outside its present manifestations, consisting, rather, of the dynamic processes that comprise its totality.

This insight, crucial to critical practice, requires revision in light of technical change. By revision, I do not mean that we need to fundamentally alter Hegel's argument, I only mean to suggest that we see this passage with respect to new temporal modalities that have shaken up the pursuit of knowledge.

The field of Electronic Literature is characteristically engaged with this disturbance in the dialectic. A casual glance will reveal that there are many significant developments in the field that, had they happened over a longer timeline, would likely be much easier to sort out. Take, for instance, the body of works known as "Hypertext fiction," which represent the closest thing Electronic Literature has to a sustained, stable format. If we track literary hypertext along the history of Eastgate Systems, we are looking at an aspect of the field of electronic literature that dates back to the company's founding in 1982 (though Eastgate's first literary hypertext, Michael Joyce's *afternoon, a story*, was first published in 1987). If we broaden our definition to include interactive fiction and text-based computer gaming, we can push the timeline back to 1975, with the creation of *Adventure.* Beyond this, we can trace the form back to the "Hypertext Editing System" by Ted Nelson and Andries van Dam in 1968. In any case, the history of this particular literary form is a half-century old at its most generous estimation, but it really isn't until Eastgate Systems emerges as the first commercial publisher of Hypertext as Literature, that we see a committed effort to the literary exploration of a particular form, with the bulk of their offerings published in the 1990s. If we add web-based Hypertext fiction to this timeline, that would add to the overall number of works available, but it would still distribute the bulk of creative output over two decades, and would place a massive technical innovation smack in the middle of this arc. [2]

To put this in perspective, one might juxtapose this to the history of the novel which, even at its most conservative definition, spans three centuries. If we want to consider a genre, say, the Gothic: Over 70 years pass between the publication of Horace Walpole's mess of a book, *The Castle of Otranto* (1764) and Edgar Allen Poe's elegant perfection of the gothic in "The Fall of the House of Usher" (1839). Though Franco Moretti has made a convincing case for a more compressed periodization of generic eruptions,

my contention is that this cyclical activity is evidence of the grand dialectical process within which durable forms achieve their refinement, apoint which does not conflict with Moretti's model. [3] In other words, historically, the time of literature has been slow and staggered. The kind of back and forth between the creator of a work and its critical reception, followed by a modified approach, and yet more criticism, has simply been short-circuited by the rate of change.

To frame my argument within a more contemporary point of reference, Alain Badiou's notion of "the set" consists of the range of knowledge and the logical potentiality framed within its structure. A "truth" is that which exceeds the bounded structure. This point of rupture is perceived as an "event." [4] If we consider the set and its redefinition by truth as marked by an event, we can rethink what Hegel aims to describe without becoming mired in chronology or bound to fatalism.

We can imagine a horizontal vision of this dialectic, that steps beyond the sequential process of thesis, antithesis, synthesis that seems to favor the vertical progress of the historical from its zero point towards the future. In other words, I mean to ask, can the dialectic as developed by Hegel be applied to a context of simultaneity? Certainly, this seems possible if the organic unity imagined is that of the interpersonal dialog as opposed to long process of "progress." Foucault's heterotopia emerges as a particularly promising instance of a momentary instance of the dialectic in action. Here, truth is located interpersonally, held into place through the negotiations of language, in which the minute turns of the conversation shift meaning over from incomprehensibility to the furtive, contingent moments of communication. To answer my question, we can view the dialectic as a set when it reaches a point of singularity, where an event brings about a social and individual shift in consciousness. The closest we can come to simultaneity in this process is only when it functions systematically, as a set whose rules can be articulated within the defined constraints of its domain.

Ultimately, does it matter from an ontological perspective that the domain of discourse occurs within the boundaries of a long arc of historical time or an abbreviated one? Is the issue the interval within which the system processes information or is the issue the means by which systems process information? To reflect on the effects of processing speed, imagine the game of *Risk*. Played on a board with dice, it is a game that can easily last several hours. Players roll dice, argue with one another, take trips to the restroom, but the objective of the game itself is always to conquer the world. Early electronic versions of the game significantly sped up key aspects of play, most notably the rate at which combat is resolved, dead pieces are removed from play, and cards are cashed in for more pieces. Also, cheating and error are significantly more difficult in this iteration of the game. As processors speed up, these actions speed up significantly, such that an old digital version of Risk can run at speeds that exceed perception. And, with face-to-face interaction limited by the interface, table talk is further limited. Yet, the basic objective remains essentially the same: take over the world. Viewed from this perspective, the basic rules of the game of *Risk* and the objectives of play remain more or less the same, but on the computer, the five hour board game can easily be played in an hour. And, if you play against a computerized opponent, this play time can be compressed even further. Within this framework of interactions, speed itself makes no alteration to the game whatsoever, unless, of course, a key feature of the game is the relationship of the human player to the game as a discrete domain of interaction, an object consisting of many little pieces that follow many rules in pursuit of a particular end.With speed it is possible to care less about the game, to suffer the loss of the illusion of the game's relevance, to weaken the immersion, and to eventually erase its pleasure.

Thus, I argue, that to understand the meaning of any process, the projection of a hypothetical subjective externality to the system matters (In other words, subjectivity produces criticism and is produced by

it). The dialectical view is less a progression through sequentially interrelated phenomena, than it is a commitment to a critical relationship to systems regardless of their interval. Just as one can easily perceive the vast difference between distinct iterations of the same game whose rules and objectives remain the same, one can affirm that the human subject itself can always potentially exist as the site of the critical encounter, when one directs consciousness to seek the most subtle relative differentials between the representations. The dialectical process is a simplification of this basic process of consciousness, and we map it onto illustrations that are obviously sequential, but the critical capacity could easily be mapped onto more subtle sequentialities, networked causes, distributed effects, and nearly simultaneous interactivity. What is needed is not a new critical faculty, but critical tools and techniques which can effectively account for differentials that occur beyond the limits of our perception. We must acquire telephoto lenses, wide angle views, slow motion techniques, freeze frames, and other ways to comprehend fast interactions, wide sweeps of behavior, gentle modulations of thought and action.

But, at the same time as we deploy new tools and methods, we must not mistake these tools and methods for subjects themselves, for the basic goal remains the same: to know what it is that is happening when something happens. The critical faculty itself, while significantly altered in its form by the new terrain, cannot be altered in its function without ceasing to be criticism. In other words, against the backdrop of material and cultural changes (both microscopic changes to the object of criticism and macroscopic changes to the system within which objects are situated), we must begin first by imagining the very potential of the truth procedure itself, the hypothetical perception of rupture. For, though we are always first situated within a milieu which seems to define itself through the consistencies of its domain, we also know that it is this very situated character of subjectivity that desires to be otherwise and elsewhere, whether we seek to be a few inches over or a few seconds sooner or later, we have motive to move, to form, to alter, to explore. This very kindling of desire is what removes us from the present moment and places us into the slipstream of historical and speculative thinking, of memory and anticipation, is the selfsame capacity that at the more abstract level enables us to imagine sudden tectonic shifts or to witness glacial changes. Those revolutions of thought which alter the very ground rules that frame what we see begin as critical stances, as hypothetical alternate subject positions that challenge the ones that we presently occupy. Criticism must begin with a commitment to what it is: A position, enmeshed in the social web, but never simply constituted by it. To put it more bluntly, criticism might be the decision to be something more than nothing, to step out of epiphenomenal existence, to struggle against instrumentality.

While poststructuralism has rendered it difficult for subjects to imagine discrete, defined roles in discursive projects, the projection of such roles is necessary if we wish to engage in critical practices. This is not to pronounce that I am a "critic," and therefore will cease to be a "reader" or "writer." Rather, it is to say that in a time when crowd-sourced approaches, fan-based scholarship, and the general spirit of open access have revealed the critical value of readerly practices, we must then accept the notion that alterations to these practices matter. At a time when networks, technology, and participatory media trends have likewise removed the critical barriers to aesthetic expression, we must accept the notion that writing has also been fundamentally altered. Rather than permit criticism to be subsumed into expressive and interpretive practices, the task before the critic is to imagine criticism that can identify in these shifts a fundamental change in the relationship between reader and writer via text. We learn nothing beyond what we already know if we overlook the systemic relation between writer-text-reader (or producer-commodity-consumer, programmer-software-user, architect-building-occupant, teller-story-listener, or really any mediated relationship).

To truly apprehend the nature of the dialectic of reader and writer held together by the thread of the text, there must be a clearly delineated third position, that which is neither reader nor writer, though one might at times be one, both, or neither. Rather than define the critic as a special class of person, it is better to identify the critical faculty as a distinctive subject position, a way of viewing the text and how it functions socially as a nexus of interaction between readers and writers.

The problem of speed, though it upends the vertical progression of past regimes of production and reception, is not in itself a problem for criticism. There are still readers and there are still writers and they still interact through the text. The difference is that these particular subject positions are not so easily isolated, not easily localized on a particular historical individual or archival document. We don't necessarily need a stable sustained form like the novel or the Gothic to understand the significance of Electronic Literature more deeply (though such consistencies, where they are perceptible, provide excellent case studies), what we need is a critical exploration of the plane of consistency itself (in this case, it is that of technological change and social adaptation). What Derrida did for words, we must do for the interface, the platform, the logic of new media itself. But we cannot simply argue against the aura of stability associated with words, we must turn to the aura of currency, of the presumed veracity of change, of the upgrade, of the improvement, of the debugged. The promise of newness is that which we have come to trust. A rigorous discussion of this trajectory is among the most pressing critical projects facing us today: What are the poetics of innovation? How does it function grammatically? How does the poet play with this language? What are the social, ethical, philosophical implications of this presumed foundation of cultural existence. Whereas past critics may have had the time and luxury to mistake their acts of reading or writing with criticism, losing sight of the function of the text within culture, we have the luxury of living at a time when we are seeing a radical shift in the function of the text itself.The question is whether or not we will do it. Or if we will simply watch the relationships between readers and texts change without thinking critically about what these changes mean, what changes we'd prefer, what changes we'd sooner avoid. In effect, it requires a critical commitment, not to what we will conclude that the text means, but to a process of criticism that is preoccupied with care, that is "interested" in the very hope that culture might truly be determined through a disinterested process of seeking what's best for human culture, rather than being determined by the tremendous social forces that have emerged as a default consequence of ademocratic processes of free market ideology. We must, as Ars Industrialis suggest in their 2010 "Manifesto," "struggle against carelessness [*incurie*], against the destruction of attention." [5] Such literary criticism must attend to that which is not immediately understood, but which holds power in the realm of expression, which animates the text, which is written, hard to notice, but nevertheless true.

In practical terms, as it pertains to the *Electronic Literature Directory*, there are two possibilities relating to the twofold process of the ELD's editorial protocols. On one level, it is a rather mundane, but necessary, meeting place for readers, writers, and works. The entries themselves really and truly do tend towards mere readerly descriptions. [6]

The second possibility, and this is one is highly contingent, is that database projects like the *ELD* may serve as a nexus for precisely the cultivation of care and attention in service of the social as the next logical step towards a criticism that is, to quote Matthew Arnold, "sincere, simple, flexible, ardent, ever widening its knowledge." In creating a common space, a public sphere for "electronic literature" that is open to all, we might inspire and cultivate a critical practice which is aware of the changing dimensions of the text vis-à-vis the discourse that takes place on our pages. What we lack in the slow deployment of verticality, we might gain in horizontality. If we grow large enough, not simply as a matter of quantity, but large enough in the depths of our social consciousness, we might take this broad horizon of literary

discourse and, in the crucible or speed, pressure, and the needs of the moment, distill a sense of just what these changes mean for criticism.

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UNMEDIATED EXPERIENCE? RE-MEDIATING PHENOMENOLOGICAL APPROACHES

Christiane Heibach

The paper discusses the theoretical tension between the desire for unmediated experience formulated in some contemporary media philosophical approaches, and the evidence, that our experience is inherently related and maybe also formed by media. How can this tension be solved? And what are the necessary theoretical approaches for a model of perception that meets the demands of our multisensory and multimedia environment?

Processes of perception / Theories	Traditional Philosophy (Body/Mind-Dualism)	Phenomenology	Anthropology/ Sociology	Cognitive Sciences	Media Theory
Sensory perception	Neutral standardized process with limited contribution to intellectual insight *Dominance* of the visual as the most distant and therefore analytical sense	*Basis* for our relation to the world - no neutral sensory input, because those data are always already interpreted *Dominance* of the visual as paradigmatic sense	Models of sensory perception are *culturally different* and depending on processes of communication within social communities *Culturally different* hierarchies of the senses	*Biological and chemical processes* of data processing in the brain based on standardized models → topography of the brain's sensory areas *Focus* on visual perception (Semir Zeki)	Sensory input is formed by the cultural dominating media → co-evolution between media and perception (Marshall McLuhan) *Dominance* of the audio-visual
Intellectual	*Pure Insight/cognition* comes from a priori knowledge that is solely preformed in the brain (Descartes, Kant) → guarantee of *rational* and *comprehensive* realization of the world outside	Principle of *Intentionality* (Husserl, Heidegger, Merleau-Ponty) → Objects are part of us as they exist only the way they are given to our perception – no strict subject-object-division	Dominance of the observer-object-relation → *distant analytical processes of insight* (although critically reflected in models of participating observation in anthropology)	Consciousness as complex process of world construction in the brain → the constructivist power of the brain to create its own world questions the subject-object-division	*Standardized cultural techniques* (reading, writing) are developed in co-evolution with the dominant media of a culture → intellectual processes are media-driven and not supercultural
Emotional	*Excluded* from the intellectual insight → Kant puts emotions to the subjective side of the faculty of judgement, the aesthetic experience as like/dislike-reaction	The *holistic psycho-physiological model of man* (Merleau-Ponty, Schmitz) includes also emotional reactions on the perceived → *sensory perception and emotion* are bound together	Reflection of *different cultural and historical models of emotion* (e.g. Norbert Elias), social meaning of emotions (e.g. Niklas Luhmann), but: sociology relies on concepts of rationality	*Differentiation of emotion/feeling* (Antonio Damasio), the first is 'natural', instinct-driven, the latter culturally formed → *unity of mind and body*, but: no concept of sensory perception	*Media cause emotion and trigger emotion* – but: Focus on film/literature → no reflection on the *cultural formation of emotions*
(Re-)Action	Action is not part of traditional philosophical reflection – unless it is mental action → e.g. processes of decision (ethics)	*No model of action* – the concept of intentionality might be seen as a kind of proposal but resembles more the mental models of traditional philosophy	Models of action mostly concerning *rituals or standardized social action* driven by rational motives and excluding emotion and subconscious processes	Action as result of complex *neurological processes* triggered e.g. by hormones, but also by other cognitive processes → basic emotions in oscillation with rational thinking	Different concepts of action: - *interacting* with technical media - *acting within media* (e.g. strategies of self-marketing)

Table 1: Overview of different epistemological concepts from different disciplines (© by the author).
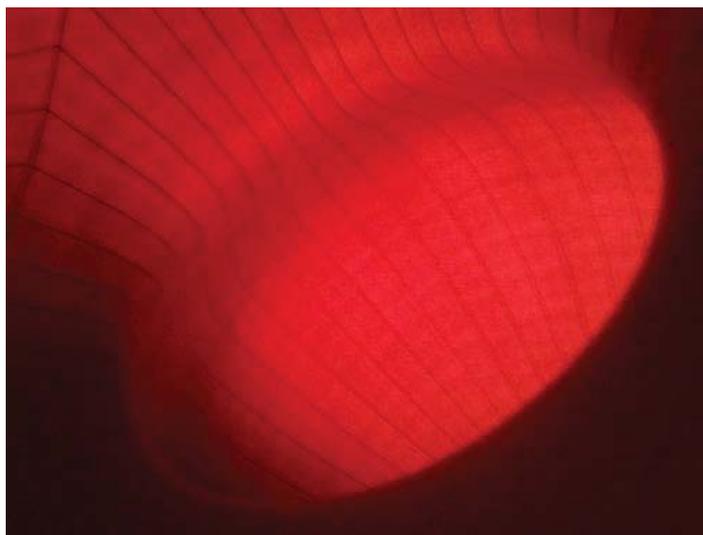
Anish Kapoor: Leviathan (2011), Interior (photo by the author)

Anish Kapoor: Leviathan (2011), Exterior (photo by the author)

During the last few years – and very obvious for example in some panels of last year's ISEA – one can observe a somehow paradox tendency: Theorists coming from the philosophy of media tend to dream of a sort of "unmediated experience" as the Canadian philosopher Brian Massumi called it, [1] and media artist and theorist Christopher Salter spoke of "felt meaning" as a form of insight which lies beyond the traditional concept of language driven consciousness. [2] Another example: Mark Hansen, author of the book "New Philosophy for New Media", [3] re-animates a concept coined by Henri Bergson in the 19th century: the bodily affection which Hansen describes as holistic psycho-physical perception mode and confronts with contemporary audio-visual media. In his explicit concentration on the perceiver Hansen neglects the anthropological dimension of technical media which Marshall McLuhan had pointed out: that human perception has always developed in co-evolution with a culture's preferred media. Furthermore, Hansen's (and the Bergsonian) concept of "bodily affection" remains rather vague, just like the other concepts of an unmediated, embodied experience: Mainly they don't distinguish between the different sensual perception modes – the body appears as a homogenious whole that is constructing its own experience of the world, and they assume that there could be a primordial experience without any preformation by nature or culture.

This longing for an unmediated experience which is based on an unspecified unity between body, mind and environment refers to phenomenological approaches in philosophy, which developed at the beginning of the 20th century: As already mentioned, Mark Hansen refers to Henri Bergson, who had significant influence on the founder of Phenomenology, Edmund Husserl, and later also on Maurice Merleau-Ponty; Brian Massumi in turn refers to 19th century psychologist and philosopher William James, who on his part influenced Husserl and Deleuze. James introduced the concept of "pure experience," [4] an experience which lies before any subject-object division and – this is the logical consequence – seems to be pre-medial; a non-mediated physico-emotional way of experiencing the world before it becomes a separate part of oneself.

Phenomenology developed during a time where daily life in European countries at the beginning of the 20th century underwent deep changes: There had been an accumulation of technical developments like the steam engine, electricity and the new media photography and film – all significantly changing our

perception modes. Phenomenological approaches like those of Edmund Husserl (1913), [5] Helmuth Plessner (1923) [6] and later Maurice Merleau-Ponty (1945) [7] opposed to the traditional epistemologies that had emphasized intellectual insight as independent from the body and equated sensory perception with visual perception. The changing epistemological environment proved the contrary – and the traditional dualistic mind-body separation seemed to come to its limits in facing the acceleration and multisensory appeal of the electrified cities and technologized perception modes.

It also might be no coincidence that the revival of phenomenological approaches is correlated with the diversification of our self-experience we currently undergo. The paradox, that theorists and practitioners who have been moving within the universe of new digital media, now call for a pre-conscious, non-intellectual, unmediated and primarily physical and emotional experience of the world, might even be a logical consequence facing a world that becomes more and more complex and where we are confronted with a multimedia environment that challenges our current models of perception and the dominance of intellectual insight.

In our every-day life we have to play multiple roles in different medial environments: communicating with friends in social networks like facebook, managing our daily real life environment, proving our intellectual capacities in our jobs, being active in our leisure time with sports, cultural events etc. All this also means managing multiple media like TV, Radio and Internet, but also diverse sensory, affective and intellectual inputs of places that are part of our daily life: be it the sensory appeal of shopping malls or wellness environments or cultural sites. The longing for an unmediated experience might be a logical reaction to this intersensory and intermedia overload. But is the current tendency to turn away from the media and praise an unspecific holistic bodily experience that ignores media theoretical acquirements really a solution for the problem that we need a more complex model of perception? I doubt this – and would like to illustrate the demands of a model that reconciles concepts of embodiment with media theory in turning to an example of a work of art:

In 2001 the Mexican artist Teresa Margolles presented her work "Vaporización" – "Vaporization" in Berlin. It seemed to be a quite simple work: The visitors entered a room which was filled with a fog-like substance. Their sight was limited, but they felt the humidity of the fog on their skin and of course inhaled it by normal breathing.

This was all – so what the visitors experienced was first of all the atmosphere of a quite dark and foggy room full of a humidity that not only enwrapped their bodies, but which also became part of their organism through the pores of their skins and through breathing in. Finally the visitors were informed that the humid fog consisted of water that was used to wash the corpses in the Mexico City morgue. Although it had been disinfected the experience of breathing water that had become part of nameless corpses and that now became part of the own body has something deeply frightening and might in most cases have caused the emotional reaction of deep disgust, and probably also the feeling of somehow being physically misused by the artist.

This becomes very obvious in a variation of the concept, a work called "In the air" from 2003 (En el Aire). I would like to quote a description I found in the World Wide Web (published under the author's name or pseudonym "Lolla Moon"):

"In the museum's soaring hall children play under bubbles that come from Teresa Margolles' piece En el Aire (In the Aire 2003). Running, laughing, catching, they are fascinated by the glistening, delicate forms that float down from the ceiling and break up on their skin. A common motif in art history, the bubble

has long been used as a memento mori, a reminder of the transitory nature of life. The children's parents, meanwhile, studiously read the captions. Suddenly, with a look of disgust, they come and steer their offspring away. The moment of naïve pleasure turns into one of knowing repulsion: they have learned that the water comes from the Mexico City morgue, used to wash corpses before an autopsy. It's unimportant that the water is disinfected; the stigma of death turns the beautiful into the horrific." [8]

This example and the description show a further dimension of Margolles' two works: The visitor is not only concerned with her own body and the proprioception in realizing what has touched and somehow invaded her body, but also with the instinctive impulse of protecting her children from being confronted with death, and probably with the body of dead people one had not even known. The intimacy of getting touched by someone is combined with the covering-up of death in our Western cultures. So Margolles' work breaks multiple taboos:

- First of all she minimizes the distance between the material she uses for the installation and the visitor. The material finds its way into the organism of the visitor and somehow melts with parts of her because the perception organs are not the distant senses ear and eye but the skin and the nose, sense-organs which have long been aesthetically ignored and therefore somehow lack any aesthetic tradition and education. So the medium chosen (the fog), and the triggered sense organs are quite unusual and challenge our standardized perception habits – which is the epistemological dimension of the work.

- Secondly she confronts the visitor with her (the visitor's) own body and her relation to other - dead - bodies, which rises ethical questions. At least it confronts us with our culturally influenced attitude towards death and towards anonymous corpses from a country where for many people survival is a challenge which has to be faced daily anew in drug war and crime – this is the intellectual and cultural dimension.

- Both together – the transgression of perception habits and cultural taboos – lead to a deep psychophysical experience that shows that intersensory perception, intellectual and cultural knowledge, emotion (disgust) and feeling (horror), and finally also action (taking away the children) are inherently bound together.

This example is so interesting because it ignores one unwritten law of art: to leave the recipients in a state of autonomy where they can decide whether they want to participate or to draw back and stay an observer. This choice is essential to keep the playfulness of art, even in borderline cases. Just to name one example: The Austrian Artist Hermann Nitsch organizes every year what he calls "Orgien-Mysterien-Theater" ("bacchanal-mystery-theatre") where a lot of animal blood and bowels are spread among the participants. Nevertheless it is left up to the audience whether it wants to participate or not, and at least everyone knows in advance what expects her/him when visiting such an event. Margolles instead confronts us with a part of our real life we normally tend to push aside in minimizing the distance art normally builds up between itself and the spectator/visitor: She uses a medium, water, which stands for cleanliness and purity, and brings this together with the visitor's body as medium so that both merge through breathing in a process which happens beyond the visitor's control.

In table 1, which of course is not exhaustive but rather a scheme, I tried to sum up the main theses of different theories dealing with the problem of perception and experience from different perspectives.

The leading question for this overview is the topical demand for a combination of intersensorial and intermedia theories. The table will show that in most cases media are neglected – and with this the social and cultural aspects of perception/experience.

This overview refers to approaches of very different disciplines and examines how they treat the processes which I consider to be decisive for the complexity of experience: Multi- or intersensory perception, intellectual and emotional processes as well as concepts of action. It is obvious that every approach has its blind spots – consequently setting up a model for 'experience' is an inherent interdisplinary task. And it shows that nearly all approaches lack a notion of media, in first place Phenomenology which claims to explain the processes of every-day-experience – but its approaches prove to be incomplete without considering the multiple impacts of natural and technical media. I doubt the existence of an unmediated experience, although a pre-conscious "feeling" surely belongs to what we call experience. But, as Helmuth Plessner and Maurice Merleau-Ponty point out, there is no sensory perception – and, I would add, no unmediated experience – without interpretation: even if our interpretative mechanisms are based on biological and chemical processes in the brain, they are also culturally and socially induced. In concentrating so much on technical media we tend to forget that our experiencing senses and our feeling body are media as well, as Margolles' piece "Vaporización" shows. Without our culturally induced neglect of death, without our instinct-driven, but also culturally formed scepticism that tells us to keep distance from everything which does not belong to our own bodies, the effect of "Vaporización" would not be this provoking as it has been proven to be. Margolles uses the human body as medium: first, the particles of the corpses are merged with the water so that they are transformed, then the bodies of the visitors become media in absorbing and again transforming the corpses' cleaning water. In this constellation the visitor's bodies are object and subject at the same time.

I want close this contribution with another example: Anish Kapoor was the invited artist for this year's Monumenta in Paris. For the Grand Palais, a very light and beautiful architectural construction, he created a sculpture he called "Leviathan":

"Leviathan" is the name of a beast which was created by God in order to reign over the sea. It was invincible and could only be defeated by God. According to the Babylonian Talmud Leviathan (who exists in Christian and Jewish tradition) studies the Tora, judges and nourishes the world and then plays with the ships on the sea. So Leviathan has become the synonym for a monster that causes chaos and is unrulable. Kapoor's "Leviathan" does not move, but it swallows everyone who comes to visit: thus it has a monstrous inner and outer appearance (as the images show), but both work very differently: Within the monument one feels as if being swallowed by a whale like the biblical Jonah. The dimmed red light (which has a natural source from the glass roof of the Grand Palais, filtered by the red synthetic skin), the sticky air, the damped sound and the very round shape that branches into cave-like bulges evokes associations of being in the stomach or bowel of a beast or in an uterus (but without the protected feeling one should have there). Stepping outside the impression is completely different: On sees "Leviathan" as a sculpture from a distance, the light is natural again, the air fresh, the sounds have regained their resonance – it is an object again and can be treated as such.

"Leviathan" offers us at least two perspectives: One is unusual and challenges our sensory perception, our psychophysical proprioception, and our intellectual ability of evoking associations, the other offers us the far more familiar perspective on an object which can be experienced mainly visually as a sculpture (but also in touching its skin) and lets us feel much more comfortable because we can remain in our culturally acquired habits of perceiving art. Kapoor thus oscillates between the creation of an interior media arrangement causing an experience that differs from our everyday perception on the one hand,

on the other he creates an outside space that allows us to regain our usual perception modes – "Leviathan" changes between unfamiliar and familiar intersensorial and psycho-physical forms of experience. This indeed seems to me to be one of the most valuable qualities of contemporary (inter-)art forms and it makes obvious that the newly evolving desire for unmediated experience is somehow romantic, but not realistic and not necessary at all if a complex model of experience is adopted.

So consequently the complexity of multi- or intersensory experience is not adequately modelled in adopting only one concept, be it

- processing sensory data, even if multisensory perception is considered,

  or be it

- experiencing a pre-conscious holistic bodily affection with its related emotional processes,

  or be it

- biologically explainable cognitive processes

  or be it

- 'pure' intellectual insight.

  All of these approaches are complementary, and they are always related to individual and cultural experiences (emotions, knowledge, habits) and media, which means natural and technical media alike. The examples should have made clear that there might be no unmediated experience, and that intense experience is a complex combination of multiple factors that can only be treated in an interdisciplinary effort.

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INVESTIGATING INTERACTIVE BEAUTY – A RESEARCH-ART INSTALLATION

Falk Heinrich

My paper presents and discusses my academic-artistic installation *Investigating Interactive Beauty (IIB)* being part of a theoretical investigation of the notion of beauty in interactive art. *IIB* is on the one hand an art installation and on the other hand an experiment that allows for collection of user opinions and experiences. Interviews and questionnaires, one prior and one, seek to collect opinions on the notion of interactive beauty.

Fig 1. Investigating Interactive Beauty – a research-art installation 2011
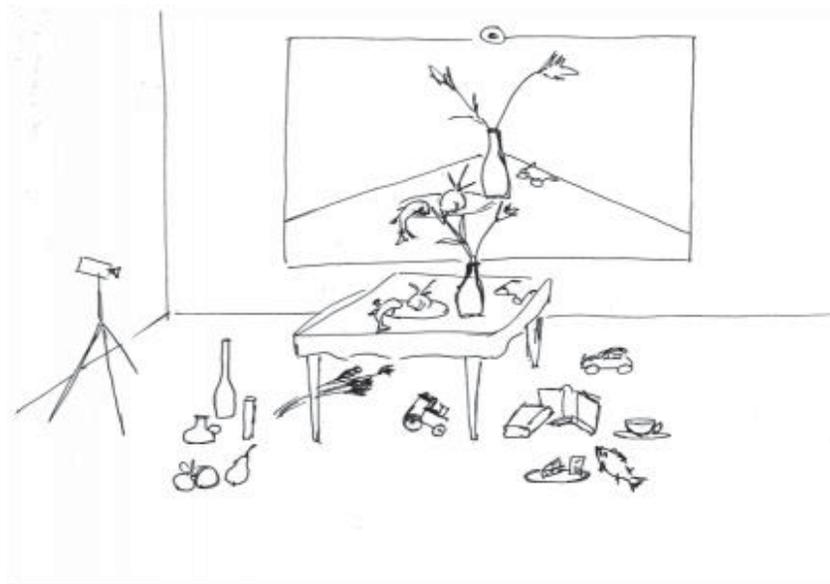
Fig 2. Sketch of Investigating Interactive Beauty, 2011

This is a presentation of the academic-artistic installation *Investigating Interactive Beauty*, preceded by a short introduction to the overall research project *Interactive Beauty*. My field of investigation is the notion of beauty in interactive art.

In academic literature, beauty is often described as an aesthetic judgment of an artefact or an object. It is generally seen as a sentiment of positive arousal. During modernity, art has been positioning the onlooker at a 'distance' allowing for a sublimation of the onlookers' immediate physiological reaction to the piece of art. The distinction between reality and fiction is one prominent example of this distance. Art works are to be contemplated. This gave rise to a distinct notion of beauty that is tight to 'emotional reflection' underpinned by the purposelessness of art (Kant). But different philosophers have different views on, whether beauty is an immediate emotional reaction or whether interpretative reflectivity plays a part in the sentiment of beauty. Beauty is generally seen as a positive experience; it is nevertheless founded on a perceptual distinction between beauty and ugliness. During the century of modern art, both its artistic and academic proponents, reject the validity of beauty for art making. Yet, there are also other voices stressing the historical changeability of the notion of beauty. For example, Roger Fry's *Vision and Design (1961)* asserts that the initial ugliness of modern art already has become beautiful since art changes its notion of beauty. The sentiment of beauty in modern art shifts from being an exclusively aesthetic judgement to be interplay between conceptual and 'purely' aesthetic dimensions.

The following thoughts and the conducted experiment is based on the belief that the sensation of beauty is an emotional reaction framed and generated by cultural and conceptual values; there are no essential and normative requisites for beauty. Nevertheless, I do not see beauty as an exclusive driving power for art; our notion of beauty today is highly dependent on other cultural developments like media technology and media artefacts (video games, interactive TV, computer applications and apps).

Foundational thesis

The shifting notions of beauty from the Renaissance up to modern and post-modern art rely on a distant positioning of the onlooker in front of the artwork. There have been many efforts to make the audience a part of the artwork, like for example installation art, performance art, and recently interactive art. In interactive art the onlooker has finally become a participant physically acting and reacting within the timely and spatial framework of an interactive art piece. Consequently, there is a need for a differentiated notion of beauty that takes into account the beauty of doing, (re-)acting, performing, and creating within a conceptually confined space of possible interactions. My hypothesis is such: the experience of beauty in interactive and performative art pieces has changed (or is in the process of transformation) from being an act of contemplation to (1) an intrinsic sentiment of interaction proper and (2) a reflective post-actional sentiment.

My investigation is mainly a theoretical one relying on philosophical inquiries, trying to answer a whole array of questions: Is the notion of interactive beauty an indication for a changed socio-cultural context or is it a phenomenon exclusively bound to interactive art? Can we trace a changed notion of beauty taking into account historic philosophical theories on beauty from the Greek Classics to modernism and post-modernism? The notion and sentiment of beauty is without doubt context dependent rendering different dimensions of beauty, what is then the relationship between let's say design and art, or the blooming beauty industry and interactive art? My hypothesis has its roots within the domain of art and art experience being thus a research question within the domain of aesthetics and art theory, but do other scientific disciplines have different notions of beauty - I here think very much of design theory and

marketing, psychology and neuroaesthetics - and how can these disciplines contribute to my investigation?

Artistic Investigation as academic method

Despite the overall theoretical modus of my investigation, I nevertheless want to describe an empirical experiment that tries to tap into the interactive art participants' opinions on the question of beauty. Since the question of beauty in modernity and post-modernity is considered to be a subjective judgment and not the result of a normative doxa, a phenomenological method of investigation is the only appropriate one. The overall method of my research is a circular (or cybernetic) process, consisting of firstly theory formation as a discursive process that questions and re-describes already existing theories on beauty, and secondly the validation of my theoretical findings by means of observation and analysis of interactive artefacts by various artists as well as own artistic experiences. It has to be emphasised that most interactive art works do not specifically investigate beauty, yet it is my conviction, that all operate with the sentiment of beauty (or ugliness). This cybernetic process takes as its starting point my own experiences as a participant of numerous interactive artefacts as well as my experiences as a maker of such artefacts serving thus as a lived and internalised background for my theoretical research. In this I follow a well-established, discursive, hermeneutical research methodology, mainly found in the humanities.

In addition to my own experiences, I decided to design an experimental setting in form of an interactive art installation. The objective of this experiment is to generate empirical user data, through, firstly participant observations, and secondly interviews. It is my hope that the results will broaden my own understanding of the function of beauty in interactive art. Contrary to the modus of experiments prevalent in the natural sciences, the goal of my experiment is not to verify or falsify a hypothesis, but rather to create a framework for concrete interaction, which allows me to further my own understanding.

The interactive research-art installation should therefore encompass both an artistic experience of a kind and a reflective perspective on the nature of beauty in interactive art. In other words, the research-art installation aims at an experience of interaction that thematizes and discusses the notion of beauty. The objective cannot be to design beautiful interactions (because beauty is a subjective sentiment), but to design an installation that contributes to the discussion of the notion of beauty in interactive art.

Designing an interactive research-art installation gives rise to many questions and challenges. One of the foundational questions is, whether it is possible to design an installation that serves art and academic research alike. As such, my experiment forms part of an already existing, but still incipient academic praxis, where artistic methodologies are used to generate a field for observation that can render different understandings of a chosen subjects (e.g. Leavy, 2008; Kaplan 1996). Artistic processes rely firstly on certain art genres and secondly are scientifically idiosyncratic explorations without a fixed goal in terms of solutions to predefined problems. Academic humanistic research on the other hand depends on a thesis and a method that generates answers. By applying an artistic method, I therefore cannot hope for definite answers, but expectantly for rather vague indicia showing general tendencies, and new valuable questions to be answered. My investigation reckons the dependency on art genre and general cultural developments. In that, it differs from for example the neuro-aesthetic (e.g. Zeki 1999, 2004; Ramachandran 1999; Turner 2006) and psychological approaches (e.g. Arnheim 1969;Boselie, F., & Leeuwenberg, E., 1985), which aim at finding generic perception principles for the sensation of beauty.

The design of the interactive research-art installation *Investigating Interactive Beauty (I-I-Beauty)*

The basic idea of the experimental installation is the seemingly contradictory notions of contemplative and interactive beauty. In the research art installation, the former is represented by the static representational genre of *still life*. The latter by the very artistic act of creating and composing *still life* set-ups. In that I am following one kind of interactive art, where the art piece offers and uses the participants' poetic (creative) impetus. The installation will give the participants the opportunity to create a physical model of a *still life* and see the photographic result of his/her arrangement real time.

The installation space is a square space. A table with covered white cloth is standing in the middle. Upon this table, the participant can put and arrange various objects found in many still life paintings: vases, flowers, food, dead animals, etc. The objects are scattered on the floor around the table. The whole scene emulates our romantic picture of an artist's studio. The participant can use these objects in order to create their personal still life arrangement on the table. The participant can illuminate the scene with a simple set of lighting devises (front and site lights). The camera, constantly recording the still life, is position in a 45-degree angel in front of the table. Behind the table, a projection shows the video picture of the table and the arranged still life.

But the picture is not a photorealistic depiction of the material still life arrangement; it shows a digitally manipulated picture. The degree and kind of modification depends on the amount and kind of the participant's physical action around and on the table. An infrared camera and various algorithms track the participant and extract a data-description of his/her movements and motion in space. These data is used to digitally manipulate the video image.

The modification of the video picture is inspired by some exponents of art history's development from representational art to various kinds of motion abstraction (Balla, Boccioni, M. Duchamps, Muybrigde) and the aesthetics of digital image manipulation. The modification process is triggered and computed by the data of various movement parameters (especially the accumulative quantity of changed pixel values). Despite of the fact that motion results in modification of the digital image and non-motion in a slow transformation back to a photo-realistic, static representation, the detailed algorithmic logic is not completely transparent. The transformational logic should be a part of a semi-enigmatic process controlled by the algorithmic system.

The experiment

The experiment begins with a short initial introduction to the overall objective, namely the investigation of interactive beauty and to the aesthetics of the chosen genre (still life). The research-art experiment is framed by an informal interview structured by questions.

1. The first part of the experiment consists of three initial questions:

Could you briefly describe your sensation of beauty?

How would you describe beauty in art?

Have you ever experienced beauty in interactive art (as a participant or as a onlooker)?

 The pre-interaction questions seek to get information about the participants' general notion of beauty and specific notion of artistic.

2. The second part consists of the interactive experience. The participant is supposed to create a still life out of the available objects. S/he can decide to finish the experiment by clapping the hands, which makes the system safe a file of the digitally manipulated picture.

3. After the short interactive experience, I pose more guiding questions:

Can you describe the relationship between the intended beauty of the tableau and the experience of arranging the tableau?

What elicits satisfaction and reward in the process of composing the still life?

Can you describe the difference between the unmediated and the digitally manipulated of picture?

The purpose of these questions is solely to propel a general discussion on the notion and function of beauty in interactive art.

Preliminary results

At the present moment, the research installation has been tested (both the digital system, the set up and the questions for the interview), but no real research experiment has been conducted. The test interviewees were students of the educational program Art and Technology at Aalborg University. The purpose of the tests was to examine the validity of the questions asked, the functionality of the artistic research installation, and the discovery of unintended aspects. In the following I am presenting the main points made integrating the interviewees' wording into my interpretation of it.

The first interview did reveal that the notion of beauty is associated with "attraction", "pleasing objects", "kindness" and the "simplicity and purity" of the object eliciting the urge to be "near and observe" the objects. Beauty is a kind of "positive" holistic conclusion made by audience, beauty sets "a period!". Beauty in art is associated with both the sensuous aspects ("awareness") but also with the conceptual aspects. A "great and strong artistic idea" with a vital "message" is beautiful. In regard to interactive art, the interviewees pointed out that a requisite for the sentiment of beauty is a "clear understanding" of the interaction mechanisms. A beautiful interactive art piece "talks to and attracts" the participant. One interviewee asserts that beautiful interactive art pieces must make sense also without the user participation, which I interpret as the clear conveyance of the conceptual dimension of an artefact.

The second part of the interview after the interviewees' experiences with the interactive still life installation revealed, that the interviewee generally like to interact and having the possibility to create and arrange their own still life (which of course is not surprising, since they all are art and technology students). They felt good as a participant being able to choose certain objects and to disregard other in the process of arranging the still life. They all sought to express a personal idea about the intended still life. Some of them chose the objects due to their symbolic value. They acknowledged that their personal vision is heavily influenced by genre paradigms and conventions of still life.

There seems to be an unintended gab (for one interviewee even an incompatibility) between the arrangements on the table and the digital representation of the tableau. It seems that the experiment deals with two different forms of interaction, a mediated and an unmediated one. This led me to a bi-partition of the second part of the experiment. In the future, the participants will be asked to focus on the arrangement of the still life (the video picture will show the tableau non-manipulated), and, in a second round, to focus on the digitally modified picture in order to elaborate on the different mediation modes.

Discussion

The experiment needs of course to be conducted for real with a demographic variety of persons interested in interactive art. This paper deals primarily with methodological questions in regard to the design of a research-art experiment as a qualitative method.

I could simply have conducted interviews with audiences of relevant interactive art exhibitions. But designing an experimental research-art installation fulfils at least one further goal apart from the collection of user experiences and opinions. The process of designing an experiment with an academic purpose (in my case the generation of user experiences of the function and sentiment of beauty in interactive art) reveals much of the nature of my research subject. For example, the notion of beauty is extremely domain-dependent; there no longer exists a general notion as in Schiller's era, where beauty indicated a unified moral and aesthetic refinement. Today's beauty is not able to defy the experienced fragmentation of life, revealing the obvious subjective quality of beauty.

One preliminary result of the test scenario seems to show that beauty in interactive art is not exclusively bound to the individual experience of interaction. The interviewees' experiences were described as funny, interesting, and rewarding since the participants are given the possibility to tell their own stories and preferences (through the choice and arrangement of still life objects). Yet, the experience of beauty seems to necessitate the objectification and extrapolation of interactive experiences into the realisation of the artefact's conceptual dimensions. The test persons seem to merge and align their existing contemplative notion of beauty in the arts with their performative acts during interactions.

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FUZZY PRECINCTS AND BLEEDING EDGES: FEMINIST THEORY AND THE STUDY OF VIRTUAL-MATERIALITY

Lynne Heller

Following a trajectory of the virtual/material dichotomy as it stems from a classicist position of a mind/body and male/female split, I propose feminist theory as a potent tool to effectively analyze the artistic implications of virtual materiality. Obfuscation, bedlam, redundancy – these qualities, redolent of humanity, are typically considered the antitheses of insight. The chaotic can be an impetus for relinquishing conceits of specialization.

Fig 1. Dancing With Myself, 2009, Lynne Heller, hybrid reality performance, Copyright Lynne Heller.
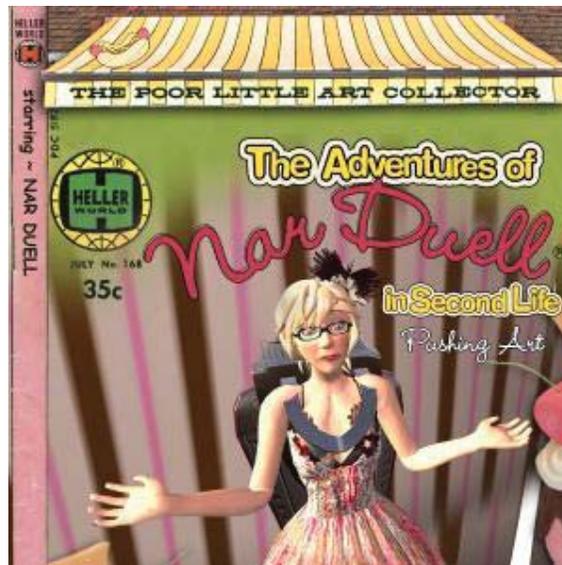
Fig 2. The Adventures of Nar Duell in Second Life - Pushing Art, 2010, Lynne Heller, graphic novel, Copyright Lynne Heller.

Fig 3. The Adventures of Nar Duell in Second Life - Pushing Art, 2010, Lynne Heller, graphic novel, Copyright Lynne Heller.

Whatever the breaks and ruptures, only continuous variation brings forth this virtual line, this virtual continuum of life, "the essential element of the real beneath the everyday."
Gilles Deleuze and Félix Guattari [1]

As an artist working in diverse media – performative new media interaction, digitally collaged graphic novels, and hybrid reality sculptural installation, I have had the opportunity to experience a breadth of contemporary creative practice, unfettered by traditional labels.

My art reflects my fascination with the yo-yo play between the two ends of a spectrum, at one end the virtual, on the other, the material. Integrating perceived oppositions has been an ongoing creative concentration for me. By essentially not 'fitting in' to any particular artistic convention, I have been free to create my own structures which inevitably pose questions of differentiation. If the two extremes, virtual and material constructs, meet and interweave on an intimate stratum, then how does one start to parse and separate them? Is it possible and / or desirable? When imagination and concrete details fuse at a molecular-like level, is it useful to consider these as separate parcels? Are packets of digital information virtual or real? Perhaps neither virtual / spirit or material / substance but simultaneously both, a unique process or matter that I will refer to throughout this paper as virtual-materiality. Analogous to light – an often invisible continuum that is defined only when it comes into contact with something else, creating colour and shadow. It is not defined by established theoretical frameworks, but through the interpretation of its internal limitations. [2]

By way of example, in my piece Dancing With Myself (2009), a performative hybrid-reality installation, I explore virtual-materiality through dance. My avatar, Nar Duell, has been scripted to perform a choreography. In real time performance she moves in an immersive environment projected onto three walls. I

respond to Nar Duell, attempting to create a duet with her, thereby inverting the person / avatar paradigm, as Nar Duell controls me. Her world is expansive and infinite, whereas the real world space where I respond and dance, a white-walled gallery setting, is boxed in and confined: once again reversing the usual view of space through a computer screen. At the end of our performance, when she has either 'expired' or perhaps is 'just plumb tuckered out', I stroke Nar Duell's face. In reality, I am touching the cold hard surface of the gallery wall, nevertheless, the warm presence of projection and the intimacy of our interaction conjures up an all too posthuman relationship. [3] Through this caress, undeniably material things (human hand, painted drywall) become conflated with the agency that I have invested in my avatar. The action ceases to be touch of simple surfaces and strives to cross a divide. Unable to label this moment virtual or real, even digital or analogue, I can only think of it as quintessentially virtual-materiality. Nar Duell's exhaustion is clearly virtual and I am most decidedly material, but the act of touching my avatar transcends an understanding of those two states. Similarly, in another piece, Pushing Art (2010), I display a video projection of my hybrid-reality graphic novel in a real-life mobile rendition of a hot dog cart and newspaper stand – once again confounding boundaries. We are no longer dealing with differences but with a continuum that defies parsing.

The turning point of this argument depends on the idea of the agency of images, addressed by the theorist W.J.T. Mitchell in his seminal text What do pictures want? the lives and loves of images.

…the peculiar tendency of images to absorb and be absorbed by human subjects in processes that look suspiciously like those of living things. We have an incorrigible tendency to lapse into vitalistic and animistic ways of speaking when we talk about images. It's not just a question of their producing "imitation of life" (as the saying goes), but that the imitations seem to take on "lives of their own." [4]

The most basic of human interaction with objects, particularly images, causes us to necessarily invest them with spirit in order to understand, control and dominate the 'stuff' of our existence. From a simple photograph of a loved one to the complexity of a virtual alter-ego we must process what we are looking at through memory and emotion. When my avatar, Nar Duell had the misfortune of a corrupted database I had to come to terms with the zeros and ones of her being. For an entire week Nar Duell and I had to sustain the indignity of having her hair attached to her posterior as she inhabited her Second Life world. She slunk around assuming poses where other avatars would not view her backside and the offending tresses. Clearly, I was projecting my embarrassment as a human being on this animation, but her bizarre behaviour was real within the context I had created, and made for an entirely different art experience. As a result of the misplaced hair episode it became clear to me that Nar Duell was protesting the brunette hair I had bought her only an hour before the data corruption occurred. She is now, and for whatever future she has, decidedly blonde. What's a feminist to do?

Before discussing virtual-materiality any further, I would like to differentiate between the digital and the virtual. The digital is real enough on a computer chip, but because it exists initially as information only and must be transformed through on and off circuitry to be experienced, we perceive it to be virtual. Even though it must be processed to be experienced and not an obvious material manifestation, it is not virtual. Whereas the truly virtual resides only in our minds and through our imaginations. It is ironic given my interests in continuum that I am insisting on difference here but I think it is important to define the terms as they are often used interchangeably. Virtual-materiality is not necessarily digital-materiality. Digits are representations just as surely as is paint. However, the malleability of digital information and the variety of its manifestations does extend our ability to imagine 'bigger and better.' In my case it allows me to create Nar Duell and experience art and life right alongside her. The quirkiness of a populous, dumbed-down application such as Second Life along with the reality of bandwidth speeds and

other people's tastes means that it is an entirely unpredictable place. This eccentricity leads to the illusion of avatars in that environment possessing souls and controlling their own destinies – a virtual existence.

As I said in the beginning of this text, the genesis of this interest in virtual-materiality comes from my engagement with different media. That, in turn, is rooted in a deeper need to grapple with the contradictions of our humanity. There is a gap between our desires and reality which align with virtual / material extremes. By trying to define these edges I find myself in the wide swath of the middle, where the melding is impossible to untangle. If desire equals the virtual, where everything is possible, and reality, the material weighed down by the intractability of matter, then how do these extremes coalesce? Fortunately, art does not have to be an either / or proposition, it is both at once – a lenticular vision, beyond simple interpolation, that does not allow for the splitting of the atom.

This paradox, desire versus reality, is threatened to be rendered mute by contemporary consumerist ideology, and is echoed in pop cultural priorities. I look to pop culture as a marker to test my assumptions about yearning and that which is 'in your face' real. The drive to conflate those extremes, which I align with the virtual and the material, is a current obsession. For instance, three dimensional film techniques attempt to make a screen-based art form increasingly immersive and tangible. On the other hand, many material based artists, entertainers and marketers are using the advantages of digitally generated or transfigured materials and processes to invest the inert with intelligence. Of particular interest are technologies such as motion capture and mobile devices that allow intersections of real and digital immersion, crossing over into virtuality. An example of this is the mobile smart phone that allows razor sharpened marketing intelligence to guide the user into real world / virtual seamless consumer experiences. The interest in the public sphere is informing and compelling. When the difference between desire and commodity is supposedly erased, we can have everything we want and like everything we have. Or – so the story goes – this perpetuated fantasy is the bedrock of consumerism. However, it is an itch that gets worse with scratching. This presumably seamless virtual-materiality highlights the contradiction of the continuum. Even though we cannot dissect virtual-materiality we still know the two extremes. Capable of a double consciousness, we sense difference and conflation simultaneously. We believe desire and object to be the same thing. Obtaining something will soothe a yearning, but the very act of possession provides unassailable proof that objects are not spirit, and fuels anew fresh cravings.

Following the trajectory of the virtual / material dichotomy as it stems from a classicist position of the mind / body split, and manifestations of the male / female divide, I propose feminist theory as a potent tool to effectively analyze the artistic and sociological implications of virtual-materiality. Plato conceived that the body is from the material world; and the soul is immortal, of ideas and universal truths, and does not exist in time and space. In this sense, the soul is temporarily united with the body and will separate at death. Descartes' theory holds that the body works like a machine with material properties, and the mind or soul is a nonmaterial entity. In this conception, the mind controls the body. I believe these dominant philosophical stances are instrumental in understanding polarities outlined in this text, and how they have come to be defined in opposition to each other. Traditional views equate technology with machine, attributed as male and related to the sublime and power; whereas beauty is often the stand-in and proponent for the aesthetics of the organic, the compliant and gendered female. Theorist Elaine Scarry discusses this perspective in On Beauty and Being Just:

…in the newly subdivided aesthetic realm, the sublime is male and the beautiful is female…Why should this bifurcation have dealt such a blow to beauty…? The sublime occasioned the demotion of the beautiful... Formerly capable of charming or astonishing, now beauty was the not-astonishing; as it is also the

not-male, the not-mountainous, the not-righteous, the not-night. Each attribute or illustration of the beautiful became one member of an oppositional pair, and because it was almost always the diminutive member, it was also the dismissible member. [5]

Scarry's critique around the issue of beauty provides pivotal clues and associations for a discussion of virtual-materiality within a feminist perspective. Once again, a 'pairing' of the sublime / beauty equals the virtual / material. But beauty, with its quicksilver qualities, helps to destabilize easy polarities. Dichotomized thinking sets the stage for an avalanche of 'thought', in all its virtual importance, overwhelming 'tangible', often just pretty and overlooked. At a micro-level, virtual-materiality, as continuum, is the antidote to definition and demarcation.

As a woman who came of age during second-wave feminism, I have a strong interest in formulating what a feminist position means to me as an artist, and particularly in my strategy of taking on an alterego. The relationship between myself and my avatar could be best characterized within a feminist context, as a mother-daughter bond. I have created Nar Duell, but I am at the mercy of her physics. Limitations and strengths determine what we can do together. I nurture Nar Duell, but it is the unforeseen and unknowable combination of what I have 'fed' her that makes the work live. But what of neo-feminism? From the simplest of decisions – what colour hair to purchase, to which friends to accumulate, one is always hyper-aware of gender in Second Life. Nar Duell's personality reveals a full range of contradictions. She strives to be nice, agreeable, conciliatory and shudders at the thought of looking dowdy for the sake of politics; but is thoroughly empowered when flying around in her super-cape. She wears a hard hat because she does a lot of building in Second Life. At the same time, she wears short, tight skirts, cat ears, fishnet stockings and stilettos – performing her own, one-woman, slut walk protest.

The reality of online virtual worlds is that they tend to be highly charged, sexualized places, full of fruitful data to examine contemporary male / female ideology and practice. The writers R. A. Brookey and K. L. Cannon, in their article Sex Lives in Second Life say "there was a great deal of optimism about the potential for virtual environments to offer users opportunities to explore multiple identities." [6] However, they conclude on a very different note: "Arguing from Foucault, we suggest that cyberspace should not be regarded as an environment that moves the user outside of the political and social matrix of gender and sexuality." [7]
We cannot entirely escape our bodies, our innate materiality within the virtual, since it is primarily a product of our history and societal imperatives. What we dream into existence is limited by what we have already, and what we have already is largely a product of what we are and the 'things' that surround us. Sometimes it appears as though the material trumps the virtual. However, the virtual is extremely robust and infects the real at the sub-particle level, making it impossible to root out. We only know it when we see it in the extreme.

My need to reflect on our human condition through virtual-materiality is a romantic notion. Although instead of peering only into the enormity we call nature (the material) and feeling awe (the virtual), I look into an abyss of technological change and find a similar wonder and incongruent beauty. Mess, obfuscation, bedlam, redundancy, contradiction – these qualities, redolent of humanity, are typically considered the antitheses of insight. They confound compartmentalization. Perhaps the necessarily chaotic can be an impetus for 'soft' thinking that relinquishes conceits of specialization and repudiates the polemics of division. By breaking down ideas of difference using visual and aural language, artists can directly encourage a bleeding of thought, sensory understanding and insight. Engagement through art stratagems can be powerful forces to find new ways of understanding that confound dichotomization and honour the idea of continuum.

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2. *I am grateful to Dr. Lorrie Boucher for this insight.*
3. *N. Katherine Hayles, How we became posthuman: virtual bodies in cybernetics, literature, and informatics (Chicago: The University of Chicago Press, 1999).*
4. *W.J.T. Mitchell, What do pictures want? the lives and loves of images (Chicago: The University of Chicago Press, 2005), 2.*
5. *Elaine Scarry, On Beauty and Being Just (New Jersey: Princeton University Press, 1999), 83.*
6. *Robert Alan Brookey and Kristopher L. Cannon, "Sex Lives in Second Life," in Critical Studies in Media Communication Vol. 26, No. 2 (2009): 146.*
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MEDIATED EARTHWORKS: NEW MEDIA GOES WILD

SCOTT HESSELS

The artistic use of emerging sensor technologies in remote locations is resulting in artworks inextricably linked to dynamic forces in the natural landscape. Like Earthworks, these projects are shaped by nature, connected interactively with their environments but using technology instead of bulldozers to mediate. New media is introducing new types of environmental impact in sculptural, visual, cinematic, and narrative construction.

Fig. 1. Sustainable Cinema No. 1: The Image Mill, 2009, Scott Hessels, steel kinetic sculpture, installed at the Ford Presidential Museum, Michigan. Copyright Scott Hessels.

Fig. 2. Mulholland Drive, 2004, Scott Hessels, Michael Chu, Martin Bonadeo, light and sound installation, installed at UCLA, Los Angeles. Copyright Scott Hessels.

Throughout history, artists have taken the materials and forces of nature and used them in the creation of works. The sculpting of clay, the mixing of pigments both represent the use of natural or organic materials as servants to artistic inspiration. However, a subset of art has allowed that relationship to be reversed. Using a wide range of tools – wind, entropy, erosion, mapping – some artworks allow nature to be a physical, determining influence in their realization. These artists have shared their vision with the natural environment and transferred the power to shape its form to the forces of nature.

Recently, new media artists have joined this tradition and begun using data from the natural world as a driver for visual, temporal, narrative or dimensional components of their work. Taking advantage of the increasingly portability of computational sensors, these artists are 'reading' the natural environment and then using the data to shape artworks that exist in a mediated but symbiotic relationship with the natural world.

Easily understood as a type of data visualization, the projects often focus on the computational and can be associated with other information arts. Alternatively, they can be viewed as ecological art, tapping into the contemporary zeitgeist surrounding sustainable design. However, if one considers the interactivity of the works – nature as a collaborator – they fall rather interestingly into a history of Land Art sculpture. Perhaps by viewing these projects as Mediated Earthworks, we broaden both the depth of these artworks and our understanding of our complex relationship with nature.

The moving image is usually considered a mediated art form since it is difficult to separate kinesis from the machines that power it. However, kinetic sculpture is also time-based, often narrative, and its changes in shape, color, and even materiality share many qualities with cinema. Making this leap, one can consider the evolving form of Calder's mobiles and the rambling wind-powered sculptures of Theo Jansen as non-mediated moving images. In a sense, kinetic artworks are screenless cinema.

The Earthwoks sculptures that began emerging in the 1960's were often sets of instructions that foreshadowed programming as well as made to change over time. Their innate ephemeral qualities – artworks that embraced entropy and change instead of battling it – made them temporal forms whose changing 'image' was part of the artists' creative strategies. As sculptor Robert Morris explained, "What art now has in its hands is mutable stuff which need not arrive at a point of being finalized with respect to time or space. The notion that work is an irreversible process ending in a static icon-object no longer has much relevance." [1] The sculptures had cycles, changing stages, life spans. Earthworks were images that moved.

 Like the moving image, interactivity is also strongly associated with computation and media. However, interactivity can be purely relational, with no mediation required. Paul Willemen puts it almost bitterly, "To refer to interactivity as a new feature characteristic of 'new tech' discursive forms is, again, nonsense. Indeed, in many respects, the digitalization of information has rendered interaction between reader/viewer and text-production more restricted in that the protocols governing interactivity have become tighter, narrower, more inflexible, and more policed. The expansion of opportunities for interaction has become accompanied by reductions in the scope for action." [2] Part of that scope of action is limited by a view that interactivity must occur with machines.

However, interactivity may not be limited to Willemen's reader/viewer either. The emphasis on process and temporality of Land Art was directly tied to forces in the environment. It was a unique and radical form of interactivity, where context was given influence and power, forming a triangle to the reader/viewer relationship. The artist interacted with the natural environment, viewers interacted with the spaces and systems that were created, and nature would interact with the sculpture by reshaping it. Artist, viewer and nature were in a messy mix of interactivity…which wonderfully increased the unpredictability of each of the interactions.

This emphasis on time and process allowed viewers to look at the dynamics of the elements in the environment. One had to experience different stages of the system to experience the whole work. The physical forces of the landscape became an interactive driver for the realization of the visual artwork. It was

"a programmatic approach to the work and advocates sculpture which experiences, reacts to its environment, changes, is non-stable… art is gradually entering into a more significant relationship with the viewer and the component parts of his environment." [3]

Changes in time led to changes in form and the Earthworks movement viewed sculpture as malleable, changing, entropic, and participatory. Earthworks connected physically with their environments and were designed to react to the forces found there. Nature was the hammer that pounded the sculptures, the brush that changed their colors. "During the period, many artists worked with natural materials, often fascinated by their evolution and their organic decomposition. To better observe this process, the artist became almost a laboratory assistant, engaging in artistic experiences." [4]

Many of the Earthworks artists would probably contend that they were fighting the creeping technology and mediation of the 1960's and took to the desert for its innate isolation and primitivism. It is ironic that many of the works were actually very complex systems and, when connected with the programmatic strategies evolving in Conceptualism and Fluxus, became keystones in the computational arts of today.

These artistic systems are celebrated as early ecological art but could easily be equally lauded as early programming art. Hans Haacke creating artificial ecosystems ("Rhine Water Purification Plant" 1972), Agnes Denes harvesting wheat in downtown Manhattan ("Wheatfield: A Confrontation" 1982), and Robert Smithson pouring tar down an eroded hillside ("Asphalt Rundown" 1969) all leaned on nature to do the heavy lifting and provide the meaning. The sculptures could not exist without the input of nature itself. The direct use of forces and processes in nature to create sculpture continues today. John Grade's "Host" (2007) is partly sculpted by the local birds pecking away at the form of his work.

Today culture has shifted towards an emphasis on sustainability – how those ecological systems can continue on. It is an approach that empowers natural systems, giving them the capacity to endure. Sustainable design often incorporates a direct agency with environmental power – wind, currents, sunlight, *etc.* The highlighting of systems in nature has been replaced by a closer look at the forces of nature.

Tapping those forces means that artistic gestures can be shared with nature itself. Kinetic art has often recognized this possibility and used natural force as a method to change the form of a sculpture. Alexander Calder's mobiles opened up sculpture to the dynamics of outside influences, for example. Two recent exhibitions of kinetic works have emphasized the forces of nature as a collaborator in the creation of an artwork.Guy Brett, curator of the Force Fields: Phases of the Kinetic show in Barcelona, explained that "we begin to see that 'natural phenomenon' and 'aesthetic decision' were at this time in a shifting and reciprocal relationship to one another. The working-out of natural processes was allowed to change the conception of the beautiful; artists ceded their 'will to form' to certain degrees and in certain ways, and allowed natural events to prevail, which was seen as an emancipatory process, and to offer deeper insight into reality." [5]

The Drip, Blow, Burn: Forces of Nature in Contemporary Art exhibition at the Hudson River Museum presented artworks that used wind, water, and fire to shape the materials of the art. Curator Thomas Weaver observed that "the natural here is not just a subject, and certainly not just a material…moving natural elements are *primal* elements that, by rupturing the boundaries that govern the significations of visual art, embody the power of art to wrestle with the world." [6]

Although wind, water and fire are dynamic forces to use as creative influences, they are just the beginning of the possibilities. Computer technologies have not increased the distance between man and nature, new sensors have actually introduced new types of environmental agency. Many natural forces are not directly tangible and now the invisible energy fields, patterns, rhythms and dynamics of nature are possible artistic 'shared gestures'.

Today, indiscernible changes in motion, light, sound, temperature, depth, and a host of other variables can be detected. Our newfound computational detail is spreading and giving us unique information about the natural environment. One of the largest initiatives, Hewlett-Packard's "Central Nervous System for the Earth," plans to release a trillion sensors into the natural and built environments. [7] Tiny wireless contraptions will swarm the planet giving real-time information on ecological systems, geological activity, energy waste, *etc.* We can now discover new types of kinesis in our environment.

Increasingly, artists are co-opting these stunning data streams for artworks. When the sensors are matched with timespans, data over time, we see the increased possibilities of nature itself affecting an artwork. Similar conceptually to Earthworks, these new computational versions have a key difference. Mediation is not limited to the photographic or video documentation of the artwork but now includes the actual collection and input of artistic materials. Media is no longer just presentational.

With sensor and datastream as a type of mediation, emerging technologies make it possible to create new media artworks in remote, wilderness locations. The miniaturization, portability, and cheapness of sensors, computers, projectors, *etc.* is leading to a body of work where the landscape is inextricably linked to the artwork. The list of sensing technologies is growing at a phenomenal rate; this includes commonly used sensors like GPS, DNA, motion, altitude, tilt, speed, light, sound, SONAR as well as emerging technologies in 3D/stereoscopy, 360 degree cameras among others. When matched with artistic strategies, we're seeing GPS Drawing, light and sound installations, projections, and a host of other technologies all using captured datasets that transform the artwork in real time as the data from nature is incorporated.

The narrative possibilities are also being explored when nature is used as a driver for story construction. The natural environment can now become a protagonist, not metaphorically but literally, in the evolution of a story. Sensed changes in nature can be used to select and present from databases of a wide range of media, creating real-time stories in text, moving image, sound, *etc.* One of the lures of exploring environmental agency is the hidden interactivity of the process. The narrative still allows for interactivity's flexibility, but is not controlled by direct human interface. Tomorrow's auteurs may be dynamic spaces.

The direct agency of the natural environment has been investigated by several artists.Mary Lucier's "Dawn Burn" (1975) used a video camera to record the rising sun until its rays left a scar on the image and eventually destroyed the camera's tubes – the power of sunlight directly shaped the visuals on screen. The Center for Land Use Interpretation (1994, ongoing) has initiated several projects that merge database arts with a proactive nature and have made advances in the art of mapping. Paula Poole and Brett Stalbaum have mixed painting technologies with GPS systems, and Haruki Nishijima has designed systems that capture ambient sound and translate it into light and motion. Sheldon Brown's "Video Wind Chimes" (1994) used wind sensors housed in streetlights that had been converted into projectors. Changes in wind changed the television channels being projected down onto the sidewalk.

In my own practice, I have also been working with the forces of nature. The "Sustainable Cinema" series (2009, ongoing) are kinetic public sculptures that use natural energy – wind, water – to generate the moving image [Fig. 1]. The artworks combine references to both the optical illusion toys that led to the invention of movies and early natural energy sources. By referencing the histories of both film and industrialization, these sculptures are simple illusions created with simple energy to make us reflect on how removed we are from the original magic of the moving image. It is a primal media experience, which due to the rapid development of cinema technologies, is no longer an oxymoron.

I had explored this direct agency of nature years earlier when I created a light installation based on the topography of Los Angeles' famous Mulholland Drive. Together with programming by Michael Chu and sound design by Martin Bonadeo, we collected the tilt, altitude, location, direction, speed and sound of the drive and created an exact duplicate of the experience of traveling along the road in a 3D computer program. That virtual path was then used to control two robotic lights in a dark room filled with fog. Like cinema, direct data is captured, then edited and presented. However, here the environment directly defines the experience, the precise geography is used computationally. "Mulholland Drive" [Fig. 2] demonstrates how the rhythms, patterns, and random chance of the environment can be sensed through new media technologies and used to create new forms of visual experience.

Computational sensing, database aesthetics, real-time processing and visualization systems all can give new perspective on the natural environment. Working with science, media artists can now use the same materials that shaped the Earthworks movement like water, air, soil, stone, temperature, light, acoustics, topology, geography. However, with sensing, shared creative input can be given to natural forces and phenomena in those materials – flow, echo, wind, currents, reflection, decay, animal migration and behavior, topology, projection, and so on.

Once again, artists are reflecting society's views on the environment but now with an emphasis on shared input – natural energy paired with creative energy. With emerging sensing technologies, hidden natural forces can also be used in artistic strategies. For centuries, nature has been celebrated as an inspiration for the arts. Finally, nature can do more than inspire, it can pick up the brush itself.

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MEANINGFUL LANDSCAPES: SPATIAL NARRATIVE, PILGRIMAGE AND LOCATION BASED MEDIA

Megan Heyward

A range of locative projects involve navigating landscapes augmented with social or historical meaning. In what ways do they echo and intersect with older cultural practices involving spatial narrative and the walking of a meaningful landscape – the practice of pilgrimage? This paper explores pilgrimage as a form of spatial narrative, and the ways in which earlier notions of walking a meaningful landscape might inform location based practices.

Fig 1. View from Yakuoji Temple, 88 Temple Pilgrimage, Shikoku, Japan, September 2008. Photograph, Megan Heyward.

Fig 2. Stations of the Cross crucifixion scene on Sydney Harbour, WYD08, Millers Point, Sydney, July 2008. Video still, Megan Heyward.

Over the last decade, developments in GPS and location mapping technologies have led to the emergence of many location based and spatial positioning applications, alongside a diverse range of artistic projects that work creatively with GPS data. While locative artwork and practice is a broad area, many projects can be categorised, according to Tuters and Varnelis, under one of two mapping approaches, "annotative – virtually tagging the world – or phenomenological – tracing the action of the subject in the

world." [1]

Many annotative locative media artworks involve navigating landscapes layered or augmented with personal, social or historical meaning. These include the placebased storytelling of Jeremy Hight, the Murmur Project, Yellow Arrow, Knife and Fork and many others, all of which affirm Hight's sense of "agitated space", of space "alive with unseen history, stories, layers." [2]

With the recent widespread rollout of 3G networks and the availability of powerful, domestic mobile devices, there has been a renewed interest in the application of location based approaches across a range of cultural contexts, particularly through annotating locations with archival images, texts, oral histories or other materials by the museum and cultural sectors. As cultural institutions increasingly move into locational spaces, and as location related tools, apps and devices become more accessible, it seems relevant to explore some of the ways in which augmented, meaningful landscapes have been a critical element in a much older cultural practice – the practice of pilgrimage.

In her 2005 article "On Spatial Perception," Nina Czegledy brought attention to the resonances between certain religious practices and augmented reality. Describing the sight of Buddhists simultaneously walking, circling stupa and praying in sacred sites in Lhasa, Tibet, she wrote, "While walking and praying in the yak-butter-lit, mystical space, the pilgrims appeared transported into an enhanced, symbolic world – an augmented reality." [3]

In this paper, I wish to explore some of the echoes and resonances between certain contemporary location based media practices and older cultural practices involving spatial narrative, annotated or augmented location and the walking of a meaningful landscape – the practice of pilgrimage. In what ways might an examination and understanding of pilgrimage practices inform our approaches to developing place-based storytelling experiences? And whilst I will focus here on some areas of commonality, I acknowledge that there are many areas of divergence. However, I'd like to explore some of these resonances; as a way of exploring how experiences of landscape, narrative and embodiment in pilgrimage practices might inform contemporary media practices concerning location, in partcila place-based storytelling and spatial narrative.

PILGRIMAGE AND SPATIAL NARRATIVE

What exactly is pilgrimage? We might think of it primarily as a religious practice involving a journey of spiritual or moral significance to a specific location or set of locations that have been designated as sacred or otherwise meaningful. Originally referring to the European Christian practice of visiting specific sites associated with the life of Jesus or Christian saints, pilgrimage now commonly refers to particular meaningful practices that are present across many cultures and religions. These include Islamic journeying to Mecca, or Hindu and Buddhist pilgrimage to locations such as Kumbh Mela in India or Mt Kailash in Tibet. [4]

In contemporary culture; the word 'pilgrimage' is increasingly used colloquially to refer to meaningful, secular journeys to landscapes of particular personal, cultural or historical meaning. For example, the journeys of contemporary Australians to Gallipoli, in the Canakkale province of Turkey coinciding with ANZAC Day on April 26, are routinely described in the Australian media as 'pilgrimage'. Visitors are said to have made the pilgrimage to Gallipoli without any hint of irony or religious overtone.

Pilgrimage – both religious and secular – can be seen as both a form of spatialised narrative and as an annotative practice whereby specific locations are associated with narrative and meaning. Further, it is an embodied practice involving both an intellectual engagement with the stories associated with place; as well as an active journey and making sense of landscape and environment as it is experienced.

In "Wanderlust: A History of Walking", Rebecca Solnit writes extensively on pilgrimage, as well as the contemplative nature of walking. Drawing links between geographic and spiritual terrains, she writes, "Pilgrimage is based on the idea that the sacred is not entirely immaterial, but that there is a geography of spiritual power." [5]

There are numerous examples of the use of spatial narrative in traditional pilgrimage practices; notably the spatialised Christian crucifixion narrative known as the Way of the Cross or Stations of the Cross. In its early incarnations, 14th Century Christian pilgrims visited Jerusalem to retrace the final journey of Christ, walking the same ground, and often returning home with relics and artefacts. During the 16th Century, Franciscan's built outdoor shrine replicas of the Stations In France, often incorporating the Jerusalem relics; and by the late 1600's permission had been gained to build the Stations inside Catholic churches.

The Stations of the Cross involves a complex layering of landscape, narrative and walked, embodied experience. In Jerusalem, it traces or augments the landscape with Christian narrative – "landscape became text, and text was engraved into the landscape as pilgrimage." [6] As the Stations journey is then reproduced and distributed into local churches, further degrees of complexity are involved – an abstracted representation of a journey; a virtualisation of real world locations; and the superimposition of a complex narrative onto a small number (fourteen) of signifying images. If we were looking for an historic antecedent to contemporary place based storytelling practices; the Stations of the Cross may be a significant example, involving "stories we can walk into to inhabit bodily, stories we can trace with our feet as well as our eyes." [7]

Contemporary Christians continue to experience the Stations in several forms, including as a large-scale spatial narrative. On July 18, 2008, the Stations of the Cross was re-enacted on the urban landscape of Sydney during the Christian World Youth Day Summit. During this event, Sydneysiders saw key Sydney locations effectively overwritten with Christian narrative – the Botanic Garden's transformed into the garden of Gethsemane; the Opera House into a torture site; and an ex-industrial wharf into the crucifixion site. Unlike the more traditional Stations experience, this re-enactment was not a walked experience, since large audience numbers made it impossible to shift people safely around Sydney within the timeframe. Instead it was a broadcast event; taking place in sequential, discrete locations, and reliant on simultaneous live media broadcast of location-specific narrative via large public screens.

The juxtaposition of the Sydney Harbour environment, including the utilisation of iconic, contemporary sites such as the Opera House, with a two thousand year old narrative that was effectively superimposed on the landscape, was, I believe, problematic, and at times distinctly uncomfortable. Although this may seem an extreme example; such an approach, which overwrites a location with an entirely unrelated narrative, is also deeply at odds with the location specific narratives and histories evident within many contemporary location based works; and to be fair, with the Jerusalem based Way of the Cross. Regardless of religious leaning, the problem of disjunct between narrative and place is an important issue to consider. Rather than superimposing upon location, it may be more effective to maximise the relationship between narrative and location.

SHIKOKU LANDSCAPE AND LAYERED MEANINGS

By way of contrast, I will turn to spatial narrative within a non-Christian context, focussing on the 88 Temple Buddhist pilgrimage in Shikoku, Japan. The pilgrimage is Japan's most popular Buddhist pilgrimage route, attracting thousands of 'henro' [8] or pilgrims each year to the island of Shikoku, in southwest Japan. Looping for over one thousand kilometres around the Shikoku coastline, and involving 88 temple loci; the pilgrimage is undertaken by car, bus, and still, at times, in its original mode, on foot. The pilgrimage relates to temples founded or restored by the famous Japanese monk Kukai, known posthumously as Kobo Daishi, a Shikoku native and significant historical figure in Japanese culture; being the founder of Shingon Buddhism in Japan, the founder of Koyasan on Mt Koya, and a renowned writer and poet.

Unlike many pilgrimages, the Shikoku pilgrimage is not seen as a strictly linear journey that culminates in arrival at one especially sacred place; rather it is structured as a looping, circular journey, where all eighty-eight locations are seemingly of equal importance. Unusually, it is a pilgrimage that can be undertaken discontinuously – one can begin the pilgrimage one year, undertake a portion of it, then return quite legitimately at any time, even years later, to pick up from where you left off.

There are several intertwined levels through which landscape and narrative are creatively aligned within the Shikoku pilgrimage. At one level, the circular nature of the route allows the Shikoku pilgrimage to operate as a type of sacred mandala; with the journey through the four island prefectures and to its temples roughly corresponding with the four stages of Buddhist enlightenment. [9] This is referred to in several texts and maps concerning the pilgrimage, dating back to the 18th century. Academic Ian Reader, who has written extensively on the Shikoku pilgrimage, writes, "The pilgrim's journey, therefore, is one that follows a path to enlightenment in which Kobo Daishi is both a companion and guide in the pilgrimage, while the island is envisioned as a sacred terrain, mandala and map of enlightenment." [10]

At another level, locations within the pilgrimage are associated with stories and acts concerning Kukai. Born in 874, Kukai is known to have undertaken solo journeys and austerities around Shikoku; notably to Mt Tairyu and Cape Muroto, where he had profound experiences that he later wrote about. Over time, through a blurring of the historical and the fictional, various legends or miraculous deeds have been associated with Kukai's presence or actions in particular locations on Shikoku. These real and imaginary stories – he carved a statue here, bringing life to the landscape; or he struck his staff on the ground there, causing a stream to emerge – have become part of the multilayered narrative concerning both the pilgrimage, and the island itself.

The Shikoku pilgrimage resonates strongly with Hight's notion of landscape agitated with unseen histories; where narrative is in a sense traced or carved onto the island through storytelling and association over several centuries, as well as through the embodied practice of walking. Ian Reader speaks of Shikoku as a moving text that is shaped and reshaped by the interweaving of historical and legendary narratives alongside contemporary pilgrimage experiences on Shikoku.

"In Shikoku, for example, there is evident correlation between the physical landscape and sacred narratives, in which the sites and settings of the henro are locations richly layered with complex weavings of meaning and textual representation. This richness of meaning inherent in the locales of pilgrimage provides a moving text for the pilgrimage, and allows scope for different participants to pursue their agen-

das and follow their own pilgrimage paths, which are themselves influenced by the settings and landscapes in which they are enacted." [11]

At a third level, the Shikoku pilgrimage employs a device that actively and creatively links landscape and narrative through the use of 'goeika,' [12] which are poetic, haiku-like instructions or hymns. Each of Shikoku's 88 temples has a discrete goeika, commonly referring to the temple and the landscape or nature surrounding it, and posing Buddhist philosophical questions or instructions to the person undertaking the pilgrimage. Written in an arcane poetic structure, very few have been translated into English, however, those that have often refer to elements of the natural landscape such as the scent of wisteria, the fading of maple leaves, or the golden colour of water in a nearby pond. Posited often in the second person, present tense, they invite the pilgrim – and here I really want to say the word "participant" – inside the narrative; inside the island's text or sacred mandala; exhorting them to engage with the landscape before their eyes; experiencing it not just as a map of historical narratives and miraculous deeds, but participating intimately in the environment freshly, as it arises. In effect, the goeika act to mediate the environment, providing a filter through which to experience the temples and surrounding landscape.

At Ichinomiya
Prayer is not easy
Roll up your sleeves as you pray
Seeking comfort in this world.

Autumn maple leaves
Scarlet or faded, perish.
Once more, springtime comes again
Unending and forever,
Death follows birth, birth follows death. [13]

These complex, intertwined relationships between landscape and narrative in Shikoku appear to indicate unexpected and intriguing correspondences with a range of contemporary location based and augmented reality practices. The Shikoku pilgrimage operates as a spatial practice; and the concept of the island as mandala supports the sense that the pilgrimage operates as a large-scale spatial narrative. The correlation of various sites with specific location-related narratives sees the pilgrimage operating as an annotative place-based narrative – a landscape augmented and overwritten with narrative, myth and miraculous acts. And the utilisation of the goeika within the pilgrimage indicates a further degree of complexity in the relationship of landscape and narrative. Through the use of a second person, present tense and the referencing of actual features of landscape and geography, the goeika act as triggers for a complex ongoing questioning and engagement with Buddhist thought in the context of the locations themselves.

As such, this multilayered relationship between landscape and narrative in Shikoku seems to facilitate an active engagement with location, and a somewhat reflexive, intimate dialogue between the past and the present; rather than representing a purely rigid set of concepts or histories that are tied to place. The potency of such an approach, where there is an intimate, fluid dialogue between the landscape, narrative, and participant can arguably also be seen in the work of various contemporary artists working with location; for example Blast Theory, Teri Rueb and Janet Cardiff, among others.

LOCATION BASED NARRATIVE AND ENGAGEMENT

Over the last eighteen months, there has been a steep rise in the uptake of smartphones in many countries, at the same time as an increase in the application of location-based technologies within museum and other cultural contexts. Mobile applications such as Layar and Junaio easily support virtual annotation of the environment, however, issues of engagement and motivation can be problematic for both practitioners and audiences. While some services, such as FourSquare and SCVNGR, utilise challenge and reward models to maximise audience participation, these approaches are not always suited to historical or artistic location based projects.

As we work with annotative approaches to location-based media – as artists, historians or cultural workers – we face multiple challenges. Why should people engage with these projects? How do we keep people engaged in walked, location based experiences that are not necessarily treasure hunts, or do not offer obvious real world benefits or rewards? If we consider pilgrimage as an historic spatial practice involving the augmentation of landscape with narrative, histories and meaning – and additionally, one that continues to engage people in complex conceptual and physical journeys – what aspects of pilgrimage practice, might be useful to consider? It seems that the most potent, relevant areas to explore involve the experience of an augmented landscape which fosters an intimate, fluid and immediate dialogue between landscape, narrative, and participant; between past, present and possible futures; or between multiple narratives, ideas and histories. Such approaches are likely to involve strong resonances between landscape and narrative; however, these suggest neither a rigid, closed set of stories, nor an unrelated, superimposed narrative or re-enactment, but rather an active, intimate engagement with landscapes traced with multiple ideas and concepts; and with complex sets of meaning.

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IT'S BEHIND YOU: THE PARAMETERS AND PROCESS IN THE CREATION AND PRESENTATION OF PANORAMIC MOVING IMAGES

DAVID HILTON

During September 2010 ICCI (Innovation for the Creative and Cultural Industries) University of Plymouth, UK, organised a 360 film, arts and performance festival in Plymouth city centre. Using the festival as a case study, this paper reflects on the parameters for and the processes involved in the preparation of creative content for the festival, particularly focusing on the issues and concerns pertinent to 360 film making.

During September 2010, ICCI (Innovation for the Creative and Cultural Industries) and the University of Plymouth, UK, organised a 360 degree video film, arts and performance festival in Plymouth city centre. The rational behind this festival was to revive and re-engage with the popular nineteenth century tradition of touring panoramas.

Drawing on this traditional context, the ICCI festival also aimed to investigate the potential of panoramic spectatorship, utilising new innovative technologies of a projection screen format of six metres by twenty metres in diameter, high quality digital HD projection, digital surround audio and a performance space/auditorium housed within a demountable dome structure

The concept of the festival had been developed in line with the aspirations of LOCOG 2012 Cultural Olympiad in the South West of England; exploring the potential of a touring venue for the display of media and performance content. Using the festival as a case study, this paper reflects on some of the parameters and criteria established for the preparation of creative content for presentation within the Arena, particularly focusing on the issues and concerns pertinent to 360 degree film making. To do this we will review the display and presentation of film within the festival's 360 degree auditorium from three key aspects. First, we will reflect on factors that relate to the audience experience of panoramic content. Second, we will discuss how particular spatial and visual environments effect both the production and experience of presented work. And third, we will look at how these factors might be understood within a particular context.

As a result of the growth in panoramic photography [1] and recent developments in 360 degree video [2] there have been an increasing number of practitioners internationally who have been exploring this format as a creative environment. However, until recently the majority of the work produced has been limited: content has usually been displayed as interactive panoramas for computer screens, employing a computer mouse or touchpad as a means to navigate a 360 degree photographic or video space that is normally presented as a spherically mapped environment on a single screen. An emphasis for the festival was placed on the presentation of panoramic photographic imagery and video filmmaking rather than computer CGI animation, although examples of all methods were displayed.

The primary position for viewing the 360 degree image is from the centre of the auditorium. For the filmmaker and the film editor, this geographical positioning of the audience is both exciting while at the same time potentially problematic. The excitement emerges from the prospect of being able to place the viewer within the action - a step closer to Borger's map, [3] the replication of reality that might be

considered a holy grail for certain artists, particularly those filmmakers seeking to comment on, experiment with and play within what is real and its representation.

A simple and perhaps obvious notion is that the image is surrounding the viewer in a way similar to the viewer's experience of 'real life' and therefore the 360 degree experience could be considered to be more realistic than other methods. This concept of immersion is perhaps where the audience position becomes problematised, in that the viewer in real, not filmic, life is perceived not as being immersed in something but participating in an experience of the world from a particular place at a particular time. Immersion within a constrained environment, be it the virtual environment of a screen or screen goggles or the more geographical positioning within an enclosing visual environment like the 360 degree dome, is not the same as the more everyday experience of 'reality.' The constraint is the frame within which the experience purports to offer a new experience or perhaps understanding. A principal paradigm of film viewing and editing is the position of the viewer in relation to the screen, which is determined by the viewer's location in the arena and the direction they are looking; there is always a front and back to the screen area (although, during the ICCI 360 Festival some viewers were pressed against the wall, to gain better visibility or view of the whole screen). From this position the viewers witnessed distortion that mitigates the illusion generated by the 360 degree image. The geographical position of the audience determines their perception of the illusion; ideally they need to occupy the central space of the auditorium for optimal viewing experience. Inevitably this limits the audience members who have an optimal experience, as central auditorium space is limited no matter how large the auditorium.

Deriving perhaps from the proscenium arch of the theatre, we look into screens as we look into a book to read. Early panoramic paintings relied heavily on the inclusion of architectural structures, either 'faux terrain' or painted, to frame the images they depicted. The frame afforded by the screens represents a single field or point of focus and for the most part this is taken for granted in viewing. One of the most dramatic adjustments that needs to be considered when producing - or for that matter experiencing - 360 degree cinema, is the idea that, although one is working with a much wider frame, the viewer is not able to see and experience everything at any one time. While, particularly for a standing audience, there is the opportunity to move one's eyes, head and body to experience the complete screen, the viewer, schooled for many years of image consumption through various sizes of flat screens and by every filmic example previously experienced, holds onto single screen mentality and may struggle to reduce the screen horizon into a watchable frame. Unfortunately, in doing so elements of the presentation may go unseen behind the viewer.

This 360 degree horizon within which the audience is placed seemingly has the potential to offer unlimited opportunity to encapsulate a scene, an environment or a moment in time. In the natural landscape, our perception of the horizon is most usually associated with an unlimited field of vision. We might experience awe in landscape vistas, perhaps due in part to the prospect of infinity, outside of and beyond where we are standing Other factors possibly mitigate against a similar perception within the Arena. For example due to the organisational constraints, the base of the viewing screen within the 20 metre diameter structure was placed 2 metres above ground level; the top of the screen was therefore 8 metres above head height. Our evaluation of this configuration determined that the screen required the audience to continuously look up to experience an on screen display. During the previous tests, conducted in a smaller 12.5 metre diameter structure the screen base was 1.4 metres above ground level with a 3 metre high screen terminating 4.4 metres above ground. The lower screen configuration and perhaps the smaller space provided an improved sense of being immersed within the film or photographic environment. With the larger diameter screen, the experience of gazing at panoramic views of the sort al-

luded to above, one was not awe-struck in the same way since their promise of infinity was quite pragmatically restricted to the geography of the structure, the horizon of which ends with the screen. Yet an idea or expectation of unrestricted horizon is built into the idea of the 360 degree image. This duality of ideas and experience is an interesting and unexpected conundrum of the 360 degree processes. The Projection within the 360 Arena offers a sense of an immersive experience but is also a framework for construction of that experience - the viewer has work to do.

It might be said that an important function of the relationship between viewer and screen in cinema is the viewers' anticipation and expectation of 'what next.' The events that are unravelling on screen presuppose a series, with one event or situation replacing another. As viewers we are in a state of expectation that will be relieved by the appearance of 'what next,' but this relief is immediately replaced by a new 'what next.' What if the 'what next' might be happening behind you? What if the 'what' also brought with it a question of 'where?' What if it were possible to have protagonists between scenes appear at different parts of the auditorium, within the horizon of the 360 degree screen?

In allowing for the illusion of placing the viewer within the geography of the action, the filmmaker has also to consider the time it might take the viewer to shift position to see something happening behind them. To an extent the filmmaker has lost control of the framed image and cannot predetermine the focus of the viewer's attention. In this respect, the production and editing of a 360 degree work allows for new ideas in editing that perhaps use things the viewer can see; such as movement, colour and contrast. And in addition to this, devices the viewer cannot see (but might hear). Teasing, perhaps. Does the video editor allow for a time lag in cuts/transitions so the viewer might adjust their viewing position, or run the risk of the viewer missing parts of the action? Should a shift in action and visual focus around the 360 degree screen be signalled, indicated or aided perhaps by a shift in sound – particularly if one is working with surround sound?

The editing of all film and animation for the festival took place using a five screen linear format in preparation for the five-projector display method that was employed in the 360 Arena. This was not an ideal solution; inevitably screen three became the centre screen for editing purposes with screens one and five (which in projection would be joined) at opposing ends. The consequence of this linear format highlighted a number of interesting editorial issues. There was great pressure for screen three, due to its central position to become the focus for editorial decisions particularly those based upon visual composition. The natural and human desire for symmetry during the editorial process became a factor that had to be consciously overcome if the link between screens one and five was not to appear disjointed and the images were to retain the benefits of a 360 degree layout. A number of the works composed of still images used the stitch process of blending a number of images to produce a whole panorama. This stitch effect was also used in a montage way by a number of filmmakers as they compiled a number of different images to produce a whole composite. An example of this would be; "Cortical Songs," movements one & two, by John Matthias and Nick Ryan, (Matthias and Ryan 2008) performed by the String Ensemble of Trinity College of Music, conducted by Nick Pendelberry. [4] This 360 projection piece constructed by the co-author David Hilton was made up of single camera recordings that were edited onto 5 separate screens to remain in sync with the music. The effect was successful, largely due to the splendid camera work of Robin Cox directed by Andrew Graham Brown, which deployed balletic craning and tracking camera motions. Perhaps because the orchestra was not seen in the round there was no single geographical centre for an audience member to experience the film, instead he/she was able to access the separate screens within any part of the circular screen that was visible to them. The structuring of the of the work started with all screens showing the same image repeated, following the expectations associated with viewing a single screen. Gradually different images or camera views were introduced on

separate screens. As the work progressed, each screen would present a different view of the performance with close ups on performers from different parts of the orchestra. In this way, the editing worked with a narrative both of the progression of the musical piece and the audience's engagement with it. Gradually, the audiences were encouraged to see what might be happening behind them and make full use of the 360 degree environment. [5]

The Ladybug 3, [6] 360 degree video camera was used for a number of productions presented within the ICCI 360 arena. This device captures video using six cameras: five around the horizon and one above to produce 80% of a hemispherical image. Within the ICCI Arena, only a cylindrical slice of this image was used for projection on the wrap around screen, the screen did not extend to the full dome ceiling. The Ladybug 3 offered the obvious choice for film that recorded full 360 degree panoramic video imagery. Only a few of the works used the Ladybug 3 as the sole source of imagery. Perhaps the most effective use of the camera was in the production of *Panoptica* by Craig Whyte, Andy Banks and Jo Plant. In this work, the producers combined live action single camera shots with live action shots using the Ladybug camera and C.G.I. effects and environments within which the protagonists of this science fiction film interacted.

The ICCI 360 screen marries both theatre and cinema and creates an entirely new experience. In conceiving the 360 film. I first thought about early cinema, largely due to the technical limitations the 360 Ladybug 3 camera created. For instance, in early films such as those created by the Lumiere brothers, all the action took place within one static shot with few cuts. In this sense, shooting on the Ladybug is the same. But it also connects the medium once again with theatre. The camera becomes the audience and the actors perform their roles within a single space. In this case, you're working on a 360 stage. [7]

The conceptualisation of the space when planning action within the 360 arena also presents problems with the design and construction of the work due to the fact that one cannot see it as it will appear, except in the 360 environment.

The best way to do it was by doing a floor plan - a bird's eye shot to see how we use the space using the 360 camera - I don't think we would have been able to do it without the plan.
There were certain scenes that worked in the film – for example the ventilator scene, that was a bit surprising, you have the main character who has escaped and ends up in this vent shaft and when you watch it as a single screen it is quite boring - but we were quite surprised watching it back in the 360 how interesting it was because he was going all the way round the 360 degree screen crawling in that space and that is the first time the audience actually get to just to see that main character. [8]

The process of production is not automated and no matter how inventive in its conception each work was the result of painstaking production processes. The degree of detailed work involved in production is perhaps exemplified by Udo Hudemaier's piece *City of Plymouth* produced entirely using still images. Each image underwent a high degree of processing; particularly evident in the shifting of perspective as each window of a high rise office was seen square-on without perspective distortion while its setting flew up and down the buildings, an effect produced by photo manipulation one frame at a time. Other producers had different problems but each had to devise a strategy for maintaining alignment of individual images to create the synchronous whole image on projection.Perhaps two methods most used were to assemble the whole 10:1 ratio panoramic image in a programme such as Adobe's "After

Effects," necessitating use of the flat one screen image to represent the enclosing panorama. Another method was to fragment the sections of panoramic images into five single screens, which then were augmented with other footage and effects – one screen at a time. In this latter method the sense of the wrap-around panoramic image or 'suggestive image space' of the work was more difficult to sense during the edit. [9] In all cases the only time the work was seen in its intended form was during the exhibition inside the dome.

CONCLUSION

The experience of preparing creative works for projection within the ICCI360 Arena has raised many subjects for further research. In this paper we have identified just a small number of these subjects and have outlined:

The large numbers of international creative practitioners who are exploring the 360 degree format are limited to the presentation of their products as navigable spherical images presented within the frame of a computer monitor. Within the computer screen one notionally has complete access to 360, but the computer screen always frames this. Whereas the frame established by the screen in the dome seems to be unframed, it is in fact the dome itself, which provides a frame: the 10:1 aspect ratio of the projected image is a very narrow window. This could be construed as a possible inhibitor of an immersive experience. The 360 degree projection environment presents further possibilities and problematics for this work.

The significance of the size of viewing space and the position and size of the viewing screen relative to the audience is an important mediating consideration. And further, the importance of viewing the 360 degree projection from the centre of the display for an optimal experience of the panoramic image necessitates a restriction in the size of audience. The scale of the immersive experience may be a factor for further exploration with regard to the 360 degree horizon and the height of screen: looking up to horizon or down upon it. [9] If the projected visual horizon is not at eye level the viewer's ability to relate to landscape is mitigated. If the image horizon is above the viewer it is related to as a picture on the wall, but if lower than eye level, one is more likely to be immersed and encounter a feeling of presence: the viewer needs to look 'at' or 'down on' and not 'up to' the image.

Of the many issues in production for the 360 environment, we should identify the following as of particular concern for future exploration: In constructing action and narrative sequences that employ the full scope of the 360 degree screen one runs the risk of the audience missing parts of the action which might take place behind, where their attention is focused. Should producers allow time for the audience to change their focus and indications - perhaps using sound to suggest this? Other devices include tracking action around the 360 degree screen by isolation of certain key points of attention such as actors/figures moving or the de-focusing or blacking out of other parts of the action. Currently the editing process requiring single screens to be laid out in a line of five may lead to over use of the symmetrical structuring of screens and a focus based on screen three (which is in the centre of the edited image) and screens one and five becoming disjointed. The degree to which one might employ a full 360 panoramic image in relation to images montage - constructed of 5 single screens - also affects the experience of the work. It does seem crucial to the development of this form, that editing facilities are developed that permit visualisation of the work during editing.

The gap between what is in front and behind and the audience's focus of attention represents an opportunity to exploit and explore a conceptual space that might be described as an interpretive space, and this provides a creative opportunity for future development.

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THE METAPIANO: COMPOSING AND IMPROVISING WITH SCULPTURE

RICHARD HOADLEY

This paper concerns the implementation and control of interactive sculptural interfaces, designed to be used by the public as well as by musicians or dancers. The main device under consideration is called the Metapiano, an interface developed to trigger and modulate an array of musically expressive algorithms. The paper describes interactions with hardware and software systems and the nature of the music created.

Fig. 1. Hangings with Glyphs, 2011, Katy Price and Andrew Nightingale, Canvas/conductive paint.

Fig. 2. Metapiano, 2011, Richard Hoadley, Aluminum sheet, steel, wire, acrylic, Arduino.

1. Introduction

This paper concerns the design, implementation, demonstration and control of interactive sculptural interfaces, designed to be used by the public as well as by specialist performers, such as musicians or dancers. The main device under consideration is called the Metapiano, an interface developed to trigger and modulate an array of musically expressive algorithms using a (synthesised) piano as the primary sound source.

The paper describes the manner in which a viewer/performer interacts with hardware and software systems, examines the nature of the music created, and details how the two are related. Of particular interest is the way in which the resulting music relates to both new and more traditional forms of composition, performance and improvisation.

2. Related Work

With the advent and growth of accessible methods of physical computing, generative composition and real-time synthesis, there has been a similar expansion of interest in more practical and physical aspects of music making. That which was considered some years ago as a fringe activity for more experimental musicians and engineers (Theremin, Partch, Cage), has become increasingly mainstream and has enabled progressively more intimate collaborations between the arts.

This growth has been primarily focused on the musical interface - digitally through the graphical user interface, physically through the invention of new instruments and generatively through the development of algorithms to enhance, replicate, replace and analyse, human activity. [1, 6] Of course, analyses of human behaviour have demonstrated the complex relationships between the activities that can account for our behaviour – strategies, planning and construction – as well as our direct physical interference with the world. [10]

These developments in software have been reflected in movements in the cross-disciplinary field of physical interaction with software through hardware. The introduction of the Arduino in 2005 has been seminal in encouraging those from more creative disciplines to investigate issues of HCI and expression. The practically based work of Nic Collins, Perry Cook and O'Sullivan and Igoe is of particular importance here. [4, 5, 9]

The work of Alexander Calder and Ives Tinguely is clearly significant to the physical form of the metapiano, while its use as a musical interface adopts some ideas developed in Earle Brown's 'Calder Piece.' [3]

3. Triggered, Gaggle and Wired

Triggered is a dance-music project that has been evolving since 2009. The core musical group of Tom Hall, Cheryl Frances-Hoad and Richard Hoadley was invited to collaborate with choreographer Jane Turner and her dancers in the creation of an interactive performance for the Human Computer Interaction conference held in at the Cambridge University Computer Laboratory and Microsoft Research. In an afternoon, a fifteen-minute dance-music performance was devised involving dance, physical interaction, algorithmic and human-controlled music generation and instrumental music performance. My contribution was the Gaggle ultrasonic interface. [8]

In June 2010, an extended production of Triggered took place at the Symposium on New Materialisms and Digital Culture at Anglia Ruskin University. This performance involved two new sculptural interfaces: Wired and Gagglina. [8] Before and after each performance the public was encouraged to investigate the devices themselves and how they are used to generate musical material.

The 2011 Triggered production was further developed for performance at the Kings Place in London. Both Gaggle and Wired were rebuilt using more usable, stable and dramatic forms and two new devices were built – a set of three canvas hangings painted with a variety of symbols and the metapiano, a metallic, Calder-esque mobile.

In order to allow the dancers movement around the devices without obstruction, they were designed to operate wirelessly, hanging from the lighting rig of the venue.

4. Hangings with Glyphs

Figure 1 shows the three hangings created by writer/poets and now artists Katy Price and Andrew Nightingale. The hangings are made of unfinished canvas and both ordinary and specially prepared conductive paint, which provides touch sensitive areas on the canvases. The panels include a variety of images referencing widely differing origins: cave paintings, modern computing symbols, antennae, etc. As music interfaces they investigate links between sound, image and meaning as well as drama and expression in performance.

During both rehearsal and performance, the dancers spent time investigating the panels and indeed, when the configurations changed slightly between rehearsal occasions, complained that this hindered their learning 'how to play' the hangings.

In terms or capacitative touch, this was one of the most fragile and unpredictable devices. It was particularly difficult to ensure that touching actually provoked a response (and the reverse, making sure that a response didn't happen constantly). I suggested a few times that from my position in front of the laptops, I could trigger some events occasionally. I was surprised by the vigour with which both dancers and choreographer rejected this on the grounds that it would be 'cheating' and, perhaps more seriously, that it would undermine the attempts of the dancers to learn how their instruments worked.

5. Metapiano

Of all the devices mentioned here the metapiano is the most complex, both in terms of hardware and software. It was conceived as an experimental multifunctioning object that could be played, or operated by a variety of types of performer, including members of the public, in a variety of settings. Reflecting this, there would be a variety of performance modes, including a standard music performance mode, where a musician would perform in a fairly traditional way, using the device as a performance interface. The mode utilised in Triggered is different: the dancers employ the power of movement and gesture as well as the algorithmic nature of the music produced to create a hybrid performance including music, movement, drama as well as, of course, dance. Another intended, but as yet unexplored mode, involves members of the public in gallery-like environments (although they could be anywhere appropriate) interacting with the device individually or in groups, and in doing so creating their own composition

or compositions.This has happened quite successfully with the original Gaggle at events such as HCI 2009.

In these situations, what is a piece of music, or a performance, and how does it differ from sculpture, sonic or otherwise? There are many examples of algorithmic and interactive art pieces that respond to movement, touch and pressure or that simply unfold over time. [6] One of the consequences has been the generation of a certain type of music: generally ambient or highly pattern driven or stylistic. I was interested in reflecting the mood, style and intention of a traditionally structured piece of western art music. One that struck me in particular was a composition that I was fortunate enough to encounter at this time, *Lune Rouge* by Alissa Firsova. [7]

This composition (and its performance by the composer) was about as far from what one might expect from a musically generative computer programme (it wasn't to my knowledge!); this is what drew me to it.   Not only was it highly expressive, it was gentle, colourful, melismatic and above all structurally satisfying. It was rich and original in its use of harmony and colour.

The metapiano, as with all devices mentioned, operates through a variety of sensors, the data from which are captured and transmitted by Arduino boards of varying configurations. The data are transmitted via Bluetooth modules to the SuperCollider audio environment, where they trigger or modulate a variety of high, medium or low-level algorithms.

One of the key sensors works through capacitative touch and is based around a 555 timer chip circuit. In addition, a force resistant sensor (FSR) was included on each of four of the leaves. A performer could both touch and squeeze a leaf and by doing this generate data for immediate sonification. When touched, the capacitative sensors send a signal to one of the digital inputs on the Arduino microprocessor board. This in turn transmitted a '1' when touched and a '0' when isolated. The FSRs (and indeed the bend sensors when implemented) output between 0-5 volts; this is sampled and given a value between 0-1023.

The lowest level algorithm is simply a SuperCollider synth, a sampled piano, which plays a single 'note' event and allows for control over particular musical parameters.

This simple event provides the basis for all higher-level algorithms. As an example, one of these generates arpeggios, imitating some of the most characteristic passages of the Firsova. The function creates gestures made of arpeggios. An arpeggio is made of a number of sub-arpeggios, each containing a number of notes, usually three or four.

Through arguments, the number and value of these parameters can be modulated or randomized, as can a number of others such as tempo and starting note. Amplitude is controlled algorithmically, or through another sensor such as an FSR or bend sensor.

As a message is transmitted by the Arduino board at a minimum of about 50 times a second, if an arpeggio were to be generated every time SuperCollider received a '1' value from the metapiano, there would be many instances of the same algorithm occurring simultaneously, overloading the synthesis engine and swamping the musical texture. In order to control this, a counter is implemented and incremented with each '1' message.Only when the counter has reached a certain value does the function trigger an

arpeggio. Even then, another counter is kept gauging the number of arpeggios playing at any given time and a further limit is placed on this.

It is in the creation and manipulation of configurations such as these that much of the detailed composition occurs. The arrangement described above causes a sufficiently prompt response for the performer to feel physically responsible for the sonic event, while ensuring that neither the musical texture nor the computer's CPU is swamped.

My original intent was that many interlocking algorithms triggered by different physical events should be configured so that they create a satisfying, varied and multi-layered 'composition' with a significant 'improvised' component when even an unskilled/unrehearsed performer, whether dancer or member of the public, played with the device. Due to the demands of performance and audience and lacking the luxury of many days of experimentation and rehearsal, I decided to supply a safety net in the form of a scheduled series of events – a seven-minute (approximately) algorithmic composition, although this can be lengthened, shortened or restructured easily. With this in place, whatever interactions the dancers instigated, there would be some thread to follow, some overarching structure.

So that the dancers should trigger appropriate events at appropriate times, the composition was structured using what I called 'scenes.' These were implemented as top-level functions directing the triggers from the real world towards particular sets of mid-level functions. During the first scene, a touch would be likely to generate a chord or small set of chords, a single arpeggio or small melisma. A subsequent scene would direct the gesture towards the generation of an arpeggio such as the one described above. Other scenes triggered rhythmic chords or microtonal swirls of notes. The use of scenes promises much in terms of a more 'improvised' and less scheduled musical structure. By allowing either the change of scene automatically, or through another as yet un-invented device, it should be possible in future to allow for more improvised experiences while maintaining feelings of structural dynamism and unity.

As a composer who was trained in the western art tradition, I find it a constant struggle to relinquish the layers of control so often necessary to the successful implementation of one of those earlier creations, and yet I am very drawn to the enabling freedom of expression allowed by technology. While I was unable to let go of the structures of western concert music sufficiently to risk the improvisation that was my initial aim, the structures created at least in principle provide a workable method to achieve this.

What is left are questions regarding the nature and importance of the interface itself: whether the nature of the devices and creations described above make a significant difference to the way people interact with them; or, indeed, the type of musical events or even structures they create.

A significant hint as to the answers to such questions may lie in the reaction of the choreographer and dancers to some aspects of the interaction with these devices during the small amount of rehearsal time available. Since there were of the complications involved in the activities described above – not least the batteries running flat or Bluetooth disconnecting (for instance) – I made it clear that I could and was prepared to trigger events from my own laptop, so that 'something' would happen. The choreographer made it equally clear that she and the dancers did not want me to trigger anything. This would, in their opinion, be 'cheating' and would cloud their ability to understand what was really happening in their interactions with the devices. In other words, even if there was a problem with the interface, it would be better for this to be openly the case. Whether this purity of approach would have been so welcomed had

there been serious problems with the performance will, fortunately, have to wait for another production as, in the event, there were no serious technical issues to contend with.

6. Conclusions and future developments

At least as far as the Metapiano is concerned, the Kings Place performance of Triggered represented a significant milestone in the development of this work, but not a zenith.

Suspending the devices proved an excellent idea, and was highly effective dramatically – this has opened up many options for future development. Any future use needs to consider the use of pulley systems to enable the devices to be easily raised and lowered. For venues where hanging objects from the ceiling or lighting rig is not feasible, boom stand systems would be a good idea.

Although the Bluetooth devices used for wireless communication worked well, I would prefer to use open, non-proprietary solutions where possible and so devices, such as the XBee, and systems making use of them, such as 'Sense/Stage', should be investigated. [2]

Less prosaically, the hanging panels revealed significant potential for the use of semantic links between image, paint and sound in the design of the interaction.

Of greatest significance is the development of these technologies for therapeutic uses in the 'Touching Sound' project, an international collaboration between musicians, therapists, programmers, psychologists, artists and others. In spite of many years of research into human computer interaction, there have consistently been issues with the explicit adoption of technology in therapeutic environments, not least because of the way in which clients and practitioners view such technologies: as unnecessary and intrusive. At the same time, there are many ways in which technology can be used productively, for instance in the spontaneous generation of aesthetically interesting artefacts as well as in the exploitation of kinaesthetic and multisensory elements, such as those described in this paper.

The Touching Sound project seeks to describe, implement and analyse work that investigates unique methods of articulating and implementing expressive gesture, synchronisation and entrainment, primarily through shared physical interaction with objects. This includes the implementation of custom-designed and built hardware and software using methods that are as close to invisible to clients and practitioners as possible while still maintaining the benefits of cutting-edge digital technologies. In particular, activities in music performance, dance and various physical and arts therapies are considered.

All of these activities emphasise one thing: the links between composing, improvising, performing and the nature of the physical interfaces used are of crucial significance in many forms of music and that we are approaching a point where a fuller and more open experimentation with such links is becoming conceivable.

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BUTTERFLY WINGS OF PYTHAGORAS

JOANNA HOFFMANN

In my paper I recall Pythagorean idea of Universal Harmony, the first model that integrated the human inside with the rest of the world, questioning its validity in our times as well as its role in the process of redefining our humanity and relations with the nature treated no longer as the object of exploitation but as the subject of civilisational transgression.
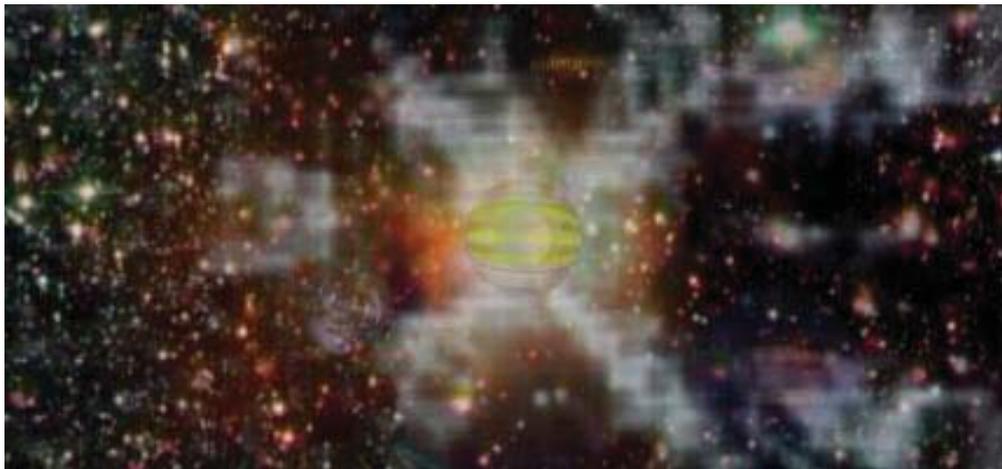
Fig.1 "Tones & Whispers", 2005, Joanna Hoffmann, still from the video animation.

Fig.2 "Hidden topology of being" 2011, Joanna Hoffmann, still from the video animation

Fig.3 "Molecule", 2011 Joanna Hoffmann, still from the video animation.

IN PYTAGOREAN UNIVERSE

When we look at the "Millennium Simulation", the most ambitious visualization of our Universe made by Virgo Consortium, and we juxtapose this impressive model with the image of human neural connections, we immediately notice uncanny similarities between these two complex systems. Is it the result of tools used for these visualisations or maybe there are actually more similarities than differences between the macro and microstructure of our Universe?
It was Pythagoras who first connected the human inside with the cosmic space. His idea of the Universal

Harmony has been considered as the most important, influential and beautiful concept born by the human mind.

Pythagoras believed that the whole Universe was music. He divided it into *Musica Mundana* (later known as Music of Spheres) and *Musica Humana* (music of the human body). Pythagorean Harmony was based on numbers and proportions. For him a triangle connecting distant stars, drawn on sand or heard in a triad chord meant the same – they expressed Logos, the hidden order of the world.
His system united philosophy, science and art, influencing their development. With time, their paths separated and today, as Gyorgy Kepes noted, our understanding of the world is divided into the rational knowledge frozen in words and numbers, and emotional knowledge embedded in sensual images and feelings. To regain an integrated vision, a consciousness that could apprehend all the richness and diversity of our experiences of the world, we have to use all our abilities to "merge the scientist's brain with the poet's heart and the painter's eye." [1]

By entering (with my poetic heart and artistic eye) the sphere of mutual relations between science and art I recall the beginnings of this union and ask about the validity of the Pythagorean idea of Harmony in our times. I begun my investigations with a series of works devoted to relations between micro and macro scales, between *Musica Mundana* and *Musica Humana*, The series employs a musical adaptation of the Music of the Spheres by Johannes Kepler, the father of contemporary astronomy, as well as data obtained by means of radio telescopes and other devices used nowadays to explore the Outer Space.

I paired this material with microsounds of my cardiovascular system and later brainwaves, discovering in them fascinating musical structures, with resonances and aliquots reaching all accessible to us octaves. It is worth to underline that for Pythagoras identifying the world with music was not a metaphor but the answer to his search for arche, the essence of the universe.

The series ends with the multimedia installation "Tones & Whispers", presented at the Dana Centre/Science Museum in London in 2005, and realized with the support of the Institute of Neuroscience at the University of London. In this piece cosmic and human soundscapes merge and images of my brain mix with those of distant stars and galaxies. In fact my brain replaces here the Sun: the centre of Kepler's celestial composition and of the universe of his times.

Today we know that our Solar System is not the heart of the Universe. Quite the opposite, we rotate on our small planet around one of a billion of stars on the outskirts of our galaxy, one of millions of galaxies racing through the Space, or, strictly speaking, together with the Space. Where should we look for a point of reference, then? One possibility is to focus on the brain and mind as its function; the nexus of individual sensations and perception of the world as well as the source of all ideas and concepts including the idea of the Harmony of the World. We can go even further and stop thinking in categories of centres (and peripheries). Then we may recognize the brain-mind unit as a "knowing-becoming-participating-valuing system functioning within a 'spacetime' context described by the synergetic collaboration between information within a system and information from outside systems". This approach suggested by Tamar Levin [2] links the individual nervous system not only to biological/genetic, historical and cultural experiences but to a greater undivided whole: to the information space and energy of the universe. Looking again at the Millennium Simulation, one can imagine that somewhere in pulsating nooks of its vast volume, there is a fractal mote (his/her brain) that manifests the deepest creativity of matter: the intelligence of life.

LIFE MATTERS

During the last century, our knowledge of the world and of ourselves has expanded tremendously. Today we know that we are made of the same components as the rest of the Universe. Thus, it is optimistic to think that at the atomic level, as part of the universal recycling, we are practically immortal. Nevertheless the question: "what makes us alive?" remains unanswered. Today we acknowledged that Aristotelian definition of life, based on the notion of a living organism, is no more valid because life "happens" on the molecular level. Biological sciences claim that only DNA is alive, making the rest of the organism merely a part of its much larger habitat. What is confusing however, is the fact that no inherent quality has been found in a replicating gene that would differentiate it from the inanimate matter. The phenomenon of life turns out to be very context-dependent.

The shared genetic heritage of the animated matter makes us realise the biological unity of all life on the Earth. The harmony of nature however conceals a ruthless struggle of genes for survival and does not favour its components. Considering the ease with which our cells start to reproduce foreign genetic sequences, it might be concluded that if mankind is ever wiped off the surface of the earth, it might be the result of the lost "gene war". Moreover, just like the extinction of dinosaurs, it would not disrupt the phenomenon of life and its further evolution. I referred to questions about the substance and meaning of life in my multimedia project "Life matters" realised during my residency at the International Centre for Genetic Engineering and Biology in New Delhi in India where I was working with research material on malaria, SARS and AIDS. I continued my investigations in the project "Proteios" developed at CEMA Centre for Experimental Media Art / Srishti College of Art, Design and Technology and the National Centre for Biological Sciences, Bangalore, India in 2009.

HIDDEN TOPOLOGY OF BEING

We usually identify life with the processes of maintaining and transmitting information and knowledge both at the biological and the cultural levels. Obviously, it is not the only interpretation. Life is also, to quote S. Symotiuk, "the way in which space exists, and vice versa; space might be treated as the way in which life exists." [3] This tautological sentence has its consequences. In our common perception our reality is made of four dimensions but according to the superstring theory it contains additional dimensions compacted to the subatomic level and hidden from our limited perception. All dimensions are liquid in their interconnectivity, and the space-time is no more defined by "specified points" or "corpuscle" but by minute strings which vibrations secure diversity of matter. Our anew musical universe coupled again science with aesthetical desires. "If guitar strings can create the splendid music in the three-dimensional space - writes the physicist Saul-Paul Sirag - think how exquisite must be the music in the nine-dimensional space!" [4]

We assume that we are connected with ourselves and environment in much more subtle ways than told by our senses, but we have to wait a long time before the evolution of our brain will overpass its current limitations and allow us to fully experience our multi dimensional existence.

Meanwhile we have to rely on our imagination and use available keys for its stimulation and for representation of our assumptions. In my artwork "Hidden topology of being" I use a model of a protein molecule as a space-time unit of my "liquid universe". Its folded globular form brings to mind Calabi-Yau manifolds, geometric formations containing contracted dimensions, whilst exposed to X-rays it shows an

arrangement of atoms that might serve as a map of the starry Sky. Bridging micro and macro scales, scientific imagery with daily recordings and poetry, I translate scientific ideas into the area of art as a source of personal and collective consciousness inviting intuitive examination of the unfathomable nature of our reality.

The structure of a protein is used also in my interactive installation "Molecule". Here the 3D model of its atomic arrangement merges with ever-changing sequences of video-animations referring to basic elements and states of matter. The installation creates a dynamic and contemplative landscape, a kind of atomic puzzle, underlining the fundamental homogeneity, instability and interdependence of components of our world. The interactive aspect of the installation enhances the experience of belonging to some dynamic system of interconnections.

FROM HARMONY TO SPECTRUM OF POSSIBILITIES

Pyhtagorean idea of the universal harmony has not gone stale but evolved together with changes in our knowledge of the world. In the 19th century, theories of evolution and thermodynamics introduced motion and variability to the otherwise stable cosmic composition, while non-Euclidean geometries opened the way for new space-time theories and interpretations. At the threshold of the 20th century, quantum physics confirmed Pythagoras's intuition, igniting our modern imagination with vibrations of micro-strings of the matter in eleven dimensions. Greek Tetractys was replaced by physical constants describing the Universe in which the biological life evolved. Seen in a new light, the oneness of nature finally rebutted our long-built illusion of our privileged position in it. The proud Renaissance monument of the human being as a measure of the Universe cracked and old Pythagorean attitude emanated through its crevices.

Born out of the observation of the chaos of the world, Pythagorean Harmony searched for interconnections not for hierarchies. Today we learnt that synchronization, adaptation and interaction are at heart of deterministic chaos that rules natural phenomena. Its notorious "butterfly effect", in which the slightest perturbation of the system leads to unpredictable but expected and unavoidable changes, proves the fragility and dynamics of relations between animated and non-animated, micro and macro environments. By all means, it concerns also the human being from his genetic code, social behaviour to mental processes.

We learn to accept that nothing in our world is for granted and there is no defined future only the spectrum of possibilities.
Paradoxically the progress in science and technologies together with the crises of humanistic ideologies give us an opportunity for re-questioning and redefining our humanity and for a renewed approach to nature treated no longer as an object of exploitation but as a subject of civilisational transgression.

BACK TO THE UNIVERSE

Our spiritual, intellectual and physical environment is changing rapidly. We cannot foresee how quantum, biogenetic and computer revolutions will transform our lives and ways of our thinking. Nevertheless using the very poor knowledge we have today we can make some random predictions and direct our endeavours.
Inspired by scientific breakthroughs in search for water in the Universe, I visited La Reunion, a tiny island

on the Indian Ocean, a home of SALM – Moon/Mars Analogue Site, serving the research towards our future colonisation of the Space.

According to scientists it will take us at least 300 years to make Mars habitable and considering all our earthly dangers as well as the development of our civilisation we should start the process of adaptation now. Yet, turning our eyes and minds towards unknown places, it is worth to recall words of one of the heroes (Snaut) in "Solaris" by St.Lem: "We leave for the Space, ready for everything that means for loneliness, martyrdom and death. Through modesty we don't say it aloud, but we think sometimes how splendid we are. Meanwhile, meanwhile we don't want to gain the Space, we want only do extend the Earth to its limits.(...) We don't know what to do with other worlds. One is enough and we already choke with it." [5] In other words, for the human consciousness there is no difference between apprehension and appropriation. The strong anthropocentric tradition (reflected in the antrophic principle) reveals a deeper problem of the human condition: inability to go beyond our common human subjectivity. Nevertheless by acknowledging and understanding our boundaries we can extend our conceptual reach and "not choke" with our own world. If we manage to mature our humanity and thus our sustainability, we may succeed, despite the threat of a nuclear war, deadly pandemic and environmental collapse, in creating a truly planetary civilization [6] able to manage and share resources of its own planet; the civilization based on advanced cooperation and cultural convergence. That would be our first step towards stars. Then in thousands of years, as a stellar or even galaxy civilisation we may come across the Golden Record, our today's message to distant civilisations, carried aboard Voyagers through the cosmic space and again listen to its immersive invocation: vibrating tones of J. Kepler's Music of Spheres, the testimony of power of human creativity, imagination and visions.

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6. *I am referring here to the classification of civilizations introduced by Nikolai Kardashev and Freeman Dyson based on the ways their utilize energy: 1. Planetary civilization, 2. stellar civilization and 3. galaxy civilization. Freeman Dyson, Disturbing the Universe (New York: Harper & Row, 1972).*

PAINTING AS PROGRAMMING: CASEY REAS AND THE AESTHETICS OF GENERATIVE CODE

Meredith Hoy

This paper considers the work of Casey Reas, an artist whose output hovers between painting and computing. It proposes that the seemingly insurmountable division between the conceptual and the aesthetic is not absolute, and argues that Reas's practice, one that is fundamentally painterly but also tied to the specific functions made possible by a digital computer, offers an alternative to this artificial distinction.

In 1999, Jerusalem-born, New York based artist Daniel Rozin constructed a wooden mirror. In it, a heavy, octagonal wooden frame encases a grid of 830 square wooden lozenges, each of which is mounted on a small servomechanism. When a viewer approaches the mirror, each servomotor receives information relayed through a computer program from a hidden video camera, and mechanically angles the square toward or away from the overhead gallery lights. The degree to which each square is illuminated by or shaded from the external light source determines that square's visible gradation from light to dark. As each servomotor receives its real-time information about the figure standing before it, a grossly pixelated impression of the viewer's body coheres into visibility, accompanied by the faint clicking sounds of hundreds of scrabble pieces spilling over and against each other in a continuous loop.

Wooden Mirror is the first in a series of interactive installations fabricated from a variety of opaque, usually non-reflective materials, including wooden pegs, circles of laminated paper, woven fabric, and trash collected from the streets of New York city. In this series, Rozin announces that his aim is to explore the relationship between the analog and the digital, to "inflict digital order on a material that is as organic as it gets." But, this opens the question: in what features does the digital reveal itself? Why should we think of this piece as digital? Does it use digital technology to create an analog aesthetic experience? Or, does it employ analog technology to leave us with an aesthetic impression of the digital?

What we would expect to see in approaching a mirror, even a "fun-house" mirror, is a detailed if insubstantial image of ourselves generated by the refraction of light, no matter how distorted the results. When confronting *Wooden Mirror*, however, we cannot say the pixelated impression hovering before us is a "reflection," in the same manner as the reflections that appear in the silvered, glass mirrors to which we are so accustomed. Glass mirrors create a sense of continuity between the reflected world and the physical world in which the viewer stands.

Rozin's *Wooden Mirror*, on the other hand, compels us to gaze *at* instead of attempting to look *through* the wooden pixels as they sweep towards and away from the light. The opaque, and non-reflective lozenges render a granular likeness of the viewer, but in such a way that calls attention to the modular composition of the interface—the grid of wooden pixels—instead of effacing them in favor of an illusion of transparency. The particulate discreteness of the "mirror image" renders an indistinct, discontinuous impression, dismantling the possibility of a perfect virtualization by foregrounding the digital elements that give rise to the overall pattern.

Most often, it will be presumed that digital systems and electronic computers are equivalent because technologically speaking, electronic computers process information digitally. The digital is a term that

has become largely transparent—digital imaging, digital technology, digital sensors, all denote a techno-logical mileu rather than an aesthetic one. However, instead of thinking of the digital as a technological category, in which an object is "digital" if it is a product of electronic computational processing, I am defining the digital as an aesthetic category, where "aesthetic" is deployed etymologically, to refer to the apprehension of features of an artifact that are available to sense perception. The digital then be-comes a configurative and aesthetic modality rather than a technological one. Consequently, just be-cause a picture is created using an electronic computer, whose underlying processes are computed digi-tally, it might not necessarily exhibit perceptibly digital features. And, contrastingly, an artifact that is made without computational processing might have digital features.

To more concretely illustrate what I'm saying, think, here, of each wooden square in *Wooden Mirror* as a "digit"—a discrete unit that, when combined into a schematic array, constitutes a digital screen. While this schema is comprised of physical, tactile materials, instead of electronic impulses, it is similar to a bit- or pixmapped computer screen, in which the pixels are spatially mapped, arranged in a regular pat-tern. The surface of Rozin's so-called mirror is configured digitally, then, insofar as it is constructed of discrete, interchangeable, and articulate modules.

Even if it is a technological possibility that the pixel-like "modules" in Rozin's mirrors could be further and further refined, to the point at which they could no longer be perceived by the human eye as indi-vidual units, and even if it is feasible that the materials deployed in these mirrors could mimic the color and texture of the person or object facing it, the more interesting question to me is why artists like Rozin choose *not* to pursue that technological teleology, and instead choose to foreground digital dis-creteness. Digital technology may be capable, notionally, of virtualizations that appear perfectly coex-tensive with the physical world. The number of calculations and speed at which they can be carried out by computers is potentially infinite, the upper limit determined only by the limitations of existing, and as we know, always dynamically changing memory storage and processing speeds. Nevertheless, it is im-portant to ask what is achieved by making the digital sensorially apprehensible, by keeping it open as an aesthetic and analytic category worthy of conceptual and perceptual consideration.

I contend that giving aesthetic priority to the digital, instead of masking digital configuration, provokes viewers to consider how a variety of pictorial techniques and technologies involve digital or proto-digital processes at various stages from conception to realization, even if the final product obscures most in-dices of the technology used in the process of structuring the depiction. I argue that the phenomenon of digitality has been a mechanism undergirding representational technologies for far longer than elec-tronic computers have existed. As such, the digital is not simply an art historical problem applicable to the study of contemporary art, but can be extended to a much broader consideration of how modules, matrices, and other digital techniques have shaped the norms and trajectories within various depictive modalities, from pictorialization to musical notation to cartography.

Rozin's work is palpably discrete, programmatic, and digital, foregrounding the digital at the level of in-terface. But I will now turn to the "programmed paintings" of Casey Reas. As opposed to Rozin, Reas treats the digital as a primarily technological category, rather than an aesthetic one. As such, his work only occasionally and tentatively reveals the digital architectonics underlying his graphic schemas; most often his work is suffused with the analog properties of continuity, smoothness, and gesturality. I see Reas as a liminal figure, who operates in an indeterminate range of picture-making, one that is funda-mentally tied to the specific functions made possible by a digital computer, but whose morphological structures are often dense, continuous, and remarkably and markedly painterly. Despite his thorough

investment in software-driven, computational art, Reas's work often obscures the discreteness of its underlying structure. The final output, in other words, is not heavily articulated in the manner of Rozin—Reas does not overtly embrace the pixel as a fundamental expressive unit. Rather, his works experiment with the aesthetic possibilities of algorithmic variation within a given visual system, a process that explores the limits of computation, but without necessarily offering up a digital aesthetic.

Let me briefly explain what I mean by analog aesthetic properties. Within the history of aesthetics it has been presumed that pictures would be a product of analog processes, and would therefore exhibit aesthetic features, which include continuity, smoothness, and perceptual ambiguity. The analog picture is irreducible, both on the level of form and content, to a distinct quantitatively assessed set of values.

The digital, on the other hand, emerges from a very different structural logic; digital composition is inherently discrete, schematic, metric, and modular. The classic example given by philosopher Nelson Goodman in 1976 to differentiate analog from digital inscriptions are the morphologically similar but semantically distinct illustrations of an EKG and a painting by the 19th century Japanese "floating world" artist Hokusai. [1] In the Hokusai painting, exemplary of analog values, every linear modulation, every increase in pressure or thickness of ink potentially affords a new layer of meaning. The EKG, by contrast, exemplifies a digital system, in which only the abscissas and ordinates bear meaning but the lines connecting them are insignificant. So, despite the morphological similarity between the two depictions, they function very differently.

Information is, of course, processed digitally in today's electronic computers, but the digital as an analytic and perceptual category can be disaggregated from the technical specificities of today's hardware and software. Rather, the digital refers to a particular configurative schema—to a state in which materials or signals operate and are operated upon as discrete states, as distinct from the continuous variation of the analog. Digital symbol systems may appear in the form of pixels, but may also manifest in a variety of other mark-making practices, such as points on a graph, in which a unit of measure has been assigned and outside of which no indeterminate state can be registered.

If Reas's use of digital technology is haunted by the spectre of analog painting practices, by a desire for the spontaneity and gestural contact that is traditionally associated with painting, this tension that arises in his work makes him an ideal springboard from which to see how the analytic category of the "digital" can, and should be disaggregated from electronic-computational machines. His work demonstrates how artists can utilize computational technology in a multitude of ways—to highlight the properties of digital graphic composition by foregrounding pixels or other structural building blocks, or to occlude the picture's digital infrastructure, leaving only indirect clues, or none at all, to its digital ontology.

It is within the architecture configured by the strict causal chain of computational logic that the oscillatory movement between digital and analog becomes evident in Reas's work. For example, Reas's series *Tissue*, beginning in 2002, layers fragile, transparent webs of spindly lines, creating dense, continuous and replete painterly surfaces, which would seem to position his work at odds with the constitutive features of digital aesthetics as demonstrated in *Wooden Mirror*. The lines themselves are generated by the movements across the screen of small bots or vehicles that leave trails of line and color behind them. The point I want to emphasize here is that while the technical, procedural and programmatic constraints of computers make them unable to process or deal in ambiguity, *Tissue* mobilizes the programmatic logic of computation towards an ambiguous end.

The characteristics visible in *Tissue* do not appear to be digital in the sense I am using it. However, the elements that produce the analog, painterly, ambiguous surfaces in these works turn out *not* index the gestural immediacy implied in the act of drawing, as we may have thought. Even though the surface appears to be aesthetically analog, it is in fact a set of digital elements drive the graphic output of the piece. As I have indicated, the lines extending across the screen or the print are created by digital "vehicles." These vehicles mimic mechanical sensors in neuroanatomist Valentino Braitenburg's studies of nervous systems in the 1980's. In a different version of *Tissue*, an interactive, CD-ROM version of the piece involving touch and motion sensitive technology allows users to move the "dots" with their fingers, changing their trajectory and thus the visible structure of the composition. As such, the two versions—print and interactive installation—reveal the digital to differing degrees, the print concealing it, the interactive installation making it accessible to perception and interaction.

In an electrocardiogram, only the ordinates and abscissas are informationally relevant—the lines connecting them are insignificant. *Tissue*, on the other hand, privileges the connecting lines: what would be, in a notational system like the EKG, secondary "information." What the viewer observes, instead of the digital units themselves, as in the case of *Wooden Mirror*, are the tracelines extending behind the elements, similar to the line of frozen vapor trailing an airplane in the sky. In a time-based version of the piece, after a period of scrutinizing the lines as they loop and intersect in seemingly random patterns across the screen, the intently watchful viewer might glean relationships between elements, and even potentially their position on the screen. We might think, then, of this moment of revelation as an instance of the digital furtively showing itself, coming into a partial visibility, but remaining camouflaged by the analog. Rather than directly seeing the simulated mechanisms, as in the see-sawing movement of Rozin's wooden pixels, we gather their information second-hand. We can guess at their level of activity and the length of their simulated lifespan as drawing agents from the complex curvatures of the lines and the density of their entanglement. These knotted skeins become the sensorially apprehensible effect of the setting-into-motion of a digital system. What we have before us is a painterly, seemingly analog visual world that is actually a visualization of the byproducts of a digital system in the act of calculation and computation, but it is not itself aesthetically digital. This is an area in which a potential divide between "computational" aesthetics and "digital" aesthetics becomes visible. The system operates computationally, and perhaps we could classify the continuously unfolding loops of multi-colored lines as exhibiting a computational aesthetic insofar as we are watching the graphic output of computational processing proliferate before our eyes. But the "digital" stubbornly conceals itself within the tangle of lines.

Reas's works after 2004, which he calls "Processes," begin to allow the digital literally to parallel the analog aesthetic exhibited in *Tissue.* They exhibit a tri-partite structure, in which natural language "instructions," in homage to LeWitt, are accompanied by a divided screen. In *Process 18*, the right screen displays a simplified digital schema of the underlying processes of the generative software. Here, a skeletal array of short white lines against a black screen reveals the "mechanism" determining the behavior of individual parts as they touch, collide, and rebound. In *Process 18* the right screen gives up the "trick" or the "game" or the "conceptual undergirding" of the work precisely by showcasing the schematic, digital structure that underlies the painterly swaths on the left screen.

On the left screen the mechanistic structural elements—the skeletal backbones—are erased, as the orthogonals and transversals disappear from a perspective painting, leaving the surface effects—here, curved, layered lines, of varying degrees of transparency and various degrees of saturation on a grayscale—available to sensory apprehension. In contrast to the austere structuralism of the right hand screen, then, its neighbor on the left reveals the more "painterly" aspect of Reas's multi-layered process

compendium, offering up an abstract, gestural surface that, minus the textures, is more reminiscent of Jackson Pollock's Action Painting than Rozin's heavily digitized *Wooden Mirror*.However, these works are more "digital" than the others I have discussed with you today because the digital and analog surfaces are placed in parallel. In *Process 18* the side-by-side placement of the screens does *not* erect a hierarchy in which the analog is granted final pride of place.

In *Tissue*, digital mechanisms, such as a line of a specific number of pixels, become drawing "agents," but in the act of drawing, they obscure their digitality, rendering the digital, in Reas's practice, a technological rather than an aesthetic category. In this sense, Reas *reverses* the schema of Rozin's *Wooden Mirror*. There, the motion of the servomotors is perceptually analog—their movements and adjustments register as continuously correlated to the position of the viewer, just as a needle in a pressure gauge rises and falls smoothly, as a direct effect of the modulations in the physical quantity of pressure in the gauge. It is only the outermost layer of the interface—the array of discrete, modular wooden lozenges—that defines Rozin's mirror as *aesthetically* digital. In *Tissue*, on the other hand, the computationally simulated bots mimicking Braitenburg's neural motors are digital—they are registered by the system in terms of their position at any given moment. But whereas the bot's *position* is digital—it can only occupy one encoded position at a time, the visible output of the system is continuous, fluid, and aesthetically analog. In the end, Reas's work does not evidence two entirely separate strains. Instead, these two impulses swirl playfully around one another in a noisy feedback loop. They are each practices built on digital platforms, but shot through with the spectre of the analog.

To return to my opening example, Daniel Rozin in *Wooden Mirror* formulates a visual (graphical) proposition in which the "digital" becomes a sensed and experiential, instead of a technological category. Here I am placing the digital in an expanded field, so that it is a mechanism, a process, and a constructive method that operates well beyond the boundaries of computational technology. Once digitality is disaggregated from contemporary electronic computers, it becomes a category that can be used to address works of art, techniques and technologies that may speak in a different language than and thus require a different interpretive framework than pictures and artifacts configured through analog processes.

What I call the digital is a mode of visual understanding that has appeared at other times under other names. It speaks to the replicability of the pointillist dot, and to the simulated matrix of perspective. Here, the digital ceases to be a highly technical term relevant only in contemporary discourse, but becomes an art historical project about making connections. This is not to enforce *congruence* between all digital, proto-digital, and quasi-digital systems—I do not claim that perspective, pointillism, op-art, and contemporary computational artworks are reducible to historical, cultural, and formal equivalence. Instead, I bring out features of these works that interface with my notion of the digital in complex and potentially idiosyncratic ways. My question of whether the "look and feel" of digital media is correlated to the appearance of individuated "digits" within pictorial structure is ultimately not merely a formal, but also a social, philosophical, and art historical problem, which seeks to discover how an evaluation of digital composition might add a new narrative layer to the long art-historical discussion about how and why pictures "mean," and what they say about a given culture in a given historical moment.

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VIRTUAL RESISTANCE: A GENEALOGY OF DIGITAL ABSTRACTION

MEREDITH HOY

According to one narrative, an evolutionary trajectory for computer graphics begins at rudimentary figures and progresses towards visualizations of a world whose properties mirror our own. But there is a tradition of computational abstraction that renders visual equivalents of abstract mathematical calculations. This paper considers whether computational abstraction fits a modernist narrative or whether it envisions a new call to order.

According to one narrative, the history of computer graphic imaging has privileged verisimilitude, in which a virtual image imitates optical reality as faithfully as possible. This account posits an evolutionary trajectory for computer graphics beginning at pixel-based figures and progressing towards rich visualizations of a world whose properties mirror our own. This history may hide the fact that this virtual world is often visualized as if it were captured by a camera; the camera-based image is simulated by encoding a mathematical model of a picture as it would appear through a lens, with a specific field of view and focal length.[i] Computationally generated pictures often analogize the visual qualities of a world seen through a camera lens, and would seem to tend towards the particular qualities of virtuality, and the visual distortions, produced by a camera.

But there is a tradition of computational abstraction that revels in the facility of the computer to render visual equivalents of abstract mathematical calculations. Such screen-based abstractions generate imagery based on formulae for physical forces such as gravity. Painterly compositions emerge as a result of inputting random values into an algorithm encoding change over time. This paper assesses whether there are a set of principles with which computationally based abstractions are concerned, and what kind of "world" is imagined through this algorithmically generated visual model. Taking into account the history of abstraction in modern art, it considers whether computational abstraction fits into a modernist narrative or whether it envisions a new call to order distinct from that set forth by 20th century modernist movements.

The aesthetic of mimetic virtuality demonstrated by graphics imitating a camera can be distinguished from an aesthetic of computational abstraction by the latter's typical foregrounding of discrete values mirrored in the structure of the picture. A digital image is defined by its discrete composition out of distinct, interchangeable units. This is most easily recognized in the formal properties of the pixel, but can also be conceptualized in a more theoretical manner, as in Nelson Goodman's formulation, according to which "to be digital a system must not be merely discontinuous but *differentiated* throughout, syntactically and semantically."[ii] This formulation adds another dimension to the theory of picturing in general, one in which analog and digital aesthetics can be formulated and evaluated as distinct categories. There is also an aesthetic trajectory that bridges the gap between the two modes of analog and digital by examining the structural features underlying a given representational system through strategies of abstraction.

One exploration into the mechanics of recorded moving images occurs in the phenomenon of Structural film that emerges in the 1960's. Deploying such strategies as loop printing, rephotography off the screen, the flicker effect, and fixed camera position, structural film is "a cinema of structure in which the

shape of the whole film is predetermined and simplified….and what content it has is minimal and sub-sidiary to the outline."[iii] Structural film unfolds algorithmically, according to a predetermined system, which provides the rules according to which the film proceeds. Structural film is invested in uncovering the material infrastructure behind the continuous motion we come to associate with cinematic technol-ogy. It also, crucially, often favors abstraction, for example in the films of Paul Sharits, as a convenient mode of exploring film technology.

To understand what kind of images or objects will be most likely produced within a particular technolog-ical milieu, it is imperative to consider the facilities of that technology—the ways its affordances and constraints will, alongside creative decision-making on the part of the artist and other factors (such as cultural norms), dictate the types of forms that will be produced by that technology. While most tradi-tional narrative film attempts to make the medium transparent through such techniques as suture, in which the editing and other elements of the cinematic apparatus are suppressed, structural film exam-ines the material qualities of the filmic medium. Like conceptual art, in which the visual qualities of the final product are secondary to the idea underlying and driving its production, structural film reveals the mechanics of film, or the "idea" of film itself. Structural film is, therefore, "cinema of the mind rather than the eye."[iv] Often, for example, structural film will use rephotography to emphasize the graininess and flatness of the image, disrupting the reality effect or impression of virtuality that might otherwise occur.[v]

Alongside structural film, early computer animation utilized the particular visual characteristics of com-putationally generated imagery to reveal what I have called a digital aesthetic based on discreteness and the use of an interchangeable module as the fundamental unit or building block with which computa-tional pictures are constructed. I suggested above that while the history of analog picturing privileges qualities such as smoothness, continuity, and indiscernability of internal parts, the "digital", recognized qualitatively as having its own particular visual characteristics, reveals its constitutive discreteness, its ability to calculate and generate patterns based on the computation of individual values. This often re-sults in the production of an abstract visual field and the rejection of mimesis in favor of a direct interro-gation of systemic principles.

Examples of early deployment of computational strategies for the production of "art" emerge in various media, including film. Stan Vanderbeek, Jordan Belson, and John and James Whitney are among the most important producers of abstract film that utilizes computation—a phenomenon that Gene Young-blood calls "cybernetic cinema."[vi] Cybernetic cinema, for Youngblood, is an approach to the produc-tion of moving images that privileges not merely a photographic capture of the external world, but situ-ates itself in terms of the relationship between humans and technology, or more precisely, as Zabet Pat-terson has articulated, "under the auspices of the human-machine feedback loop."[vii]

The link between abstraction and technology is observable throughout the history of modernism. The rise of modernism is concomitant to the rise of industrial and reproductive technologies, and as such, technology itself becomes the subject of art. Modernism is also recognized as bringing about the advent of abstraction in the visual arts, and while technology and abstraction might seem at first glance to be unrelated, or to follow divergent principles, they are in fact inextricably entwined. Abstraction begins to turn toward the look of the technological in numerous instances, as in the proto-computational, pixi-lated forms of Victor Vasarely's Op-Art and in the synthesized mandalas of John and James Whitney.

Meditations on the expansive effects of technology on the horizons of visual representation in mod-ernist art practice are nearly endemic. Futurism gives up "meat" (the representation of human figures,

especially the nude, in the history of Western art) in favor of creating a visual universe that celebrates the beauty of speed, simultaneity, and the clang of machinery, all phenomena directly attributable to the compressions of time and space wrought by new technologies.[viii] Futurism does not only depict machinery, but it also explores the way in which technology provides a new visual and perceptual experience of the world—it examines not only what technology can do, but also the ramifications of that technology on our consciousness, for example the shrinking of time and space that occurs with the invention of mechanisms for fast transit, such as the automobile.

But modernism has also been characterized by a concern with the spiritual, with purity, often achieved by the reduction of form to its most basic elements. Total abstraction, then, with its aims towards a spiritual universalism, would seem to be opposed to a technological worldview focused on functional forms. But as RL Rutsky has pointed out, a formalism oriented towards the *look* of technology in the end abstracts the technological from functionalism, so that the technological becomes a representational trope that speaks toward an overall word view rather than a direct portrait of specific technological devices. Heidegger has argued that "the essence of technology is by no means anything technological"—technology is not revealed in particular objects, but in a turn toward a technological way of thinking, in the way that new technologies reveal aspects of the world to us.[ix]

Ultimately, technology and spiritualism become deeply imbricated. The theosophic foundations of De Stijl, led by Mondrian and Van Doesburg, merge spiritualism and functionalism. Abstraction is posed as the antithesis of nature and the natural—it is "functional" and ordered as opposed to the disorder of the natural, and is of the spirit, which is also separate from nature. Universalism and abstraction are deeply imbricated with one another, united in their opposition to nature, as is evident visually in the precise geometrical angles and forms of Mondrian's and Van Doesburg's painting. These geometries are linked to modern urban life; the "genuinely Modern artist sees the metropolis as abstract living converted into form."[x] Moreover, modern living is characterized by the machine, and machines are, counterintuitively, connected with spirituality; "the machine is, par excellence, a phenomenon of spiritual discipline."[xi] Abstraction, now associated with the functionality of the machine, in turn becomes a function *of* the machine, as is visible in the films of Vanderbeek, the Whitneys, and later generative computational "drawing." (And it is notable that the Whitneys state an alliance with Mondrian and his view that abstraction attains a "truer" reality.[xii]) The images we see unfolding on the screen can be read, alternately, as simulacra of computational functions or as indexical traces of the same. This undoes the opposition between autonomous generative grammar and indexicality, given that generative grammar can be seen as leaving its own imprint in filmic form.

"Function" can have various meanings. Computers are functional in their ability to create a model of the world by numerically calculating and graphically representing calculable data. This utilitarian view of function can be set against the theory of abstraction, as proposed by De Stijl or the Suprematists, in which abstraction provides an indirect model for universal social freedom. Both approaches to abstraction have a distinctly utopian bent, the former imagining a perfect simulation of the world attainable through the powers of computational machines, the latter championing the capacity of abstraction to produce social harmony. The two poles of realism and abstraction, therefore, eventually converge in their utopian teleology.

Film and video are most often associated with principles of realism—they are technologies whose particular affordances lead toward mimesis. As a reproductive technology, film might be thought to have the capacity to reproduce the world in much of its fullness; film both reproduces the world and is itself reproducible. But cinematic trends toward abstraction have coexisted with traditional narrative film, as

we see in early experiments with abstraction such as Duchamp's *Anemic Cinema*. Abstract, generative computational video takes filmic abstraction even further, going beyond abstract cinema's exploitation of shape and line to offer a visualization of often *invisible* forces such as push and pull at various rates. Mark J. Stock's simulations, for example, combine individual elements exhibiting simple behaviors into "complex galaxies" of abstract, moving forms whose rules for development and change are governed by a mathematical system with distinct parameters. According to Stock, these fluid visual landscapes reveal "the natural origin of their rules. This is the way of computational science: to break complex, real problems up into many smaller and easily solvable problems such that the ensemble predicts the behavior of the real system."[xiii]

One can go one step further to claim not only that technology and abstraction have been linked from modernism forward, but that there is a particular view of technology and technological operations that foregrounds a computation and calculation. This computational order privileges systems that deploy numerical values or other non-numerical forms of calculation (any kind of "system") to produce its results, in this case the visual field of representation. The work of Frieder Nake and George Nees presented a mode of artmaking in which the artist's unique capacity to manifest the beautiful is supplanted by the computer, leading to a rationalization of beauty, a notion of beauty as emanating from programmatic schemas. Amongst early computer artists, including Nake and Nees, there was no small anxiety about this notion of programmed beauty—could the artificial generate an authentic work of art, or would the experience of beauty be authentic? Eventually, the most likely conclusion to be drawn is that what is being accomplished is not merely the imitation of pre-existing modes of artmaking, but that something new is being introduced: an art that foregrounds the abstract structures produced through programming. Machine-realized art moves us away from the virtuosity of the artist's hand, the grand designs of her mind. Computationally executed art comes as close as possible to completing this circuit. In so doing, it envisions a world of values and forces, understood better in terms of computational efficacy than mimetic reflection.

A brief look at the history of computing reveals the development of a philosophical trend in which mathematics and systems theory play an increasingly prominent role in theories of knowledge, human behavior, and even art. Researchers such as Turing, Von Neumann, Shannon and Weaver, and Wiener postulate that phenomena can be accounted for in terms of logical operations. "Rationalization" in representational terms consists of analyzing and reducing form to its most basic elements, whether this is the simplified form of the square or the breakdown of the world into data.[xiv] Likewise, abstraction is a process of stripping down worldly phenomena into its most elemental or essential forms. In this way, abstraction can be viewed in terms of rationalization, as a mode of quantification of form into a series of operations. Thus, abstraction can be both spiritual, in its search for essences, and procedural, in its breaking of matter into its constituent operative parts.

George David Birkhoff, the American mathematician, proposed that the beautiful is a function of order, so that something with the greatest amount of order and the least amount of complexity is the most beautiful.[xv] This parallels the theories of abstraction in the history of modern art that have attempted to systematize visual signs through the reduction of elements such as shape and color to their most basic forms. As I have suggested, abstraction, for visual artists including Malevich and Kandinsky, approaches spiritual purity.

Information aesthetics are often associated with generative art, which has been defined as art that deploys a system, such as a computer program, that is "set into motion with some degree of autonomy contributing to or resulting in a completed work of art."[xvi]A work that is designed and carried out

using a pre-determined system that unfolds with or without the intervention of the artist's hand does not necessarily but will often demonstrate the aesthetic or formal properties of that system in a self-reflexive manner. Thus, the visual world built by these systems is one that replaces mimesis with an exploration of repetition, transformation, and parametrization.

Looking at Mark J. Stock's 2009 *Rising*, it becomes apparent that because informatic and generative art is concerned primarily with the principles and system with which it is constructed, it will be more likely to remain unconcerned with verisimilitude. Viewed from one angle, generative art emerges from a lineage of proceduralist aesthetics, wherein "inanimate accuracy" is substituted for "human touch."[xvii] Generative graphics reveal a field of operations whose principles of change—growth and decay, for example—are given by certain encoded parameters that exist and unfold apart from the artist's decision-making process. Because it is computational, the system necessitates fragmentation, the existence of parts that can be set into motion by the program. As a visual form, generative art is certainly concerned with the aesthetic qualities of its product, but the aesthetics are defined by the interactions between parts and the emergent qualities that develop as a result of this interaction.

Lev Manovich has defined the aesthetic quality of computational art in terms of an aesthetics of complexity,[xviii] which exists in contradistinction to the simplified forms of earlier 20th century modernisms, such as the extremely reduced formal vocabulary and palette of the Russian avant-garde, and particularly Suprematism, in which Malevich "in 1913, trying desperately to liberate art from the ballast of the representational world…took refuge in the square form."[xix]

I would define computational aesthetics not so much in terms of complexity, but consider instead the aesthetic ramifications of the computer's ability to carry out rapid, repetitive calculation and to build structures out of discrete, interchangeable units. Looking at Gursky's *99 Cent* or Jennifer Steinkamp's 2008 *Daisy Bell*, we can observe instead an aesthetics of repetition, a sense of an indefinitely extendable universe of discrete elements arbitrarily cut off by the boundary of the screen, the mechanism by which this computational universe is made visible.

This repetitive calculation can be used either to mask or to highlight a picture's computational underpinnings, to build a dense, virtualized simulation or to emphasize the discrete, numerical infrastructure of the image. Artists such as Jim Campbell, who in his *Ambiguous Icons* series reduces moving figures to broad, highly unresolved silhouettes by filtering them through a grid of LEDs, choose to foreground the fact that what ultimately appears as a picture on a screen begins as a chain of abstract data. Campbell abstracts photographically captured imagery using discreteness and low resolution to interrogate the notion that computational imagery must always produce a seamless virtualization of a three dimensional world.

What I have shown in the preceding arguments is the way in which theories of abstraction have united with theories of modern technology, from the mechanical to the computational, to produce a particular mode of representation: technological abstraction. Technological abstraction has a lineage that extends beyond the advent of computers; after the invention of modern computers, it is evident in work produced using mechanical, analog computers and later, digital computers. These works deploy the same machines used to generate immersive virtual worlds, but utilize that technology towards very different ends. We should not suppose that computational abstraction emerges simply because computers were not yet able to construct virtual worlds, but rather that it arises alongside a fascination with a computa-

tional universe, governed by the same physical rules as the human body, but adhering to a different per-
ceptual order, one which favors pure relations, patterns of data, and elemental forces, and into which
we are ushered via the screen, with its array of points of pure light and proliferation of digital units.

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INVESTIGATING THE DIGITAL SUBLIME THROUGH PHOTOGRAPHERS' VIEWS OF REALITY: A CASE STUDY OF NATHAN BAKER'S OCCUPATION PROJECT

YI-HUI HUANG

The digital sublime refers to digital-composite photography that presents the existence of something unpresentable. Dissatisfied with the representation of the outer world, sublime photographers are compelled to create personal versions of the world. To better understand these photographs, I propose that we investigate the artist's views of reality. This paper cites Nathan Baker's project *Occupations* as an example.

Introduction

The concept of the "sublime" has been discussed by a few philosophers. According to German philosopher Immanuel Kant (1724–1804), the sublime refers to something "absolutely great" [1], such as the vast Saharan desert or an earth quake, that surpasses one's ability to comprehend with one's reason. The sublime brings a mixture of anxiety and pleasure to those experiencing it: anxiety from the conflict between reason and imagination, and pleasure from the awareness of the supremacy of human reason. While Kant focuses on sublime nature, French philosopher Jean-Francois Lyotard (1924–1998) concentrates on sublime art, such as avant-garde art, which presents "the existence of something unpresentable" [2] and that confronts us with the limits of our ability to reduce the world to rational concepts.

More recently, the term "sublime" was used to indicate a new type of photography. With the rapid advancement of technology in the photographic industry, more photographers, such as Jeff Wall, Pedro Meyer, Barry Frylender, and Loretta Lux, have been relying on digital facilities and embracing the style of digital-composite photographs. Using computers to combine pieces of images, digital-composite photography requires a new method of production and renders a matchless look – a sophisticated fabrication, a perfect and clean composition, a maximum color saturation, a multiple-point perspective, and stunning or newfangled content – which is often referred to as the "digital sublime" [3].

This paper investigates what "unpresentable" entities the digital sublime attempts to present. Dissatisfied with the representation of the outer world that can be easily accomplished by pressing a single shutter button, photographers who painstakingly synthesize images together to create the digital sublime seem to be compelled to create personal versions of the world, which may be closer to the beliefs through which they interpret and interact with the world.

To gain a better understanding of these photographers' digital sublime photographs, I investigate the photographer's worldview, or what s/he values as knowledge. As contemporary architectural theorist Mark Gelernter (1995) suggests, knowledge is the foundation of one's intention, ideas, and thus, forms of artwork [4]. If we understand how a photographer sees the world, we can have a better idea about the principles that guide his or her artmaking. A more approachable way to inquire into a digital photographer's know-ledge is to ask about his or her view of reality [5] with questions such as "What is your definition of reality?" "What notion of reality do you represent in your photographs?" and "How do you visualize your reality in photographs?" After knowing their layers of reality, the deepest and the most

sophisticated layer can be considered as their knowledge, which may explain the "unpresentable" substance presented to viewers.

As an example of how we can understand a body of digital sublime work, the following section cites the photographic project *Occupation* of Nathan Baker. The discussion of Baker and his work is primarily based on an interview I conducted with him in December 2006 in his studio. In addition, I referred to Baker's artist's statement as well as consulting other critics' evaluation of his work.

Herein, I first introduce Baker's process of photographic creation, including his initial feelings, thoughts, ideas, and finally, the actual production. I then relate his definition of reality, and strategies he employs to visualize reality in his photographs. Next, I interpret Baker's multiple layers of reality and cite suitable theory, realism, to explicate her work. Last, I conclude with the knowledge provided by Baker's photographs, from which we can gain a better understanding of his art.

Baker's Occupation Project

In his project entitled *Occupation*, Nathan Baker, a Chicago-based artist, produces composite photographs that express the labor one puts into one's job. By condensing various tasks required by a job into a single frame, Baker evokes "the frenzied tedium of a wide variety of occupations and the intensity of effort that people put into them" [6]. The *Occupation* project consists of twenty photographs, each presenting one job at a workplace, and hence describing twenty occupations ranging from scooter repairer, house painter, to hotel housekeeper.

Baker explains that his initial idea to produce *Occupation* was from a negative perspective. It was later, from viewers' responses concerning the humanity shown in the photographs, that he started to look at the occupations positively. Coming from a lower-income working-class family where money was always an issue, Baker learned that jobs have occupied most people's lives, and that people devote incredible amounts of energy, effort, and time only to benefit other people. In turn, what they gain is mostly contempt or mocking of their "circus-like bodily performances" [7]. However, viewers see this project differently: esteemed humanity outweighs other messages. Therefore, intentionally or unintentionally, Baker demonstrates the tension between the disgraceful and dignified natures of a job—its skills provoke scorn, though they deserve respect.

Baker articulates his production of these images. All of the twenty occupations are working-class, which reflects a lot of labor and specific manual skills. The stationary camera is usually positioned higher to render a full view of the whole space as well as the details of every task. In addition, the faces of the workers are intentionally sheltered or side-viewed to avoid viewers' quick recognition of the fact that it is the same person at work in the final images. This strategy prevents Baker's seamless digital composites from being immediately read as unnatural Photo-shop collages. His ultimate purpose in de-emphasizing the Photoshop techniques is to make his photographs documentary-like.

To improve the believability of his documentary, Baker utilizes photographer Robert Frank's (b. 1924) "filmic style of photography" [7], where photographs are composed in a seemingly casual way by intentionally leaving some part out-of-focus. This style imitates the visual habit of glimpsing as if one is looking at the actual scene. By implementing this filmic strategy, Baker invites viewers to enter the scene, or

makes them feel that they are present in the situation where the photographs were taken. In Baker's opinion, the more viewers can bring themselves to the scenario, the more believable the photograph is. For example, Baker incorporates a blurred arm in the left side of the frame in *Casino Boat Engine Room* to create an illusion that viewers are actually present in this space and watching these workers.

Despite embracing Frank's strategy of filmic documentary, Baker says that a single shot was not suffi-cient for him to describe some-thing thoroughly. He then realized that when putting together all these single shots of the same person digitally, he was able to communicate more facts about the job so as to achieve "a real representation" of it. Be-cause each shot was taken in real time and in a real space, the final images are still considered documentary. However, in Baker's terminology they are more than tra-ditional documentary; they are comprehensive documentary. Baker has described each occupation as fully as he can within the framework of the medium of photography, and since he directs people to per-form the tasks of their jobs, he also calls his project "directorial documentary" [7].

Baker tends to investigate a subject by showing concrete objects associated with the subject. For ex-ample, in his previous project *Tangible Mediation*, he showed an individual and an object the individual chose in each photograph. By closing the eyes of each individual, he directed viewers to see the objects first, and then ponder the relationship between the object and the subject in order to sketch the iden-tity of the subject. For Baker, objects are "mediators that provide both personal and societal representa-tions of individual identity" [7]. In other words, in Baker's view, a tangible object from the outer world serves as an important clue to understanding what is going on in a person's mind.

Baker succinctly defines his view of reality: "My definition of reality is one's experience, which is com-posed of a physical component and an intellectual component. Those two things compose one reality" [7]. According to Baker, the physical component comes from his five senses, and the intellectual compo-nent indicates his thought or idea that responds to the sensory stimulation. Following this criterion, Baker's *Occupations* represents a reality for him. On the one hand, it presents his experience of actually taking pictures of these people. On the other, it demonstrates his ideas of comprehensive documentary, which thoroughly describe twenty occupations.

Baker also asserts that his photographs carry multiple types of reality to viewers. The first type is the physical reality of the pictures itself. The second type presents each figure performing in real time and in a real place and was recorded as snapshots. The third type, even more real than the second, shows a multitude of figures co-existing in an invented space, and contains fuller information. The last type is the metaphoric references or visual connotation that makes viewers think about the ideas behind the pic-tures, or different mental places that viewers go individually.

Theoretical Understanding of Baker's Work

Based on Baker's assertion that two components constitute his reality, his view of reality can be ex-plained as two-layered. The first layer comes from the five senses, and the second is the idea or thought provoked by the sensory. Thus for Baker, coming from the most sophisticated layer of reality, knowledge is ideas derived from sensory experiences, and such a view renders Baker a realist.

According to British realist philosopher John Locke (1632-1704), objects exist in the external world in-dependent of the mind. In some circumstances, when these objects act upon the senses, a stimulus is transmitted from the senses through the nervous system, and eventually gives rise to a mental

process—the conscious perception of the object [8]. The idea of the object thus derives from the faculty of understanding which abstracts, systematizes, orders, and abbreviates the data of sense. Locke also explains that the mind is like a camera; when it is passively acted upon by external objects and receives stimulation, the mind, or the camera, registers ideas that reflect and resemble these objects. For Baker, the sensory and ideas rely on each other and are indispensable components in the formation of his knowledge.

Baker's ordainment of the four types of reality given by his photographs can actually be categorized into his two layers of reality. The first and the second, respectively the physical reality of the picture itself and the fact that each figure exists in front of the camera in real time and space, are physical realities where viewers can touch and see their existence. The third, where multiple figures coexist in an impossible plane, comes from Baker's idea, which results from solving the problem of how to bring more information into photographs to provide a complete illustration of his view. Finally, the fourth is viewers' mental states or individual interpretations of images. Echoing contemporary philosopher Kendall Walton's (1984) assertion of "trans-parent photographs [9]," Baker contends that when viewers look at his photographs, they not only see the pictures themselves, but by seeing through photographs, they literally see figures photographed. In addition, viewers capture Baker's creative idea of putting figures all together, as well as giving rise to their own meaning about the photographs.

Baker's *Occupation* corresponds to Aristotle's (384 BC – 322 BC) description of mimetic artwork, which is considered the first theorization of realist art. First of all, *Occupation* does not only represent the particular event of a person at work, but illustrates occupations in general, such as hotel housekeepers. Baker presents a normative idea of what an occupation *ought to be* from his own point of view.

Secondly, the basic components within the final images are acquired from the world; that is, they are all what one can observe with the naked eye. It meets Aristotle's emphasis on the use of the senses, and on the empirical observation yielding certain and clear knowledge of the world. In addition, Baker's attitude toward the subject matter is not fantasizing, disdaining, or criticizing, but is fairly and objectively displaying what a job consists of. Also, his manner of presentation is not prejudiced, distorted, or idealized, but is impartially describing what he sees about a job from his own perspective. In other words, the subject matter of people at work is the primary concern, while his judgmental expression is secondary.

Thirdly, an important criterion for Aristotle in art is the dispensability of form and content. Baker's strategy of repeating an identical person at work does not derive from a formal concern, but is crucial to the articulation of his idea: the tension between the complex skills an occupation can involve and the entertaining bodily performances an occupation requires. In Baker's view, his strategy also serves to describe an occupation fully by bringing in more information. This information does not come from Baker's subjective inner world, but is from his experience of interacting with the world. Alternatively put, for Baker, to describe something fully is to provide all that he can sense, and what an occupation means to him is comprised of what he can experience visually. Consequently, for example, a job is depicted by using thirty-six decisive moments, which are simultaneous form and content.

Lastly, similar to Aristotle's articulation that the intent of mimetic drama is to give pleasure, Baker urges viewers to contemplate pleasure from viewing his well-planned photo-graphs. Condensing various bodily gestures at work, Baker highlights the amusement from watching circus-like performances. This plea-sure requires viewers' cognitive operation of the mind. Viewers can understand this humor as long as in the real world they have ever seen similar presentations.

Baker's work is also subject to realist explorations in general, and hence provides realist knowledge. His comprehensive documentary stresses the resemblance of the representation in synthesized photographs to what, in his view, is actually happening in the real world. The verisimilitude of his depictions gives a vivid sensation of seeing those workers in everyday life. By arranging them realistically so as to make use of the believability of documentary photographs which dictate a real time and a real place, Baker's viewers tend to consider the workers as, indeed, being in front of the camera. However, what makes *Occupation* different from normal documentary is its more-than-usual amount of true information about what it depicts. This motivation of adding more factual and pertinent information has made *Occupation* realist [10]. Consequently, Baker's realist knowledge provided by his photographs dwell in the window on the world, which presents the likeness of what occupations really are. By including more data and keeping the combination seamless, Baker has polished the window itself so as to let it contain a richer view.

Baker's strategies to visualize occupations correspond to his realist worldview. Whether in *Tangible Mediation* or *Occupation,* his realist intention is to illustrate a person through objects around him or tasks he encounters. That is to say, what accounts for a person or an occupation is situated in the outer world. To understand a person, Baker resorts to an object the person picks; to know more about a job, he compacts a variety of tasks into photographs. Along the same vein, *Occupation* is composed of a culmination of multiple documentary photographs, which no doubt originated in the external world. After gathering components from the outer world in the form of documentary, it was Baker's faculty of understanding at work to systematize, abstract, and abbreviate data, and then generate the idea of multiple figures in one image. The final result is the comprehensive documentary which surpasses documentary's limitations, while preserving its nature. Influenced by but different from Robert Frank's filmic style, in which "the image seems boundless, not contained within the rectangle of the frame, but stretching beyond it," Baker's composite photograph is literally a film, which stretches beyond one single decisive moment and records the whole process of time and tasks associated with the job.

The directorial ingredients in *Occupation* do not interfere with its realist essence. In theorizing the directorial mode in photography, critic A.D. Coleman (1998) asserts that the directorial elements have played a part in a large number of documentary or straight photographs, including those of photographic image-makers who title themselves documentary champions. In *Occupation*, the authenticity of the original event is not an issue; rather, it is the general idea of what an occupation consists of that anchors the subject matter. Therefore, no matter how the scenes were constructed, how workers were directed to perform their skills, or how many pictures were condensed in a final image, Baker's realist perspective remains the same, where he acquires knowledge about occupations through his experiences and presents what he has observed with his senses to viewers, who then gain the same knowledge. All of the directorial efforts were made only to describe the given object or event fully, rather than to impose Baker's emotional impulse from his inner to alter the given knowledge from the outer world.

Conclusion and Implications

Investigating digital photographers' views of reality helps identify and clarify the valuable knowledge they communicate in their work. In Baker's sublime photographs, we can find two layers of reality: the sensory stimulation and his understanding of it. In *Occupation,* he exemplifies realism. The knowledge he provides to viewers and the "unpresentable" substance that his photographs try to present reflect his perspective of a detailed, true-information-laden, and believable representation of those occupations in the real world. By making his photographs resemble the world, Baker urges viewers to look into the

drama screened in paper film, and to contemplate the dignity and humor that transpire from the human figures.

Students of photography need a deeper understanding of the nature of digital-composite photography before they select it as the medium for expressing their ideas. In order to appreciate and teach about the digital sublime, photographic educators need to be aware that the digital composite may deliver a variety of aesthetics and knowledge, which may encompass modernism and postmodern-ism so as to incorporate pedagogies that address both the appreciation of fine arts and the critique of visual culture in classrooms.

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DIGITAL RE-PRESENTATION AND SIMULACRUM IN AUGMENTED REALITY

Yu-Hsiung Huang, Tsun-Hung Tsai & Su-CHu Hsu

This paper presents new definitions of digital re-presentation, simulacrum and pleasurable design for augmented reality (AR). We use this definition to survey some recent digital artworks. We move from AR to digital re-presentation, building on Baudrillard's ideas. Digital information processing can amplify AR, allowing virtual objects and virtual reality to join together. It makes a simulacrum world in which we can take pleasure in immersing.
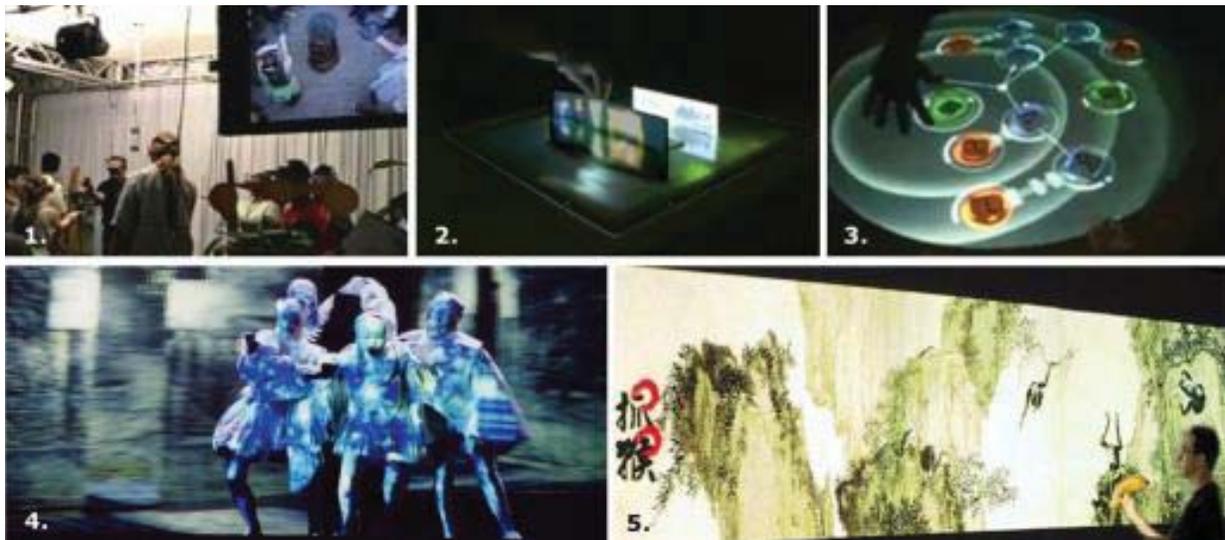
Contact Water (2001) Fig. 2. Tablescape Plus (2006) Fig. 3. ReacTable (2006)
Fig. 4. The Jew of Malta Opera (2002) Fig. 5. Immersive Chinese Painting-The Ten Gibbons (2005)

Examples of Digital Re-presentation in Augmented Reality

This section gives examples of the application of digital re-presentation and augmented reality in digital art. In each of the augmented reality system described below, an object acts as a "marker" for projecting or recording information for the augmented reality.

- Augmented Reality in Interactive Entertainment
  Art Digital entertainment art contains the potential for teaching and pleasure. Artist Taisuke Murakami's Contact Water was presented at SIGGRAPH in 2001. [3] Participants donned head-mounted displays and hand sensors, and were able to virtually take a miniature dolphin out of a central pool, and pass it to other participants (Fig. 1). This interaction was both fun and an example of augmented reality. A digital re-presentation of each dolphin was projected onto the hands (marker) of participants. The participants were able to use their hands to transfer the virtual dolphin re-presentation to other viewer's hands, creating a sensation of virtual physical touch.

- Augmented Reality in Interactive Story   AnimationAugmented reality can advance animation from passive to active participation. Tokyo University's*Tablescape Plus* [4] used augmented reality in interactive story animation (Fig. 2). This work projects animated characters and scenery onto real objects marked on a tabletop display, using a camera which can recognize objects (markers) on the tabletop display. When the participant puts marked objects close to each other, the characters react to each other, as if in a movie. The user's operation is the key step in the digital re-presentation of these cartoon stories. By creating conversation among selected object, *Tablescape Plus*enhances the sense of exemplary viewers' involvement, and shows the fun in the stories. The audience can enjoy the story animation and have intellectual and emotional pleasure.

- Augmented Reality in Interactive Visual Art
   Visual art transmits the artist's idea visual impact. Interactive effects can improve art works and deepen the impression of the audience. Clara Boj and Diego Diaz's *AR Magic System* [5,6] records participants' faces (markers) and exchanges the faces with different bodies in a screen projection (See the URL at reference [6] for an image from this artwork.) This "digital re-presentation" causes a strong visual impact and a funny confusion of identity exchange.

- Augmented Reality in Interactive Sound Art
   Sergi Jordà at Universitat Pompeu Fabra used augmented reality in his 2006 *ReacTable*. [7] ReacTable is a collaborative musical instrument. People place different blocks (markers) on the table to control musical loops and filters (Fig. 3). These interactive sonic displays allow participants to feel relaxed and enjoy an interactive musical performance of the digital re-presentation.

- Augmented Reality in Interactive Opera
   PerformanceAugmented reality has begun to be applied to interactive performances. Germany's ART+COM used augmented reality in the stage setting and costume design of the opera *The Jew of Malta* premiered at the Opera Biennale Munich in 2002. [8] Both the furniture (markers) and all other aspects of the stage were white, as was the costumes (markers) of the actors. Using tracking technology and gesture-based control, the system projected images onto the stage setting and costumes – a milestone in using augmented reality in opera (Fig. 4). This production also broke down the fence between stage design and costume design. Through digital re-presentation created plentiful dramatic effects and different morphological visual images projected onto the stage and costume design.

- Augmented Reality in Interactive Digital Archives
   Recently, digital archives have been used in interactive art and become a vital part of culture preservation. It creates new opportunities to teach, create interest in, and present historic artifacts. We have used augmented reality technology in our 2005 work *Immersive Chinese Painting-The Ten Gibbons*. [9] Pu Hsin-Yu (1896-1963) painted The Ten Gibbons, which today is owned by the Taiwan National History Museum. We used augmented reality technology and infrared cameras to allow the participant to move a banana with his hand to attract the gibbons to the original position in Pu's painting (Fig. 5). The sight of the gibbons hanging on the trees or standing in a valley presents a humorous visual "digital re-presentation".

Simulacrum World in Augmented Reality

Patrick Jordan's 2000 book *Design Pleasure Products*, argued that producing pleasure products is a central function of design. [10] Jordan's book is a response to the same motivations as augmented reality –

pleasure is the central goal. Canadian anthropologist Lionel Tiger presented four concepts of pleasure in his 1992 book *The Pursuit of Pleasure.* [11] Tiger's four concepts play an important role in designing augmented realities:

- Physio-pleasure: This pleasure comes from the sense of perception organ, including the sense of touch, taste and smell. *Contact Water* is a good example of physio-pleasure in augmented reality.
- Socio-pleasure: This pleasure comes from the interactive relationship between oneself and others. *AR Magic System* is a good example of socio-pleasure in augmented reality.
- Psycho-pleasure: This pleasure comes from emotional reactions. The design should be able to cause cognitive emotional reaction. *Tablescape Plus* and *ReacTable* are good examples of psycho-pleasure in augmented reality.
- Ideo-pleasure: This pleasure comes from people's values and their sense of knowledge. *Tablescape Plus*, *The Jew of Malta* and *Immersive Chinese Painting-The Ten Gibbon*s are good examples of ideo-pleasure in augmented reality. The works teach and encourage participants to speculate and learn.

Augmented reality technology makes virtual world and real environments meet each other through digital information processing. It creates "digital re-presentations" and "simulacrum worlds," and also creates a new language and direction in digital art.

French sociologist Jean Baudrillard's Simulacra and Simulation argued that reality has been displaced by symbolic simulcara. [12] Baudrillard thought that the world simulated by media is more "real" than "reality," creating a "hyper-real" world, in which it is difficult to distinguish the real and unreal.

This paper discusses how in the digital era people become conscious of and interact with reality and simulacra, through the pleasures of art appreciation and immersion. By analyzing the media and form of augmented reality, we have new ways of discussing "simulacrum" and "re-presentation". Augmented reality uses information processing to deconstruct, transform, and re-combine, creating digital re-presentations and simulacra worlds where virtual images and reality coexist, enabling people to perceive hyper-reality. For example, AR_Magic_System processes people's faces to create "face re-presentation" and "identification re-presentation." It creates a hyper-real identity in a simulacrum world generated through augmented reality, and participants can become immersed in this simulacrum world by viewing and interacting with the art.

Conclusion

The origin of Jean Baudrillard's Simulcara and Simulation lies in the age of television, and it takes at times a cynical view of simulation in society. Baudrillard's concept of re-presentation mostly focuses on negative messages re-combined by the media and to create a simulacra world which transcends reality.
    In contrast we take a more optimistic attitude. Augmented reality creates "simulacra world" in which we can take pleasure in immersing. Its re-presentation can stimulate participants (exemplary viewers) to think further about the purpose of the creators in using virtual information to project onto or replace real objects. By selecting and transforming virtual markers, augmented reality builds a complete different frame of mind and atmosphere. By interactively mixing simulacra and reality, participants can derive pleasure and enjoy the interactive feedback from the artwork.
    In this paper, we simply point these concepts. We hope more discussions will be presented in the future.

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BELOW THE BELT – PARTICIPANT EXPERIENCE IN A BREATH CONTROLLED INTERACTIVE ARTWORK

Jiann Hughes

Contemporary theories of embodiment and affect are explored in relation to the breath-responsive interactive installation, Below the Belt. The artwork uses bio-sensed data to measure the breathing patterns of participants in an attempt to uncover the relationship between breath and emotion. The artwork forms the test-bed in an examination of how emotion and breath are considered in the construction of experience across bodily and social realms.

Fig. 1. Below the Belt, 2011, Jiann Hughes, photo- graphic media, Copyright Pia van Gelder.

Fig. 2. Below the Belt participants, 2011, Jiann Hughes, photo- graphic media, Copyright Pia van Gelder.

Introduction

Despite the development of body-responsive interactive art the vast majority of artists and researchers working within this genre have explored embodiment from an external perspective, privileging the senses of the outer body or the proprioceptive sense of the body in space. Few have examined perceptions of the inner body. Where the inner senses have been used to drive the work the participant's focus has often been directed towards self-reflection and their affecting relationship with the social sphere has been ignored. When the affective nature of social interactions is considered the works have commonly bestowed a pacifying and subdued meditative tone.

The interactive installation *Below the Belt* is a breath-responsive artwork exploring how the aesthetic experience of engagement with breathing and emotion can promote an awareness of embodiment. It amplifies the breathing patterns of participants to extend their expressive and perceptual awareness and their connections to the inner senses. Often we only become aware of these senses when we become unwell. This can lead us to alienate the body further in an attempt to dissociate ourselves from the discomfort, and so detachment becomes a habit. This work examines how breath awareness can subvert our customary tendency to favour the outer body above the inner body by magnifying our perception of our inner world. [1]

Below the Belt provokes the participant to explore the broader relationship between their breath, emotions and the social realm. It stretches their focus beyond their fleshy boundary to bring awareness to the subtleties of the affective relationship between these bodily responses and their social interactions. The primary motivation of this work is to take the lived experience of breathing out of the private realm and into the public. It attempts to understand participants' first hand accounts of their experience using a phenomenological approach as a way of focusing on the whole bodily being.

In this paper I briefly explore theories of embodiment and affect to assess the role that emotion and breath play in bodily and social domains. I continue by positioning this work in relation to other breath-focused interactive artworks before providing some context to the work itself. The paper concludes with reflections on the experiences of a selection of the participants who encountered the work and on how these findings are informing my ongoing research in this area.

Embodiment and Affect

Contemporary approaches to the study of embodiment and affect theory sustain inquiry into lived experience, subjective perspectives and meaning making. The existentialist phenomenological tradition questions the dualistic nature of Descartian thought that bifurcates mind and body. In *Phenomenology of Perception*, Maurice Merleau-Ponty explained perception as bodily experience where the body is subject distinguishing between the objective, physiological entity of the body and the phenomenal body that we experience the world through. [2] However the term embodiment is still often misused to describe the body's role in cognition while still maintaining the Cartesian paradigm. I believe embodiment is the very nature of being and the primacy of the body in constructing experience.

Medical anthropologist Margot Lyon suggests that because the experience of embodiment is accentuated when we are emotionally present in the world, we can study embodiment by studying emotion or a bodily capacity linked to emotion, such as breath. [3] The respiratory function is related to feeling in part because of the nerve fibres it shares with the autonomic nervous system, which plays an important part

in emotion. For example, slow, deep breathing can regulate the functioning of the autonomic nervous system by increasing parasympathetic activity (rest and digest responses), effectively bringing the involuntary autonomous nervous system into the realm of the voluntary. This argument does not attempt to diminish emotion to the function or arousal of breath. It acknowledges that behaviour cannot be reduced to physiological processes and makes no attempt to match feelings with particular breathing patterns.

It should be noted that whilst embodiment and affect theory has only recently been articulated by Western scholars it has of course been studied through practice based research for many centuries by philosophers of Eastern traditions who have used breathing practices and meditative states to reflect on states of consciousness.

Body-responsive Interactive Art

Body-responsive interactive art is entirely reliant on the actions of the participant, which becomes the instrument of communication. The participant responds to the work through their embodied reactions, the work reinterprets this feedback and so the dialogue unfolds. Their aesthetic experience is defined not in terms of beauty but rather through their experience of this interaction. It is this experience that creates meaning for the work. Body-focused interactive artworks provide a unique platform to engage in dialogical exploratory practices.

As biofeedback technology has emerged, so have creative ways of engaging with digital breath-focused interactive artworks. Below the Belt is situated amongst works that are activated by breath such as George Khut's work *Cardiomorphologies v1*. [4] My research looks beyond the self-reflective aspects of this focus to the broader affect of breath on the social realm. Works being created in this area include Christa Sommerer and Laurent Mignonneau's *Mobile Feelings.* [5] Also Thecla Shiphorst's wearable body architecture *Whisper*, which uses breath to explore human interactions in the social domain. [6] Where as most artists working in this area have focused on the meditative aspects of reflections on their work I am interested in provoking a broader range of responses from participants to allow them to more fully explore the complex relationship between their breath and emotions. The artwork *Below the Belt* provides the 'black box' in which to examine these theories.

Below the Belt

Below The Belt is an interactive installation that affords participants the space to feel the affective nature of emotion, and its role in human experience, through the prism of breath. It attempts to re-embody interaction within video installations, to amplify and extend the bodily experience of participants. The installation uses affective computing and the breath of participants as the vehicle to explore embodied subjectivity. It places embodiment theory and the affecting influence of emotion and breath centre stage, directing participant attention to their breath to explore how it is affected by the instruction. The participant is presented with a playful environment to experiment with breathing techniques and an opportunity to cultivate their breathing literacy. Participants interact with breathing coaching Tony, made visible through a single channel projection, who guides them to slow down their breath and increase the natural rise and fall of their abdomen.

The installation relies on wearable computing to make Tony's instruction audible – protective boxing headgear, implanted with wireless headphones, provide an immersive auditory environment blocking out extraneous sound and focusing the participant's vision on the projected video. A biosensor embedded in a champion title-boxing belt wirelessly relays the degree of stretching to an Arduino microprocessor attached to a laptop. The microprocessor feeds this stream of data to Max/MSP software (Cycling 74), which identifies patterns in the data attributable to the pace of breathing and degree of abdominal movement. The laptop, visible directly under the projected video image, displays the Max patch, the guts of the processing driving the work. This includes a simple graphic representation of the participant's pattern of breathing.

The first stage of the encounter involved attaching the belt, immediately drawing the participant's attention to their upper abdomen, the region under measurement. Tony then spends the first minute setting the scene and explaining the rules of engagement. During this time a baseline is calibrated for each participant according to her or his breath patterning. The participant's overall performance is judged according to deviations from this baseline. Thereafter, at regular intervals the average value for the preceding period is calculated and compared to the participant's previous results. These differential values are fed to Jitter software which triggers the appropriate video vignette of Tony's feeback. The work does not attempt to make judgments about the participant's natural breathing patterns as performance is measured in terms of changes in the pattern of breathing during the encounter.

The breath coach, Tony O'Loughlin, is actually a boxing coach from Elouera-Tony Mundine gym in Sydney. Tony's antagonistic coaching style starkly contrasts with instruction found in the more popular meditative breathing practices. He takes each participant through five rounds. After each round he provides feedback, often harsh, on their breathing performance for that round, based on the Max patch results, and offers appropriate breathing exercises to improve performance in the next round. At the end of the five rounds the competitor's overall performance is calculated and Tony proclaims their performance with all the fanfare of a championship bout. Tony's aggressive motivational style was chosen as a way of provoking a reaction that is at odds with the calm, smooth breathing he demands. The participant has the challenge of obeying instruction to relax and breathe deeply, delivered in a forceful and abrasive style. The natural body response to this harsh feedback for some may be an increase in their nervous system's sympathetic responses leading to shallower, faster breathing.

Through the metaphor of boxing the work examines the tensions between competitive contact sports and the inward focus of supportive breathing practices. It plays with the constant mediating role that breath plays in the bodily and the social realm. While the participant is sensing and performing their responses they are also differentiating and appreciating the systems interpretations, in the full knowledge that they are being measured. Although the work relies on rhetoric grounded in competition the reality is that each participant is only ever competing against herself or himself, never with each other. The irony is that when participants get caught up in this sense of competition the natural reaction of the body is to retreat to flight or fight mode which produces shallower, faster breath consequently impairing their performance.

Understanding Participant Experience

When John Dewey redefined aesthetic experience, he contended that the work that art does takes place within the entire process of art making. Art is more than the material 'work of art', it is the development

of an experience and recognises the aesthetic experience in everyday living. Pragmatist aesthetics elevated the experience of the audience as a vital component in completing an artwork. It proposes that to fully assess any work of art the experiences of those who interact with it must be considered and understood. [7] This philosophical position supports the dialogical aspect of my inquiry that seeks to understand the lived experiences of participants interacting with this work.

There is very little empirical research on audience experience of interactive art. [8] Whilst various literature has examined participants' creative engagement with body-focused interactive artworks these approaches have mainly used third person investigations which rarely examine the physical, emotional and affective experience. Where they have taken into account the quality of experience they have often employed methodologies that take an embodied cognitive approach, which maintains that the mind is split from the body. In addition purely first-person accounts of participant experience can easily be dismissed in academic realms as anecdotal, unless they have been rigorously interrogated. My exploration is motivated not just in attempting to understand the experience of interacting with the artwork but also in seeking to understand the participant's interoceptive exploration. This area has been neglected, perhaps due to the difficulty of articulating experiential response, yet it remains central to the way in which we interpret and understand an artwork. The phenomenological approach used in this investigation recognises the body as our basic mode of being in the world in terms of both the process and practice of this research.

The relational practice that grounds this work seeks to develop dialogue between the participants, their audience and the artist. Seeking to understand their experiences during their interaction with *Below the Belt* led me to enter into research-focused dialogues with seven randomly selected participants. Unstructured interviews, conducted immediately following the encounter, used open questions to initiate a conversation about the experience. Participants were asked to recollect their thoughts, feelings, perceptions and sensory memories of the interaction. More specific questions followed, focusing on observed body language, gesticulations and breathing quality.

Reflections

A selection of participant quotes are found below along with a brief description of the themes identified in these responses.

BREATHING LITERACY

The diverse quality of participants' connection to their breathing is illustrated by the following statements:
S1: "I never think of my breath, it's just kind of always there".
S3: "Tony's advice was at odds with the instructions I was given as a kid with asthma. I used to be told to breath into my chest and not into my belly. That new logic was really hard for me."

ENGAGEMENT

Participants chose to engage with the artwork in a variety of ways as described below:
S2: "I got swept up by the competition. I got heavyweight but I found myself quite anxious and tight in the process. Although I fooled the system I feel like I cheated myself".

S4: "About half way through I could see the graph on the laptop and figured it was my breathing. I hooked on to it for the rest of the time".

PARTICIPANT CO-EXPERIENCE

The social aspect of this seemingly solitary pursuit was perhaps impacted by the competitive tone of the work. Some took the opportunity to perform to their audience – on a number of occasions the participant, on stepping out of the installation, would announce to their 'audience' the title Tony had given them, often in the same flourishing style he had used.
S2: "I was determined to beat my girlfriend – she got super-heavy weight."

The challenge for both interviewer and participant in understanding these encounters is the limitation of words to describe an embodied experience. This required attentiveness to all the forms of communication used by participants in relaying their experiences. They were encouraged to verbalise their body language and take time to unearth meaning where there was ambiguity in their language. Overall, participants reported an appreciation of the opportunity to have their breath foregrounded in this way.

Some participants struggled to recollect aspects of their encounter. It is intended that future studies employ the video cued recall method to support participant memory. The audiovisual nature of this medium honours the temporal, embodied and emotive nature of the artwork and captures the participant's body language, gesticulations, breathing quality and tonal subtleties of voice.

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GAMES: FROM BLOCKBUSTER ENTERTAINMENT TO IRREVERENT EXPERIMENTS AND LOVELY BASTARDS

LYNN HUGHES

This paper presents games as the post-cinematic cultural form. In the era of powerful accessible tools and internet enabled distribution, there are broad questions about what and why (high?) art is. What is clear is that the increasingly broad field of games already includes everything from blockbuster entertainment through serious games to 'games d'auteur' and experimental forms such as the five examples presented.

Propinquity: 2010–11, Lynn Hughes and Bart Simon with team, Custom wearable sensors and interactive visuals. Photo: Brian Li.

In the contemporary art world, even in the new media sector, games are often still caricatured as 'mere' entertainment - somehow essentially superficial. They are at best a minor mode or a trendy margin. But I am interested in games because I think they are absolutely central -formally, technologically, socially and artistically. Indeed, it is becoming increasingly clear that, in the way that cinema was the central cultural form of the 20th century, games are the central form of our time. [1] This is not to downplay the persistence or importance of other inherited or current forms of art, it simply describes the contemporary, cultural state of affairs.

I would characterize the centrality of games in two ways.

The first is formal: current post-cinematic culture is the culture of the computer rather than the camera and, by implication, of active rather than passive relationships between audience and cultural product.

Computer and network-enabled interactive media imply a designed relationship between a closed, authorial shape (typical of, for example, painting, photo or cinema) and a more open, participative space. The participative space is still a designed one but is open, to one degree or another, to user choices or paths and may have emergent qualities - whether deliberate or unanticipated. [2] While this is generally true of interactive media, digital games articulate this relationship in a particularly explicit and clear way so that we can see them as the definitive form of interactive (digital) media.

A, perhaps more compelling, description of games puts the emphasis on the notion of exploring a system. Playing a game leads us to discover an underlying, constructed / designed system with its affordances and assumptions. [3] In a nutshell, games stem from, and point to, the world as increasingly systematized and they ultimately suggest that we need to be both aware and critical of the implicit, constructed and systemic nature of our realties. Here again games can articulate in complex, critical and compelling aesthetic ways, key contemporary preoccupations and situations.

Beyond these formal arguments, it seems essential to point out that people who dismiss games, or rather don't see them, almost always have little or no playing experience. Perhaps even more importantly, they have little idea of what the field of games looks like, even at this relatively early point in its development, in terms of breadth, depth and variety. To a significant extent this is simply because of the pace of development. Games have really developed over about the last forty years and the acceleration of development after 2000 was matched only by the revolution in approach and audience in the last two or three years. Most art critics and curators are over forty and so it is not surprising that they don't understand games. To them, games are the violent blockbusters that all look about the same, along with, perhaps, the recent addition of lightweight family entertainment for newer controllers like the Wii, Move and Kinect. A few curators are becoming aware that there is an art fringe to the game community. But art games or game art are just a margin of what is already a very rich, varied, artistically and socially exciting arena. It is already clear that the field of games will soon look very much like cinema in that it will include everything from blockbuster pure entertainment (like Hollywood, much of it repetitive and uninventive but occasionally something both commercial and good) through games d'auteur, to low budget independent and experimental genres.

Even a book like *Gamescenes* [4] makes the mistake of seeing the games industry as relatively monolithic and, while this may partly be because it was published in 2006, it is also because it looks at games through an art / not art lens that is essentially rooted in the fine or visual arts. In his introduction, Matteo Bittanti suggests that games cannot be art because they have too big an audience (!) [5] Like much cinema d'auteur and experimental cinema, independent and experimental games also (usually) have smaller audiences.

At the same time, games' very centrality is firmly linked to a digital culture that is radically questioning who makes art and for whom. As David Robbins suggests in his collection of essays called *The Velvet Grind* [6] the rapid and radical democratization of access to sophisticated networks and digital tools has already enabled a culture of 'amateur,' users and assorted individuals and groups, who even a decade ago would not have had access to the means to both sophisticated production and distribution. [7] In the games industry this is leading to rapid development of the independent sector as alternatives paths - from individual, to micro and small, development studios- become viable. Arguably more viable than the ungainly mega studios.

As a corollary to the increasing accessibility of sophisticated, affordable tools for creation and distribution, many polarities supported by more traditional social and cultural models are beginning to break

down. These include creator versus consumer, of course, but also high vs popular culture. Robbins also suggests that the quality and relative accessibility of new technology and distribution networks means that independent and experimental work is no longer condemned to obscurity. In fact he contends that we need to end the "tired theatre" of opposition between artists who cultivate exclusivity and look down on mainstream culture, and a mainstream industry that cultivates the illusion of speaking for the masses and encourages a suspicion of intellect and experimentation. [8] I would argue that many other traditional distinctions such as art vs design, object vs performance and virtual vs physical are also, at the very least increasingly unstable. Contemporary game culture participates in and provokes this fertile instability.

The visual part of this presentation will look at a few recent games that experiment in different ways with the game form. (Needless to say, in such short presentation it is difficult to suggest the variety and breadth that is currently emerging around games or to decide what angle to privilege). The four games I will present are: *Propinquity* (2010-11) a full body game by myself and Bart Simon, *B.U.T.T.ON* (2010) by Douglas Wilson of Die Gute Fabrik, *A Slow Year* (2010) by Ian Bogost and *Chain World* by Jason Rohrer (2010).

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THE TALL AND THE MOBILE: A MEDIA ARCHAEOLOGICAL INVESTIGATION OF THE MEDIATIZATION OF OUTDOOR SPACES

ERKKI HUHTAMO

This paper tries to understand the current modalities of outdoor media use by excavating the processes of their becoming and the various cultural forms that have anticipated them. The theoretical issue informing the paper is the formation of the "outdoor subject" - the observer, the listener, the interactor - of media culture.

Media scholars have traditionally focused on audiovisual forms that are experienced indoors and in static settings; cinema-going and television spectatorship provide good examples. Researchers are slowly beginning to realize that such an emphasis covers only a part of the complex terrain that constitutes media culture. That part may even be shrinking, thanks to current developments within urban environments and experiences. Not only are metropolitan cities covered by high-tech media attractions such are giant LED-display screens; a growing number of citizens are walking or cruising through such spaces with media devices in their hands. The current smart phone revolution may be just a beginning for much more dramatic technological, behavioral and cultural changes.

This paper will approach this situation from a media-archaeological perspective, trying to understand the current modalities of outdoor media use by excavating the processes of their becoming and the various cultural forms that have anticipated them. These earlier forms are not treated as clear genealogical steps leading to the present condition. Rather, they are analyzes are symptomatic manifestations of contradictory motives and discursive fragments that have at various times and contexts highlighted issues the current media culture may erroneously believe it is encountering for the first time. Such issues cover, for example, the saturation of the city space by commercial messages like billboards, and the attitudes toward them; the varied early forms of "mobile media" such as "walking human posters" (sandwichmen), and the practices of using fans, watches, and other forms of "proto-wearable" media; and the complex relationships that developed between them. Ultimately, the theoretical issue informing the paper is the formation of the "outdoor subject" - the observer, the listener, the interactor - of media culture. The process of its becoming is far from clear-cut, involving numerous detours, lacunas and pot holes of history, buried deep underneath the "officially" recognized and legitimized media cultural developments.

The evolution of outdoor advertising in the nineteenth century is an important topic to investigate, not only because of its proliferation and institutionalization, but also because of the enormous enlargement of the ads themselves. The earliest signboards and broadsides were relatively small. Their scale could be characterized as anthropomorphic, which more or less corresponded with the dimensions of the living environments. From the Middle Ages to the early modern times, the elements that did not conform to this principle had to do with power. Cathedrals, city walls, castles and town halls were meant to impress the 'common people' by their size. Gothic cathedrals had enormous rose windows mae of thousands of pieces of stained glass. Standing under Bernini's immense cupola at the new St. Peter's in Rome was meant to convince the visitor of the might of the catholic church. Still, even extraordinary public sights, such as the astronomical clocks built into the walls of churches or townhalls (sometimes on the outside) often consisted of relatively small elements. Their clockwork-operated *Jaquemarts* performed at regular

intervals, but the mechanical moving figures weren't necessarily larger than the automata demonstrated at fairs by itinerant showmen.

An indication that the situation was likely to change was provided by an early nineteenth century French cartoon that shows two men trying to read announcements posted on the wall. [1] One of them is peeking at the densely filled sheets from a ladder, while the other is using a telescope. Although the point of the cartoon is the absurdity of posting long official notices on the wall, its 'statement' can be generalized. Broadsides began not only piling up, but also climbing up along the wall, which made reading their messages difficult. Interestingly, broadsides were sometimes called 'handbills,' which refers to their other use: the practice of distributing them from hand to hand.

During the nineteenth century the situation changed dramatically, partly due to economic developments and changes in the urban environment, partly because of improvements in printing techniques. Toward the end of the century it had become possible to produce very large chromolithographic posters in multiple colors. Graphic designers learned to deal with large size, concentrating on elements that could raise interest, and be detected from a distance. They simplified the textual part of the message, focusing on the trademark and what came to be known as branding. Advertisers also began to take into consideration the placement of the billboard within the 'adscape,' playing with issues of scale and perspective. An 'aesthetics of the gigantic' was in the making.

The development led to the opposite direction as well: from enlargement to shrinking. Lithography and its improvement, chromolithography, as well as the techniques of photographic reproduction, provided possibilities for an unprocedented production of "smaller than usual" pictures. Illustrated magazines were part of the trend. Tiny mass-reproduced images spread to any imaginable place, even though the fashion among society ladies to dress up in photographs (a strange echo of the 'animated sandwiches' walking on the streets) proved to be short-lived. [2] Pictures filled up photographic albums and scrapbooks, and were also used as raw material for parlor pastimes, such as the creation of colorful collages of 'found' imagery on the common folding 'screens' (room dividers). So the enlargement of public images was accompanied by its reverse: miniaturization and privatization.

The mediatization of public space was reflected in the cultural imaginary. The dream worlds of emergent consumerism were internalized as shared (day)dreams. These were expressed in complex ways by cartoonists. A well known motive was the "bill poster's dream" that showed a bill poster sleeping next to a wooden fence completely covered by overlapping broadsides; their combinations led to the formation of surrealist-sounding sentences (anticipating the Exquisite Corpse). This idea was anticipated already in the 1830s in a series of prints titled "Cross Readings" (W. Jeffery, London), but without the dreamer (the composite messages were read column by column from top to bottom, in the manner of a newspaper page). The dreamer of consumerist dreams turned into a cultural topos that appeared in numerous versions, including political and propagandistic ones. In the time of the American Civil War, the Confederate President, Jefferson Davis, was put into the dreaming bill poster's place as the "rebel bill-poster" by *Harper's Weekly* (March 1862), seeing the war as nightmarish "writings on the wall."

The outstanding summary of this topos tradition was Busby Berkeley's "optical illusion" sequence for the Warner Bros musical *Dames* (dir. Ray Enright, 1934). Young lovers, who are traveling in a tram, fall asleep in their daydreams. At the moment of losing consciousness, the seductive posters on the walls of the tram are associated by the male's (Dick Powell) mind with his girlfriend's face. This provides the entry point to an outlandish dream sequence, where scores of girls carrying advertising boards (with the girl's iconic face, doubling as the character and the star actor, Ruby Keeler) are transformed into a series

of elaborate fantasies following one another. The spectators are transported deeper and deeper into the logic of the capitalist dream worlds. The external is merged with the internal. The concrete manifestations of commercial media culture are situated in the lead mail character's, and as a consequence, into the spectator's head. The musical film (ironically and significantly, produced in the heart of the Great Depression) provides the device that weaves the outside and the inside together.

To understand the peculiar ways in which the large and the small, the external and the internal were merged together, one might use the idea of the "gulliverisation" of the visual environment, as I suggested twenty years ago. [3] The concept refers to a two-directional optical-cultural 'mechanism' that worked against the idea of a common anthropomorphic scale. The size of the human observer kept on shifting between gigantic (in relation to the *carte-de-visite* photographs or tradecards) and lilliputhian (in front of large billboards or below advertising spectacles in the sky). Something similar happened in the field of media: 'immersion' into an enormous circular panorama or diorama painting (and later, the cinema screen) found its counterpart in the act of peeking at three-dimensional photographs with the ubiquitous hand-held stereoscope.

Gulliverisation operated at the divide between the public and the private. The dimensions of the urban environment, with the skyscraper as its ultimate manifestation, became more and more 'inhuman' – as the cultural reformists readily pointed out – whereas the home provided a welcome return to the anthropomorphic scale. The countless miniature objects and images that dotted the Victorian parlor were a way of handing the inhabitant an illusion of control that s/he was more and more clearly losing in public outdoor spaces. The gulliverisation also raised the issue of the relationship between things that are near (tangible) and distant (unreachable). Mediating between these opposites became a part of the advertisers' strategies, even if it may not have been always explicitly formulated. The billboards gave products a monumental and 'universal' quality, associating them with the urban environment. Tradecards, newspaper ads and other tangible forms brought them close, making them tangible and 'personal.' At the fingertips such paraphernalia functioned as temporary placebos for the products the subject did not (yet) possess. Everything was mediated by 'magic' transformations – in particular, by changes of scale that were inseparable from the perceptions and motions of the observer (the potential buyer).

Similar 'bipolar optics' manifested themselves somewhat later in phenomena like the movie stardom and the ideological manipulation of the masses in totalitarian societies like the nazi Germany. From around 1920 pictures of film stars became one of the most popular topics for *figurines*, collectable trade cards. The uncannily large faces that stared at the observer from promotional billboards and the cinema screens were shrunk to the size of one's fingertips: the object of adoration from afar suddenly was close and tangible. These pictures had an assignment in the expectations, promises and lust-evoking machinery with which the star cult was maintained. But they could be, if kept just like family pictures in the wallet, more than just a picture: the representation of someone who wasn't there, almost a part of that someone, a way of touching the thing that avoided being touched. The religious qualities that are often associated with the star cult may be the most apparent in the star figurines. In fact, they resemble mass-produced devotional cards, whose iconography derives from altar paintings and other large-scale religious representations. Advertising, the star system and the religious worship share the interplay between the monumental and the intimate. In this sense commercial billboards could perhaps be characterized as altar pictures for the cult of capitalism.

The nazis were aware about the ideological possibilities inherent in the gulliverisation of the visual sphere. They harnessed new media, such as cinema, radio, and even television (still at an experimental

stage) for their purposes. They organized carefully 'orchestrated' mass events and symbolic acts, including 'spontaneous' book burnings, and the dramatically staged *inferno* of the Reichstag (for which they accused the Jews). Leni Riefenstahl's state-sponsored 'documentaries' *Triumph of the Will* (1934) and *Olympia I-II* (1938) were part of of the media façade the nazis built to impress both the Germans and the foreigners. Massive billboard-like images of Hitler's face were displayed in the nazi rallies (reminding one of the strategies used by other totalitarian regimes), but the nazis also understood the power of the ephemeral. The ideological indoctrination of a nation depended not just on explicit propaganda and mass rituals relayed by the media, but also on seemingly insignificant channels. A company named *Cigaretten-Bilderdienst*was established by Joseph Goebbels' Propaganda Ministy to produce series of collectable cards placed in cigarette packs. [4] Their subjects included the life of Hitler, nazi uniforms, the *Anschluss* of Austria and the *Wehrmacht*. Predictably, there was also a series about the Berlin Olympic Games of 1936, which provided the lilliputhian counterpoint of Riefenstahl's colossal film. Handsome collectors' albums, with carefully scripted captions, were also produced; the nazi ideology was internalized as a 'side-product' of 'innocent' hobbyism.

Adding the fascination of the media apparatus to the collecting experience, the Munich-based Raumbild-Verlag published sets of 3-D picture-pairs of Germany's war efforts. [5] These were viewed with a stereoscope that was stored, together with the stereocards, within the album. The first volume depicted the Polish compaign of 1939. This evokes an important issue that cannot be elaborated on here: the proliferation of portable gadgets. [6] It may not have been very evident at first. In the late nineteenth century the amateur photographic camera was one of the few options. Portable radios, sometimes in the guise of everyday objects, like purses or even pinkie rings, were introduced already in the 1920s, decades before the breakthrough of the transistor radio. Eventually, mass-marketed gadgets like Sony's Walkman, Apple's iPod and the nearly endless variety of pocket-size mobile communication devices would change the users' relationships to their surroundings, including the public screens. In a few experimental cases (mostly in the media arts) the personal portable devices have been turned into terminals for manipulating the content of public screens. Understandably, this has been limited by the authorities, who want the ultimate control over the public space. Handheld mobile screen-based devices may be a challenge to the giant screens, but this challenge is perceptual, rather than interactive. It has to do with the quality of looking, its direction, mobility and intensity. These issues began with the gulliverisation of the visual culture in the nineteenth century.

References and Notes:

1. *Repr. in David Bernstein, Advertising Outdoors: Watch this Space! (London: Phaidon, 2007, orig.1997), 12.*
2. *See my "Cyborg is a Topos," in Synthetic Times: Media Art China 2008, ed. Fan Di'An and Zhang Ga, 52-71 (Beijing and Cambridge, Mass.: National Art Museum of China and The MIT Press, 2008), (in English and Chinese).*
3. *See my "Gulliver in Figurine Land," in Mediamatic Vol. 4, No. 3 (Spring 1990): 101-105.*
4. *See Antonio Faeti, "Il tabacco di Goebbels," in Figurine! Pubblicità, arte, collezionismo e industria 1867-1985, ed. Rolando Bussi and Enrica Manenti, 76-89 (Modena: Edizione Panini, 1989).*
5. *Die Soldaten des Führer's im Felde (München: Raumbild-Verlag Otto Schonstein K.-G., n.d.). The albums contained 100 photographic stereoviews.*
6. *For details, see my ""Pockets of Plenty: An Archaeology of Mobile Media," in The Mobile Audience, ed. Martin Rieser (Amsterdam: Rodopi, forthcoming).*

PERIPATETIC VISUALIZATIONS: WANDERING BETWEEN ART AND SCIENCE

Christina Nguyen Hung

Through this work, I create situations in which viewers are required to negotiate space and engage in kinetic activity – to move their bodies in order to experience the "scientific" visual material on display. In this situation, no single perspective is privileged as ideal. It is designed to prevent a disembodied, cinematic mode of viewing and all the privilege, knowledge and power that such a mode of viewing implies.
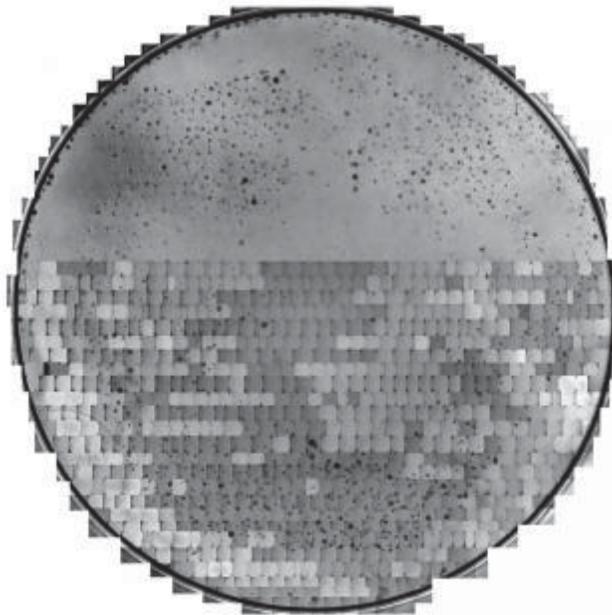
Neurons In Vitro, 2010, Christina Nguyen Hung, high-resolution image of chick embryo neurons in vitro
144 × 144 in.; 365.76 × 365.76 cm.

In my most recent work with high-resolution images, I use microscopy equipment and techniques to visualize a wide variety of biological and geological materials. This work began with the assistance of a former graduate student of Clemson's Bioengineering program. With his assistance I attempted to control the growth pattern of chick embryo neurons in vitro. While our efforts to produce a specific pattern (of text) were not successful, the failure of our experiment yielded results that were in fact more interesting to us than what we had set out to create. The neurons formed groups roughly equal in size and the groups were spaced evenly across the petri dish. The student confessed that he had never seen anything like it and I found the results to be visually, quite compelling. Unfortunately, due to disciplinary and research constraints, the student did not have the freedom to investigate our results further. For the student scientist, the work ended there. I on the other hand, photographed the sample – the entire 35mm petri dish -- at 10x magnification, a process that yielded over two thousand images.

Since I photographed the neuron culture at the end of 2009, I've been analyzing and aligning the individual images in an effort to create a single image that, when completed, will allow us to see both the individual cells and the entire in vitro environment, simultaneously. This produces a second interesting research problem: the visual (image) I am attempting to create far exceeds the capacity of any large format printing system and pushes the limits of new high-resolution digital display system. When complete, the printed neuron image will measure at least twelve by twelve feet.

Through this work, I intend to create situations in which viewers are required to negotiate space and engage in kinetic activity – to move their bodies in order to experience the "scientific" visual material on display. In such a situation, no single perspective is privileged as ideal. One cannot claim with any certainty that one has fully experienced the image and therefore cannot claim full knowledge of the object represented, without also having to acknowledge that their relationship to the visual material is contingent, deeply subjective, limited by their location in time and space and the physical limitations of one's own body. This situation is profoundly different from the way we are permitted to access large amounts of visual scientific data though software interfaces such as Google Earth, Gigapan and other screen-based interactive game/display spaces. Through such software interfaces, the viewer participates in a disembodied, cinematic mode of viewing and all the privilege that such a view implies, in terms of knowledge and power, remains unquestioned.

In the future, the large quantities of video and photographic material I gather will provide the foundation for interactive, semi-immersive art installations. Through these installations, I will be able to extend the conceptual basis for my current work by modeling extreme differences of vision. For instance, such work might permit us to imagine the world as it might be seen through a compound eye structure, much like that of the common housefly. The premise for this work being that it is entirely conceivable that such a visual experience might further reveal how our understanding of the material world and our relations to it have been entirely governed by the very anatomy, the limitations of our human, binocular visual system. It is my hope that these installations (images and immersive experiences) will allow us to rethink our relation to the world around us in radically new ways.

For example, in "Mapping the Empire v.1," four HD video cameras are strapped to my wrists and ankles as I traverse a rock formation. A "map" of the terrain emerges from the process that suggests a mode of perception that is distributed, and polyvalent. This approach represents an inversion of the landscape tradition, which reproduces the perspective of a single human and uses the window as an organizing compositional metaphor. Taking my cues from GPS, and social networking technologies I employ an approach to visualization that is ecological, collective, and distributed: data is gathered, processed and then [de/re]composed. In Empire, the "map" I create nonsensical, more accurate as a record of motion defined by the logic of living flesh, rather than a systematic grid-like construction of space and time.

This claim: that a new, technology aided system of vision might allow us to experience the world in new ways by generating models of extreme difference, is not a new one. Many of us who work with new visualization technology hope that our work will inspire others, especially those within the scientific community, to be more open to "difference" or at least, to pause and consider other possible interpretations and meanings presented by the visualizations we all create. What is interesting to me about this claim is that few researchers seem willing to contemplate and articulate the assumptions about difference per se that are implied in such a claim, and even fewer are willing to explore the impact that their work might have on our cultural understandings of difference. What is implied in the claim is that we, as makers of new visualizations hope our work will inspire tolerance of difference and that representations

of extreme difference will affect our cultures, leading them to embrace diversity in material, thought, cultural and bodily forms. Obviously, I myself harbor this hope.

In part, what I hope to achieve through this work is, in a limited sense, an intervention of sorts. By using new visualizations technologies and processes, I create images and experiences that are not only different but that prompt questions about the practice of visualization in contemporary science and knowledge generated by these practices. In works like "Shattered," "Crushed" and "Burned," there is no attempt to ascribe a scientific value to the image. Historical, literary and cultural narratives are impossible to avoid when one looks at these images as they are constructed so that historical and cultural contexts are foregrounded, along with obvious references to imaging in science and technology. Through these images, researchers in science and technology are asked to respond to the social context in which they work in a new way, just as scholars in the arts and humanities must respond to new models of thought and creativity posed by developments in new technology.

WITH DESIGN IN MIND? 'MORAL ECONOMY' AND CONTEMPORARY DIGITAL CULTURE

Gordon Hush

Technological innovation is often characterised as producing a moral economy of "tempted" bodies, corrupted desires or utopian potential distorted by unlimited possibility, and juxtaposed to a now-fore-gone simpler era and existence. This paper seeks to explore the relation between subjective experience (consciousness) and the contemporary environment, in particular, the dissemination of digital technology within mobile devices.

This paper addresses the anxieties around 'freedom' in relation to emerging technologies and their use in contemporary capitalist culture. It does so by investigating the figure of 'the consumer' and its mediation of the relationship between the human, the artefactual, and the proliferation of digital devices and services. The failure of the discourse of consumerism to explain today's culture reveals an *aporia* regarding the description of the mutually constitutive relationship between people and things. The historic attempt to ground theories of the human in rationality, desire and now the brain/genes reveals a fear of freedom, of the loss of demarcated boundaries, of definitive distinctions between moral and immoral categorisations of activities and pursuits. The technological capacity of contemporary capitalist culture, its devices, distractions, pleasures and potential represent a problem for the social sciences and their conceptualisation and explanation of the behaviour of human beings, as citizens, as consumers, as gendered identities, as workers etc, precisely because the non-human world is changing so dramatically.

Broadly speaking, social sciences assigned people identities, roles or types, which might vary or overlap with context but which were largely stable and enduring – even if less stable or enduring than those putatively assigned to earlier social formations or other cultures. This implied shared moral framework translated into ethical action, understood as personal conduct shaped to a greater or lesser extent by law and custom, as the citizen-consumer exercised choice as an indicator of personal (psychological) preference based upon calculations of utility framed within a set of circumstances including individual idiosyncrasy, socio-economic position and educational background. This position evolved over two centuries against a backdrop of the production of capitalist commodities, desirable objects and mechanical machinery – alienable and demarcated in time and space. The historically recent plethora of digital devices and immaterial services has complicated the relationship between people and things, consumers and commodities, to such an extent that previously held shibboleths describing consumption require revision. Arguably, the digital domain has altered the spatial and temporal rhythm of contemporary life to the point where neither 'consumption' nor 'production' remain unchanged and the modality of the inter-relation between the human and the non-human must be reconsidered.

The relation between human and non-human coalesces around technology. The anxiety over this liminal threshold has prompted an inquiry into whether some property of human physiology, perhaps the brain or the genes, can offer a foundation for this discussion; or whether a useful contemporary understanding of 'human' requires the radical re-thinking of our relationship to the non-human. Against the nostalgic evocation of an 'authenticity' accorded to certain desires or actions in which the human can be rooted this paper asserts the latter. Rather than devise a moral economy of action, exemplified in consumer activity, to define the limits of the human through notions of taboo, sin or the profane – without

denying the legal framework that codifies such concepts – this paper considers the concept of human as part of an evolving discourse emerging from contemporary culture and its formulation of a relationship of 'co-shaping' between people and things.

The historical evolution of the figure of the consumer and its centrality to contemporary accounts of life in capitalist culture is predicated upon the role of choice; where selection signals preference based around a calculation of value amongst equivalents or alternatives. This unification of bourgeois psychology with utilitarian economics sees a socialised homo œconomicus as a self-directed individual acting in concert with personal desires and social norms. Consequently, the discriminating choices and purchases evidenced by goods and services assert an apparent unity of psychology and social life. This is the normal and normative individual engaged in the 'biographical fiction of the self' [1] through an interaction with the material culture of contemporary capitalism.

This fiction of the consumer is at odds with the historical evidence – most obviously when the pathological acquisition of objects, services or experiences are considered. The ubiquity of eccentrics, collectors, hobbyists, the predominance of habits, acquired, inherited or imitated behaviours, the over-indulgent or self-denying obsessive all serve to dispel such a myth. Indeed, the only possible existence for such an ideal-type consumer or citizen would as an absence, as a putative precondition that was ceaselessly interrupted and deviated from.

The nineteenth century's expression of the utilitarian psychology through rational action as the precondition of identity production appears superannuated:

The classical bourgeois world view can be understood as a process of individuation, as the pursuit of pleasure. The pursuit of pleasure is the pursuit of the self; and the self, like the cosmos, is a system of relations tending towards a unique equilibrium. This has long since ceased to be a plausible view of either psyche or cosmos. [2]

 As a result, homo œconomicus, the homunculus of the 'consumer,' was rendered redundant just as the figure of the consumer was adopted by discourses as varied as law, political theory, marketing and sociology as the basis of an explanation of the particularly modern incarnation of 'consumption. Here freedom to consume is the freedom to construct an idealised version of the self, to express through external actions the inner being. Consequently, the types of choices made, the preferences expressed are freighted with meaning and significance implying, as they do, the inner world of psychology, morality and personality. In this way the problem of choice, of particular choices or even the renunciation of consumerism are deemed to be moral considerations, ethical activities and problematically gendered experiences. Against, 'economic man' and his will expressed through the manipulation of the material world in accordance with a rationally organised desire for utility stands a hysterical figure that is prey to the irrational emotions and temptations of desirable commodities.

While social science added psychological and socio-spatial meat to the bones of *homo œconomicus*, the 'consumer' remained the moral intersection of bourgeois psychology and utilitarian thought. The subject was considered an active agent who organised the world of inert matter or manipulated pixels on a screen, in the service of a desiring self. Critical sociology sees in this the realisation of an authentic selfhood stymied by the denigration of experience inherent in the 'culture industry' and an 'ersatz individuality' [3] as the result of a corrupted libidinal economy. The manipulation of commodities to manufac-

ture personal identity can involve a degree of 'risk' for the subject, as unstable identity formations, contingent upon consumption habits and practices, solidify into lifestyles, which are viewed as being to whatever degree deviant, immoral, or illegitimate.

This desiring consumer can be seen as the lodestone of a nascent 'consumerism' and 'consumer society,' a harbinger of modernity and the 'mass' consumer society of today. In doing so, alternative forms of exchange – non-modern, non-market forms, such as gift-giving – became the focus of a nostalgic privileging of the archaic that functioned as a fantasy of the 'real' or 'authentic' in human consumption that is apparently warped by the over-provision of commodity capitalism. Here the promised satisfactions of the commodity outweigh utility, and possession comes to be predicated upon meaning, or social worth, rather than functionality.

As a brief example it is instructive to consider the recent riots in the United Kingdom's larger cities. In an economic era commonly termed 'post-scarcity' – in which mass consumption prevails for the majority of the populace – even allowing for these recessionary times, much of the mass media coverage of rioting focused specifically upon *looting*, and the illegal removal of goods from retail environments (or other looters). People who were otherwise, and previously, considered to be consumers were denounced as *feral*, *criminal*, or *manic* and their actions immoral, sinful or unreasonable. Such unruly consumption does not bear upon the *use* to which any goods appropriated would be put, but simply describes the manner of their acquisition. It is interesting to consider that the goods liberated from stores – at least as reported in the popular media – were consumer items (widescreen TVs, mobile phones, designer clothing: portable, high-value items), which simply replicated the types of goods already possessed by many of those rioting or looting. Indeed, the difference between looting and shopping appeared to be the unregulated manner in which it occurred - the absence of law, social convention, surveillance and the disciplinary apparatuses normally associated with these. So, the rationale governing the actions of individuals was not simply a desire for utility, economic necessity or, in most cases, pre-planed criminality. It is precisely in the *irrational* aspect of these events, in their *group* character that we see the failure of conventional models of the consumer.

 By characterising the riots and looting as *immoral* and unreasonable acts the political and media apparatuses seek to re-assert the fiction of the morally responsible, rational and law-abiding citizen-consumer at the heart of contemporary capitalist society. Even when criminality intrudes and individuals are suborned in some manner this must be construed as a *deviation* from the norm that creates transgression. Beyond assertions of "mob rule" there was no attempt to understand the behaviour of the participants in these events as members of a group in which the group is the unitary entity, and that its behaviour and rules of operation and engagement would not conform to those normatively expected of individual consumers. The concept of mob rule was deployed to explain why an aggregation of individuals behaved in such unexpected fashion.

However, a contradiction emerges between the rational and irrational, moral and immoral since the apparent co-ordination of mob or looter activity, was deemed to be rational, planned and criminal. And the tools that allowed this to occur? Digital devices. RiM's Blackberry 'phones and its messaging service were pinpointed, one politician to urging a 'BBM curfew' in London. However, the hysteria highlighted here by those unaware and fearful of the technological possibilities of digital devices (and the many alternatives to BBM) exposes a fear of emerging technology that echoes the alarm over commodity fetishism by critical sociology – that otherwise rational, discerning, morally upright individuals will be seduced into inappropriate activities by *objects*, either alluring commodities or technologies that confer a seditious set of freedoms upon their users.

Into the 'black box' of the technological device disappears the rule of law and the citizen-consumer; by simply assenting to the potential of such technologies, so this logic goes, we are losing, undermining or deforming our humanity – a physiological as well as moral corruption occurs because our bodies and our minds are embroiled. The possibility of the corruption the flesh and the mind of the users of such technology through the stimulation of illicit or novel desires re-animates religious conceptions of sin and taboo in the contemporary world, even underpinning notionally secular discussions. The degree of freedom putatively offered by digital technology, whether in the web itself, the communications and interactions it makes possible or the purchase of goods and services it facilitates, seems to escape regulatory purview – where are the digital police, and what might they term a crime? In the absence of the citizen-consumer and a pseudo-rational pursuit of utility, how are we to determine the nature and conception of the human agent and identify appropriate limits upon action? How is it possible to determine the *authentic* human desire or action from its inauthentic counterpart, which arises merely from tempted flesh and seduced mind, born of an excess of possibility?

One position can be phrased as: if we distinguish truth from falsity, the authentic from inauthentic, based upon a combination of physiology and psychology then we can legislate accordingly. The enduring appeal of medical discourses in the arena of consumption is evidence of this: including 'hysterical' women being pathologised as kleptomaniacs or phrenology revealing thieves. Descartes' mind/body dualism here hints at resolution, if only we know where to look. This putative re-unification of the biological and the symbolic, of matter with meaning, whether removing the false freedoms of technology or the fetishistic deception of the commodity-form, would allow for authentic experience of the world, discrimination between the true and the false, the consecrated and taboo in a contemporary and technologically permeated world. A 'moral economy' of action might emerge that would reconcile the human with the non-human by asserting what it was permissible to ask of the world and those within it. No longer would desire (cause) result in an immoral or inauthentic longing or wish (effect).

This is precisely the promise of explanations premised upon the relationship between the social and the natural or medical sciences. For instance, the emerging area of neuro-anthropology seems to promise just such a reconciliation via its address to the 'encultured brain' and investigation of the relation between physiology and culture. Equally, developmental psychology or behavioural economics seek to patrol and map such terrain in their own distinct fashions. A more intriguing starting point for considering the relationship between technological culture and human behaviour might be Marshal McLuhan's famous dictum that media, artefactual as well as communicational, are 'extensions' of humanity. Such formulations foreground the relationship between humans and non-humans, highlight experience and invite a discussion of consciousness under specific conditions, rather than as a human attribute absent in non-humans. In proposing a relational understanding of consciousness, rather than its 'medicalisation,' we avoid a reduction to the brain as site and origin of consciousness (intention).

Explaining human action in this manner requires unpicking the enigma of the mind/brain (consciousness) by resorting to technologies capable of imaging or 'imagining' the brain's operation. In imaging the brain in search of consciousness and the source of human action, science must attribute to it changes of state that are visible and recognisable, to which are assigned functions, states and operations: to these, in turn, is attributed a relationship to consciousness and action. In relation to Persistent Vegetative State (PVS), we expect or require patients to respond to stimuli – questions, medical probes etc – in the manner of the healthy. Failure to respond as expected and they are deemed to be functioning imperfectly or not at all. However, they may simply be functioning – interacting with their environment and us – in a markedly different or altered fashion, which we are failing to recognise, comprehend and respond to in our turn.

The various medical technologies for inspecting and interrogating the brain as it operates include Positron Emission Tomography (PET) and functional Magnetic Resonance Imaging (fMRI), both offer indications of levels of cortical activity in patients, but establishing how these quantitative measures relate to qualitative experiences or states of mind, or even capacity for such things, is problematic. The multi-coloured images produced are intended to correspond to levels of varying neural activity. However, the description of such fluctuating processes in no way supplies an explanation of their role in or relation to conscious experience or intentional action. Emerging digital technologies appear to complicate the question of what it is to be human, and identify a specific anxiety on this point with regard to contemporary culture. The reconciliation of biology with the symbolic, physiology and culture, in a comprehensible relation of cause-and-effect is both promised by technologies, such as PET or fMRI, and undermined through the generation of innovations in how humans and non-humans interact, the expansion of possibilities for experience and affective transformation.

It may be instructive to pursue the relationship between humans and non-humans, the association or networking of actants (Latour) or the relation between organisms and their environments discussed by ecological psychology, which 'affords' experiential possibilities for individuals and populations. This allows a 'postphenomenological' (Verbeek) [4] analysis of the relationship between people and things in which the Cartesian privileging of the human subject is circumvented through an analysis of the 'ontological relationship' of affordance forged between 'organism and environment.' [5] Specifically, this asserts the mutually constitutive relationship between people and things:

… the concept of mediation helps to show that technologies actively shape the character of human-world relations. Human contact with reality is always mediated, and technologies offer one possible form of mediation. [However…] any particular mediation can arise only within specific contexts of use and interpretation. Technologies do not control processes of mediation all by themselves, for the forms of mediation are always context-dependent […]. [6]

The immersive engagement with technology obliges the human body to become the repository for the forms of experience that arise: the aesthetic and sensorial experience generated in the relation of affordance acts to transform cognitive capacity, as anyone who has ever looked through a microscope or a telescope can testify. Latour's re-discovery of Tarde's rejection of a 'primordial identity' in favour of a constant process of differentiation of 'being' through 'avidity,' or having, implies that every actant is an 'unstable aggregate' defined by the qualities it possesses.

Subjectivity, corporeality is no more a property of humans, of individuals, of intentional subjects, than being an outside reality is a property of nature […]. Subjectivity seems also to be a circulating capacity, something that is partially gained or lost by hooking up to certain bodies of practice. [7]

Consequently, the continuous transformation of subjectivity through the experience of difference is exacerbated by participation in the technological arena. The relationship between people and things functions as a medium within which being is articulated to having as an 'affordance' that re-defines subjective experience: this transmission of experience allows the 'differentiation' of the individual from itself in space and time. So, possession is not purchase, acquisition or ownership but the re-formulation of the relationship between 'being' and 'having' in which concepts of morality are dispersed by technology. In place of desiring consumers, 'unstable aggregates' constituted by their historical experiences and technological relations of affordance coalesce. The plenitude offered by digital devices and the service-based interactions they support 'affords' a range of experiences appear 'immoral' and corrupted only when

viewed through the lens of the nineteenth century and its economy of desire subordinated to rationality.

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LEAF++

Salvatore Iaconesi & Luca Simeone

Leaf++ is the product of a research project that aims at designing a prototypal interactive system involving computer vision, gestural interfaces, augmented reality technologies and cross medial platforms to create a novel tool to experience botanical information about plants and their leaves.

A computer vision system in a mobile application is able to recognize the leaf and to show available information.
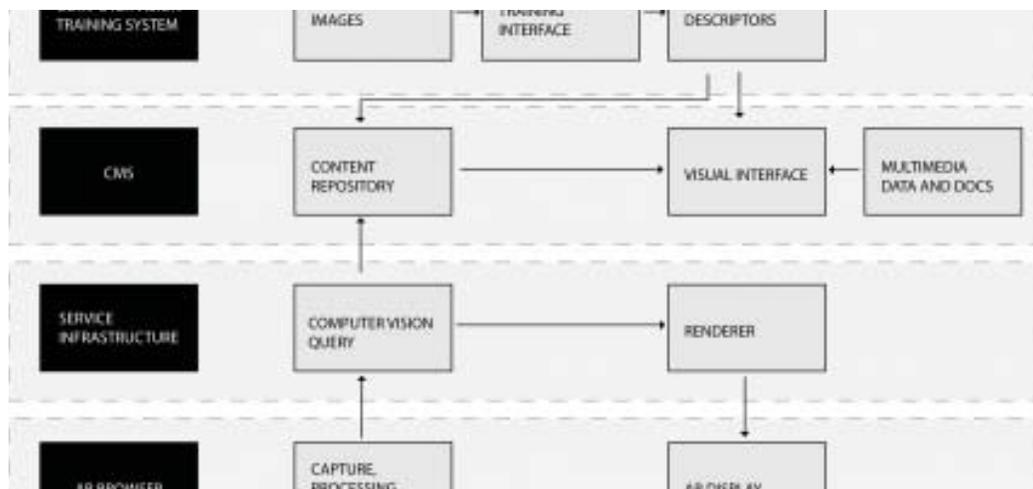
Leaf++ logical architecture (courtesy of the authors)

Introduction

"The Third Landscape – an undecided fragment of the Planetary Garden – indicates the sum of the spaces in which man gave up to nature in the evolution of the landscape. It regards urban and rural forgotten places, spaces for transit, industrial wastelands, swamps, moors, bogs, but also the sides of roads, rivers and train tracks. The whole of these forgotten places are reserves. De facto reserves are: unaccessible places, mountain tops, uncultivated places, deserts; Institutional reserves are: national parks, regional parks, «natural reserves»." [1]

Gilles Clément's Planetary Garden is one of the most suggestive answers to the mutation of the definition of urban space. Planetary Garden is to economic and urban globalization what urban gardens were to the cities of the 19th Century.

The Third Landscape is a connective fabric composed of residual spaces that tend to take a liquid state, never preserving shape, resisting governance. Classical preservation or environmental conservation

tools such as surveillance, protection and the creation of limits and borders cannot apply to the Third Landscape without destroying its characteristics, as Clément writes [2] "not property, but space for the future". An idea of space that goes beyond the ideas of landscape as a place for identity, being used as an asset for local societies, and as a strategic tool for memory.

As John Barrell spoke about "the dark side of the landscape" [3] while pointing out the imposition of a point of view of a single social class, with Clément we could speak about a "light side", for the Third Landscape is not an exclusive model but an inclusive one: "a shared fragment of a collective consciousness". It is based on a planetary remix (brassage) which is at the origin of the current richness of ecosystems. [4] Clément talks about the necessity of training our gaze into recognizing and understanding the Third Landscape. This requires a new possibility for vision and knowledge dissemination in urban natural environments, a renewed sense of aesthetics, and a morphed sensibility for the possibilities for interaction and communication offered by our surroundings.

Our current interaction and interrelation with the natural environment in urban spaces is mainly delegated to an institutional definition of borders and is rather far from the traditional knowledge of the ecosystem and its elements. Globalization and daily routines often force human beings to recognize plants and vegetables only in terms of their use in products that are found in supermarkets, or of the trees and bushes that decorate the sides of our roads. People progressively lose contact with the knowledge about the seasonality and origins of vegetables as they have come to expect any given product at any given time in a supermarket. One study, [5] among many other studies of a similar scope, gave advice to farmers in remote parts of the world encouraging the production of off-season products for export and highlighted this practice as a truly effective marketing strategy based on the documented assumption that consumers want specific products all-year-round.

Stepping outside of the supermarkets, we see that plants still remain within the great unknown as regards the majority of inhabitants of urban spaces. In cities, plants populate the periphery of our world view, living a life that is mostly aesthetic and excluding practically all forms of knowledge about their origins, characteristics, benefits and roles in the ecosystem, which remain largely hidden from the majority of citizens.

Leaf++

Leaf++ is an ubiquitous, interstitial information tool.

It is designed as a new "eye" that can be used to look at the natural landscape of our cities.

It is designed to help us see and understand the Third Landscape.

Leaf++ is an augmented reality system which employs computer vision techniques to recognize plants from their leaves, and allows us to associate them with digital information, interactive experiences, and generative aesthetics whose purpose is to create a disseminated, ubiquitous, accessible form of interaction with the natural environment, realizing a suggestive, exciting, desirable and accessible contact with the knowledge, wisdom and awareness about the inhabitants of the natural ecosystem in our surroundings.

Leaf++ shifts our focus in the vision of urban landscapes.

It is a tool for a new vision which, through augmented reality, enables the creation of an additional layer on our visual landscape: an infoscape and information landscape which is directly and coherently added to our vision; a new field of vision that is accessible by looking at the world through a mobile device which acts as a new lens on reality; a new vision in which leaves and plants come to a new visual life as the computer vision system actively searches for them and highlights them, populating our view with information about their origins, living conditions, characteristics and interactions with our urban/natural ecosystems.

Leaf++ acts as a distributed, dynamic, real-time, emergent geographer of the Third Landscape: each vision of a member of the plant kingdom in an urban space triggers a mutation of the map which is shared in realtime by all persons using Leaf++, providing a fluid cartography of the Third Landscape. These new visions are turned into an ubiquitous sensorial experience, transformed into morphing, moving images and sounds which create a state of wonder that further connects us to this new visual landscape.

Methodology

The Leaf++ project has been designed and implemented through the following methodological steps:

- initial briefing, which produced the definition of the concept;
- the choice and experimentation of several technologies which could be used to realize the concept;
- the design and implementation of several prototypes, which were used in an iterative, participatory process;
- the generalization of the best prototypal solutions into an open platform;
- the usage of the resulting platform to create two use cases, for education and artistic performance.

Leaf++ was intended as an augmentation for vision, to increase the level of awareness about the natural environment, to promote the establishment of a collaborative set of practices for dissemination, sharing and communication of knowledge and information about the ecosystem, and to create an ubiquitous digital interactive layer onto the natural environment that could be used for education, expression and for artistic and performative purposes. Anthropology, Cognitive sciences, Biosemiotics, Environmental Psychology and Aesthetics, together with a wide range of disciplinary experiences in geography, geoecology, geobotany, ecology, landscape architecture and planning, converge in the direction of landscape ecology, and find landscape as a common meeting place. Several definitions of landscape emerge from all these approaches, as reported in Farina: [6]

- "the total character of a region" (von Humboldt);
- "landscapes will deal with their totality as physical, ecological and geographical entities, integrating all natural and human ('caused') patterns and processes ... " (Naveh);
- "landscape as a heterogeneous land is composed of a cluster of interacting ecosystems that is repeated in similar form throughout" (Forman and Godron);
- "a particular configuration of topography, vegetation cover, land use and settlement pattern which delimits some coherence of natural and cultural processes and activities" (Green)
- "a piece of land which we perceive comprehensively around us, without looking closely at single components, and which looks familiar to us" (Haber).

All of these definitions move across several dimensions in which landscape can be described, with the more cognitive-oriented ones (such as Haber's) resulting in broader visions that are able to bypass the

concepts that might classically be viable for public administrations to enact their policies and strategies, and to produce a more fertile humus for creation of a significative description of the planet which is able to include expressive and performative possibilities for humanity.

The concept of cognitive landscape, and of its possible contaminations through technologies and the results of the more advanced contemporary research in urban anthropology, has been a fertile domain for discussion during the initial phases in which we gave shape to the concept. A cognitive landscape can be thought of as the result of the mental elaboration by every organism of the perceived surroundings. [7]

We decided to contaminate the observations found in Farina's analysis of the theory of cognitive landscapes and of the mosaic theory within Clément's idea of nomadic observation of a constantly mutating environment, by focusing on the value of being able to recognize and understand the fluid and ever-changing natural ecosystem in a process that is inclusive, collaborative and disseminated.

In this mindset, we described a series of objectives, which later formed the concept for Leaf++:

- to create a tool for vision or, even more desirably, a new or mediated vision;
- to create an accessible and natural interaction metaphor, as close as possible to the practices to those which we are accustomed to; one which is easily executable by a wide range of persons across cultures, age groups, skills;
- to create an open platform so that it will, in and of itself, create an active ecosystem of practitioners wishing to use and modify it to enable more practices and possibilities for vision, awareness, understanding, expression and ubiquitous knowledge sharing;
- to create a usable information and interaction layer that is easily hooked onto the elements of the natural environment and that is accessible through mobile devices;
- to create a process which harmoniously conforms with the processes of our vision; just as we interpret what we see geometrically, symbolically, culturally or through our memories, experiences and relationships, Leaf++ should progressively populate our mediated field of vision with aesthetics, information, knowledge, possibilities for relation, understanding and interaction, just as details progressively emerge while we look at things;
- to create an aesthetic, sensorially stimulating, cognitively suggestive experience; one which is able to trigger wonder and emotion, to inspire action and participation, to activate cultures and open dialogues.

Along the lines defined by these objectives the research group set forth in designing the experience which was to be then implemented. The most pressing point turned out to be one regarding the ability to characterize Leaf++ as a "vision." Current Augmented Reality (AR) systems did not completely satisfy us with their interaction metaphors and in the composition of their interfaces as most of them heavily relied on movie-generated ideas of what an augmented reality interface should look like: radars, sonars, floating icons and other visual assets seemed to create videogame-like experiences that, while being usable and (in some cases) wonderful to look at, did not match the feel and aesthetics of the "new vision" which we wanted to produce. Our desire was to create a lens, a see-through transparency onto which the additional information layer would visualize in the most natural possible way.

Another pressing characteristic to be researched was the bypassing of the limits imposed by GPS driven augmented reality systems and to create an experience that was strongly based on (computer) vision.

One of the objectives which we regarded as being not only strategic but also fundamental in promoting the vision which is defined by the Leaf++ project was the requirement for openness of the technologies used and produced in the process. Due to this consideration the research team opted not to use any of the existing commercial (even if free) platforms that are currently available to perform computer vision based AR. We chose to develop our own technology and to release it for open usage to the international scientific and artistic community (the source code of all software used in Leaf++ is currently available on the project's website under a GPL3 license). The production of an open, working platform is, in fact, one of the most outstanding results of the project, and it fully supports the idea of open, accessible knowledge which we tried to enact in the natural ecosystem by engaging the making of Leaf++.

During the second phase of the project, the technological architecture was defined.

We chose to develop a mobile AR browser with the characteristics defined during the previous stage. The chosen mobile platform was developed for Apple's iPhone, mostly due to the availability of a stable development environment and for its ease of use – to satisfy the requirements in terms of accessibility and usability – and due to the availability of multiple international development groups dealing with computer vision issues such as the ones involved in the project, thus allowing us to establish an effective mutual collaboration which proved to be both effective and rewarding.

The platform which was created for Leaf++ is composed by the following elements:

- a trainable computer vision module
- a multimedia CMS (Content Management System)
- a service infrastructure

A computer vision (CV) module is used to provide image recognition features to the system. The CV module uses SURF (Speeded Up Robust Features) algorithms and techniques to identify the various types of leaves. The SURF image detection techniques and descriptors described in Herbert Bay, et al. [8] are used in the system together with a customized version of the optimizations described in Maha El Choubassi and Yi Wu. [9]

Specifically, the CV component is integrated in a system enacting the following process:

- image acquisition
- generation of feature descriptors
- classification and initial configuration of the CMS

A guided procedure allows the user to capture all the images that are required to correctly identify the relevant visual features of the leaves that are to be added to the system. In the next phase of the process an interface is used to navigate the groups of images of each feature and to use them in generating the SURF descriptors that will be used in the end system. Each descriptor uses information captured by the images as suggested in [8] and [9] to create the data that is needed for the realtime image recognition process. An initial version of the descriptor is generated automatically and the user is guided through a series of iterations whose objective is to refine this initial information, thus producing a better, more efficient, descriptor: by iteratively modifying selected parameters, and using the leaves in front of the camera, the expected results are compared to the effective ones, thus identifying the needed modifications to the descriptors.

At the end of the process each one of them is associated to a series of keywords establishing a taxonomy whose nodes are associated to the visual elements of the various types of leaves.

This taxonomy is used in the CMS. The CMS is implemented using a customized version of the Wordpress content management platform. The taxonomy produced in the previous phase is reproduced inside Wordpress under the form of a "customized taxonomy". Using the standard features of the CMS it is, thus, possible to associate multimedia content (videos, sounds, texts, documents and interactive experiences) to each part of the taxonomy and, therefore, to the visual elements of the types of leaves that have been added to the system.

The service infrastructure is used to bring all parts of the system together for the usage experience. A series of software components that can be readily integrated into iPhone applications connect to the device's webcam and enact the realtime feature recognition process. When a leaf is recognized, its identification is translated into a series of terms in the custom taxonomy and relevant content is fetched over the network by interrogating the modified Wordpress CMS. The multimedia assets are then progressively shown onto the smartphone's viewfinder, coherently with the realtime onscreen position of the leaf.

Results

Leaf++ has proven to be effective in realizing an experience in augmented vision, applied to the possibilities offered by creating augmented reality layers of information and interaction onto the natural environment. The open platform produced during the project is currently being used for two specific purposes:

- an education platform
- an art performance.

The education platform enables teachers and students to add information about the plants in their environment directly onto plants' leaves. This allows all subjects involved to create ubiquitous education, knowledge sharing and information dissemination processes. At FakePress Publishing we are currently using the platform to create ubiquitous publications on the themes of ecology, sustainability and food and dietary education, producing information facilities that are ubiquitously accessible about the natural seasonal availability of vegetables, their origins and characteristics, creating enjoyable, suggestive and interesting ways to re-connect with the knowledge and traditional wisdom about food and environment which is progressively being lost in our urban ecosystems.

Leaf++ is also being used for the execution of an art performance in which the system is not connected to a set of databases containing information but, rather, to a generative audio and video engine. In this "concert for augmented leaves" the performers use the leaves in front of cameras to generate suggestive audio and visuals. The performance is currently being developed into a fully participatory experience in which the audience takes the role of the performers and is free to move around urban space and generating the audio and video collectively, by augmented-looking at the leaves that come across: a concert in the Third Landscape.

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WIND, RAIN, AND PROLIFERATIVE PRESERVATION

Jon Ippolito

Generally considered a culprit in the destruction of traditional human artifacts, nature may end up serving as the inspiration for such new automated paradigms for the perseverance of culture. Yet, as successful as genetic algorithms are in preserving the information stored in the DNA of living creatures, harnessing genetic algorithms to propagate human artifacts would breed a new host of ethical questions about authenticity and responsibility.

Fig 1. Karl Sims, Evolved Virtual Creatures
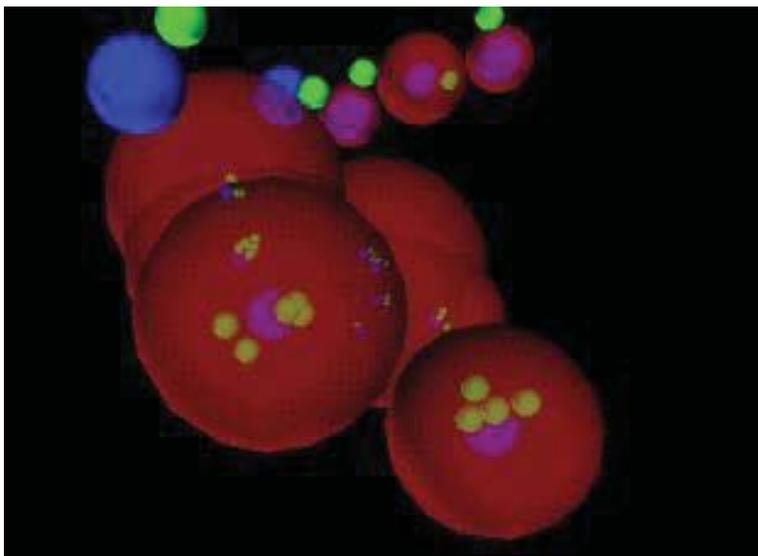
Fig 2. Tom Ray, Tierra

"If you take the Christian bible and put it out in the wind and rain, soon the paper on which the words are printed will be gone. Our bible is the wind and rain."

--Salish elder [FN]

The organic archive

The word "archive" usually brings to mind hardware—shelves of solander boxes, racks of server boxes—or software—arrays of bitmapped images, frames of digital video, folders of Word documents. This paper considers the potential for an archive based instead on wetware—one that imitates the algorithmic processes of biological perserverance, if not its actual membranes and mitochondria. An organic archive would preserve via unorthodox processes like genetic replication and mutation rather than storage and migration. So it's worth speculating whether organic processes might help preserve information-based culture in all its forms.

Digital tools like GarageBand and GIMP may grant today's remix artists the power to proliferate culture, but this power pales by comparison with the fecundity of genetic processes. From natural ecosystems to synthetic genomes to genetically engineered algorithms, evolved systems are able to calculate, create, and copy with a robustness that remix culture cannot match; given the new millennium's obsession with genomics and biomimicry, evolutionary paradigms are likely to play an increasingly important role in many disciplines in the coming decades. Our individual memories are organic, after all—why shouldn't our social memory be?

DNA as archive

Archives that live and breathe are the beneficiaries of evolution, which is the tendency for natural processes to promote stable structures. As a consequence, an organic archive doesn't need conservators and librarians to tend it, but given the right combination of energy and nutrients can reproduce itself. Artists like Joe Davis have already begun exploiting this fact to preserve rudimentary artworks via biological replication. Working with researchers at the Harvard Medical School and University of California at Berkeley, Davis encoded a Y-shaped symbol for fertility into DNA, and then inserted this "infogene" into the chromosomes of otherwise ordinary *E. coli* bacteria. Left to reproduce in test-tubes in a lab, Davis's microscopic studio assistants soon reproduced billions of copies of this rune simply by dividing and making more of themselves. "I'm the most published artist in history," said Davis. [FN]

So what if you want to preserve an entire collection, rather than a single work? In a 2007 conference at the University of California at Berkeley organized by Richard Rinehart on "New Media and Social Memory," Stewart Brand and Kevin Kelly suggested that we might encode the Library of Congress in DNA [CK]. This proposal is essentially Joe Davis' infogene writ at the scale of an archive rather than an individual artwork.

DNA has shown potential as a computing medium for parallel-processing [FN: Square roots], to be sure, but a vat of DNA has a mind of its own, and is unlikely to treat cultural preservation with any more respect than it treats blue eyes or other desirable condition. DNA is transformative—partly via mutation, partly via sexual reproduction—and this fact is essential for its role in evolution.

That makes trusting preservation to an actual organic system is a dicey proposition. Of course, you could try to preserve the Library of Congress in a jar of DNA that's frozen; this would prevent it from mutating very much but not be a big improvement on storing it on a hard drive. To harness the power of an organic archive, you need to harness evolution's power to proliferate, which means either trusting replication to an actual organism (like Joe Davis's *E coli*) or an artificially stimulated evolution using manual processes such as polymerase chain reaction or exposure to ultraviolet radiation. In this case, a strand of DNA encoding a bitmap of the *Mona Lisa* wouldn't sit still in a vat of genetic goo, but would unzip and zip its halves promiscuously with other strands, replicating and mutating.

Synthetic genomes

Of course, it usually takes a lot of time for nature to evolve stable systems. Yet if evolution is really the cause of organic stability, then time measured in years or millennia is less relevant than time measured in generations—for it is by mutation and testing that organic stability arises.

Fortunately for future preservationists, not all evolution has to happen on glacial time scales. The short lifespan of the fruit fly favored by genetic researchers, *Drosophila melanogaster*, is compensated for by its precociousness, with the result that geneticists have been able to observe evolution at work in the laboratory because each new generation only takes a week to mature. As exciting as it may be theoretically, encoding cultural data in a genome is rather impractical. It's not trivial to extract the DNA of a fruit fly just to look up *Moby Dick* in the Library of Congress, much less to figure out whether its words have mutated along the way.

There's a much less messy way to exploit genetic proliferation. Researchers have experimented with digital equivalents of such fast-breeding organisms, called genetic algorithms. And they have gone further by setting the parameters by which such virtual creatures evolve. Such "fitness functions" vary depending on which traits the researcher wants to encourage. Might it be possible to design such a fitness function to encourage the perserverance of digital culture?

Fitness functions

As in so many radical approaches to preservation, artists were there at the outset. To create his *Evolved Virtual Creatures* [FN], artist Karl Sims used a random number generator to create mutations in a series of boxlike shapes whose movements and articulations were also determined by their genetic makeup. Sims then ran these creatures through a series of tests, each corresponding to a different fitness function: Which creature could swim the fastest? Which could win a hockey game?

By breeding successful mechanisms together, Sims stacked the deck so that the winners in each category were more likely to pass on their genes to the next generation of creatures. To be more specific, as each creature was represented by a simple computer algorithm, Sims interspliced the formulas for these algorithms to produce new formulas that are in a genetic sense the offspring of the older algorithms. As a result after a hundred generations [FN: http://www.karlsims.com/papers/siggraph94.pdf], Sims' bizarre creatures could perform their tasks with recognizable competence—even though Sims never designed them to do anything except evolve according to a particular fitness function.

Of course, as intriguing as Sim's system is, it's less a means of preserving forms we already have than a means of inventing new forms—a sort of eugenics program for art. Fortunately, even if you don't want your artwork evolved by organic processes, they may still help generate the software necessary to preserve it.

Danny Hillis and others have experimented with similar processes to evolve useful software, such as word processors. [FN] What if such an evolutionary system were trained not to create a faster or more efficient word processor, but to create a more stable one, that could work in a wider variety of documents and operating systems? This strategy would shift focus away from preserving individual artifacts and toward setting up the rules necessary for evolving an ecosystem capable of withstanding unpredictable changes in technology. If the word processor is the figure, its technological context is the ground, and they must complement each other if the ecosystem is to endure.

We know how to write the figure—a word processor—with code. But how do you model the ground—those unpredictable changes in technology? We can turn to a helpful metaphor from evolutionary biology that explains how individual species and fitness functions interrelate: the Epigenetic Landscape. [FN:17]

Wind and rain

Biologists invoke the Epigenetic Landscape to depict the way the development of an organism can be subject to genetic and environmental forces at the same time. Imagine a stretch of land in which dramatic peaks and valleys have been formed by powerful seismic forces; different populations live in the various valleys of this landscape, out of touch with each other due to the intimidating ridges that separate them. In this visualization, seismic forces represent genetic influences, which tend to segregate species into incompatible gene pools; hence birds and reptiles can no longer mate, even though they evolved from a common ancestor. Nevertheless, the behavior of the population is not determined solely by this seismic topography, for rain and wind can erode previously impassable peaks down into humble hills more easily traversed by the landscape's inhabitants. In this metaphor, the wind and rain represent environmental influences, which tend to encourage the evolution of new species through dramatic climatic change. (Paleontologists hypothesize such a cataclysm to explain the sudden extinction of dinosaurs and diversification of mammals 65 million years ago.)

How might this abstract model be applied to evolve a more adaptable word processor? The organisms on the landscape—variations on word processors—might be interbred to produce new variations, and those judged best able to display various documents would pass their code onto the next generation of word processors. Meanwhile, in addition to a predefined set of technical conditions—from, say, a Wordstar file in Windows 3.11 to a NeoOffice file in Mac OS X—researchers might expand the test by adding some wind and rain—random samples from an algorithmically generated set of documents and algorithms. In this way, the resilience of display software could be tested against technical contexts that don't yet exist. [FN: Lanier]

The ethics of genetic preservation

This vision of self-evolving, future-proof artifacts is heady. But it's also hazardous, because it plays into our society's increasing reliance on genetic modification for innovative solutions without regard for the long-term effects. While pharmaceutical research has produced blight-resistant crops and new tests for

cancer, it has also produced suicide seeds and antibiotic-resistant germs. Genetic modification has had a similarly mixed effect on preservation. Scientists by 2009 had created a living clone of an extinct species by transferring cell nuclei from the preserved skin of an extinct Pyrenean ibex into the eggs of a contemporary goat. In the same year, however, the US Food and Drug Association approved the sale of the pharmaceutical protein antithrombin produced in the milk of genetically engineered goats—in effect, engineering a new species of mammal for the sole purpose of delivering cheaper drugs, a practice known as "pharming." Given the limited resources on planet Earth, the fact that genetically modified creatures can often outcompete their natural cousins [FN: Wikipedia on Genetic Engineering] suggests that tampering with biological systems could reduce their diversity rather than amplify it. It may be that biotechnology does not support the **both/and** logic of digital proliferation but reverts to the **either/or** logic of analog space.

To harness the enormous parallel processing capability of a virus or cell is to play with fire; the same potential for explosive and unpredictable growth that makes genetic processes attractive as a preservation strategy also makes them a potential danger to existing creatures and their ecosystems. Critics such as Jeremy Rifkin question whether humanity is mature enough to wield the power of genetic processes responsibly, given their unpredictability and proliferative potential. Even technologists such as Bill Joy have expressed concern over the "gray goo" scenario, a doomsday endgame in which one species wins the zero-sum game of a planet with limited resources. In this hypothetical future, researchers accidentally unleash a self-reproducing, evolving machine or organism that overwhelms the natural (and possibly the built) environment, covering the planet with a kind of gray goo that obliterates the rest of the animal and vegetable kingdoms.

And what of the preservation of genetic artworks such as Eduardo Kac's glow-in-the-dark bunny or Davis's runish bacteria? Allowing them to breed uncontrollably in the wild may be the best way to promote their perseverance, but it accords these artists with a power far beyond what artists are accustomed to, even in the age of the Internet. Although the biotech industry would prefer we didn't notice, genetic materials are among the most powerful "weapons of mass destruction" available today. So how could archivists exploit nature's proliferative powers without endangering nature herself?

As important as the task of preserving human culture may be, we have already seen the effects of its being **too** preservable: landfills piling up with plastic toys and rusting automobiles, pharmaceuticals showing up in breastmilk, and space junk crashing down from orbit. In our experiments with organic forms of preservation, we should make sure that our zeal to leave behind a permanent footprint doesn't end up squashing nature in the process. Sure, it might be possible to encode the works of Shakespeare into every schoolchild's DNA for their future reference—but what unintended consequences might this have for our evolution and our planet? Even a self-evolving word processor, while it sounds innocuous, could mutate into a virus that overran every desktop on the Internet.

Emulating ecosystems

One safeguard that might be worth exploring is built into Tom Ray's *Tierra* project, a self-proclaimed "wildlife sanctuary for computer viruses" that simulates evolutionary processes in software. By creating a virtual petri dish in which snippets of code can mutate and reproduce, Ray harnesses a similar power as artists like Davis or Kac, as he cannot predict the outcome of the microscopic orgy committed by his computer programs. For example, to explore their behavior across a range of silicon ecosystems, Ray built a system that allowed his viruses to email themselves from server to server across the dispersed

harddrives of his collaborators. Once set loose in this closed network, Ray's critters decided to circum-navigate the globe. Remarkably, they became a nocturnal species, always seeking the dark side of the planet where they could take advantage of CPU cycles left unused by a computer's sleeping user.

When challenged that he might be endangering everyone else's computer network if one of his viruses ever escaped captivity, Ray replied that the emails [FN: Synthetic Ethics] bouncing around between servers did not contain any code that was executable on its own, but only within the specialized runtime environment of the *Tierra* software architecture. To employ a term from contemporary preservation, Ray's critters live in an **emulated** world. Programs running in emulation don't have direct access to real hard drives; they just think they do. If I download a virus into a Windows emulator, it can eat up my emulated resources, but won't have access to my real resources if I don't want it to.

So it may be that combining the security of emulated environments with the power of genetic replication could provide a safe and powerful future for cultural preservation. Transgenic Canola plants engineered to outcompete their feral cousins have extinguished their competitors in the field [FN: Wikipedia ibid], but a genetically evolved word processor on one hard drive needn't automatically erase an older word processor on another hard drive.

Nature: from culprit to collaborator

It is hard to imagine nature playing a positive role from the standpoint of today's archives, with their banks of manila folders and solander boxes arrayed against nature's will to entropy. Yet in the long term it may be that archivists will no longer be able to resist letting natural processes in the door—maybe even the wind and the rain—either because of their amazing powers of perseverance, or because the artifacts under their care are increasingly created with such natural processes. At that point perhaps the archive may aspire, like so many of our current institutions, to find a way to cooperate with nature instead of working against it.

[This paper is based on material from the forthcoming book *New Media and Social Memory* by Richard Rinehart and Jon Ippolito (MIT Press).]

References and Notes:

[Original source mentions: "To come"]

WET PAINT

Vicky Isley & Paul Smith (boredomresearch)

boredomresearch explore the natural progression from static imagery allowed by recursive technologies which enable data to remain liquid. The artists Vicky Isley and Paul Smith often think of themselves as employing computer gaming technology to create landscape paintings and life studies that move. In this paper the artists will discuss their computational systems which manipulate data chunks to produce a diversity of moving images.

Lost Calls of Cloud Mountain Whirligigs (detail), 2010, boredomresearch, software artwork, 60 x 49 x 2cm. ©boredomresearch, courtesy of [DAM]Berlin/Cologne.

Introduction

Here we will discuss the impact technology has on our practice, breaking the stillness of static image creation as we respond to the unique potentials that computational technologies make possible.

We are artists not technologists and our practice is not situated on the cutting edge of technological innovation – it is however responsive to the new possibilities present in current technologies. We employ computation in our practice to extend the heritage of painting. Computation allows for the creation of artifacts that can remain fluid and open in contrast to the medium of paint that dries; becoming fixed and stable. There is nothing exceptional about our adoption of these technologies as they are now more freely available than the traditional tools and materials used by painters. We accept them as a natural and inevitable progression, but one that may require some new approaches to the creation of art.

Many artworks we make rely on the iterative nature of computing creating each frame of an animation just in time to be seen. This is similar to a game engine where each frame is created in response to the changing state of play. Another aspect of games is their use of AI to provide game play with a synthesized opponent. The artworks we will refer to here include the AI component without user interaction. The entities exist in a closed universe interacting with each other; each frame created as a consequence of these interactions. Like paint that never dries the canvas remains fluid and open, rearranging and re-

composing itself thirty times a second. Film and animation bare more in common with paint, in that despite being animate, each discreet frame remains stable, identical and loyal to the artistic choices of its author. In contrast each frame in our work lasts for a fraction of a second before being discarded.

THE RISK AND REWARD

This ability to break from the stillness of previous media offers us something fresh to explore. We are able to make life studies that incorporate and respond to the processes present in natural systems by modeling aspects of them in code. We first explored this in our computational work 'System 1.6' [1] where the behaviour of the forms bring a sense of life to the work rather than their visual appearance.

'System 1.6' uses artificial life algorithms to construct a live visual and sonic composition that is different each time its played. During production this required different considerations to artworks that remain constant as we were dealing with a composition based on probability and likelihood. There were many emergent properties occurring, not as a direct consequence of the coded instructions but from the complex interactions of a large number of autonomous bodies. Small changes to the code could trigger a cascade of unpredictable events giving results inconsistent with our artistic vision. The only way to be sure our modifications were effective was to observe the work, sometimes for hours or days. It was more a case of nurturing behaviour than creating it directly. The artwork was finished when we felt reasonably confident it would perform well over an extended period of time. 'System 1.6' could run indefinitely without the interactions repeating but the forms themselves remained constant. In nature, life forms gradually shift and change giving rise to the vast diversity that exists.

Our artwork 'Biomes' [2] contains creatures that use a rule based system to form intricate patterns on their bodies. The rules are generated randomly from a vast range of possibilities. During development we were keen to explore these possibilities over an extended time frame. The problem was only a small proportion of rules created patterns, of which even less were rewardingly intricate. To solve this we introduced a virus like component that would move around the world killing off creatures with non–intricate marks. The proportion of creatures with complex patterns increased over time reaching a plateau. From then most creatures exhibit a level of complexity defined by the virus's selective pressure; with the occasional simple one slipping through the net. The cost of limiting the work to only those creatures that have a certain degree of complexity is that some interesting but simple forms are lost; while some complex but unrewarding forms remain. This constraint did not stop the 'Biomes' exploring a huge diversity comparable to that which exists in nature.

We had shifted from making exact choices, describing precise qualities, to creating environments that nurture interesting forms and outcomes. The more freedom we gave the work the greater potential for interesting and surprising results but with increased risk for periods of blandness, or worse, collapse.

The 'Biomes' have natural cycles of activity, not dictated by us, but emerging from their behaviour. Normally this alternates from moderate periods of tranquility to intense action. Very occasionally a 'Biome' can fall quiet for an unusually long period of time. Creatures can develop motion paths bypassing the small part of their world that can be seen. If a number of creatures develop this trait it can prevent others entering the visible area, causing an ice age of inactivity, weeks can pass without a single machine being seen. Whilst interesting, this naturally occurring phenomena, may not make for a rewarding experience in a week long festival context.

JUST BREAKING THE STILLNESS

One of the greatest potentials of creating artworks that remain fluid and open is their ability to throw up the unexpected – injecting some surprise into work that would dull with familiarity. Surprise is a double edged sword. During the development of our artwork 'Lost Calls of Cloud Mountain Whirligigs' [3] we were surprised to find our flying creatures 'Whirligigs' all in a deep sleep from which they would never wake. The challenge we face is balancing the reward of leaving artworks open to change, without it being terminal. In 'Lost Calls of Cloud Mountain Whirligigs' we have chosen to blend together elements that remain open with those that are fixed; elements that repeat in regular cycles, with behaviours that will never repeat.

The 'Whirligigs' represent a study of a narrow facet of diversity – they live and die with each new family exploring a seemingly infinite range of song, colour, form and pattern. Because their ability to change is constrained, they will always look like 'Whirligigs'. Like the order of insects Lepidoptera which presents a vast amount of diversity whilst maintaining an overall visual consistency. Within this tiny slice of diversity there are more possibilities than anyone could view in a life time, even if they did nothing but sit and watch 'Whirligigs'.

In the artworks we have discussed here we have attempted to employ ubiquitous contemporary technologies to break the stillness of traditional forms of representation, whilst remaining true to a heritage of artistic practice that observes and is inspired by nature, its forms, behaviours and long term ability to change.

The medium of paint has given artists thousands of years of possibility. The comparatively new medium of computation now challenges artists to find meaningful and rewarding ways of incorporating its capacity to remain fluid in their practice. We continue to be excited by these possibilities and proceed to tentatively exploring this, as yet, scantly charted terrain.

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FROM STILL TO MOVING: AN ALMOST INDISTINGUISHABLE MOMENT

Cynthia Lawson Jaramillo

I challenge the traditional definitions of photography and film through work that is situated in that very short moment when still images become moving and therefore not definable as just one or the other. Furthermore, I argue that in this fast-paced era in which 24 hours of video are uploaded to YouTube each minute, that in-between moment has become almost indistinguishable.
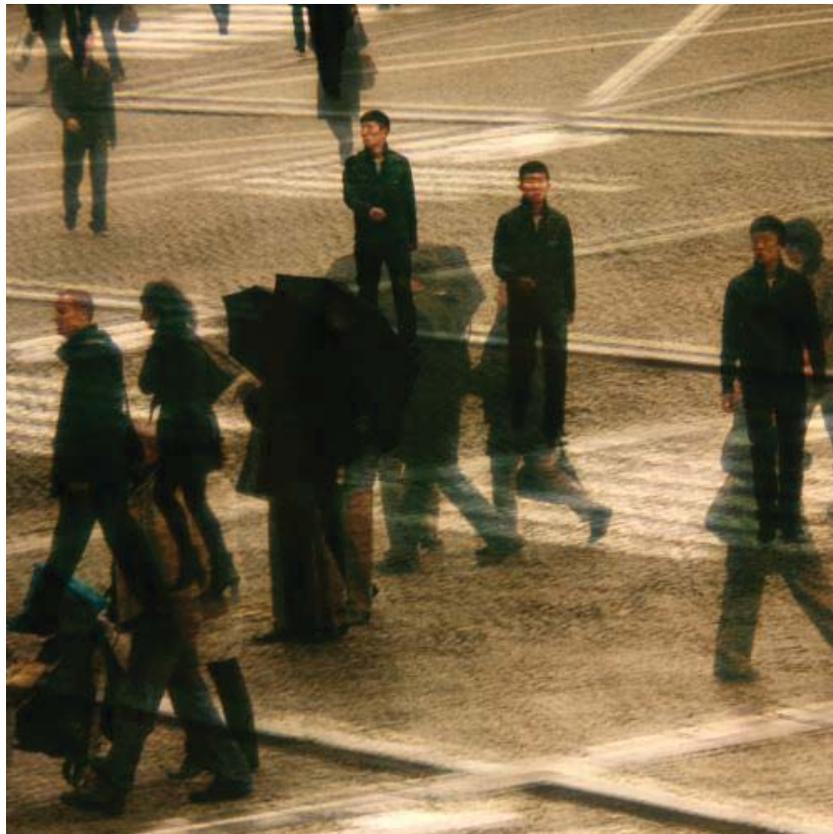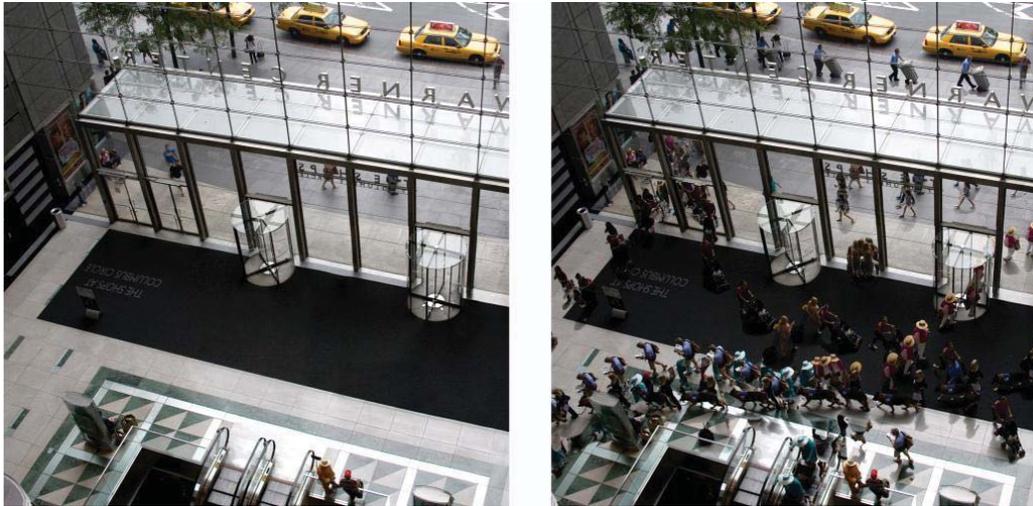
Fig 1.-3. Details from The Shops, 96 Seconds #1 and The Shops, 96 Seconds #36, 2010, Cynthia Lawson Jaramillo, Archival digital prints, 19in x 13in each.

INTRODUCTION

Analyses on film and photography often characterize the photograph as a still image and film as a sequence of images. [1] I challenge these notions through work that is situated in that very short moment when still images become moving and therefore not definable as just one or the other.

In this paper I specifically discuss the principal techniques I incorporate into my image-based works, such as digital and physical layering, which push each piece as far away from the "still image" as possible. I question our capacity to perceive slow changes and multiple temporalities through works that explore both. Furthermore, I argue that in this fast-paced era in which 24 hours of video are uploaded to YouTube each minute, we have lost our ability to slow down and perceive small changes.

The work of contemporary artists such as Bill Viola, David Hockney, and Hiroshi Sugimoto offer a framework for my own artworks which I describe as photographic works in motion, which exist more as time-

based media that incorporate photography as a vehicle for the production of images, and less as photographs that pause time.

CHALLENGING TIME AND SPACE

"Time has begun to be experienced as something infinitely elastic, in which the relationship between past, present, and future becomes open to human intervention. Similarly, space is no longer a static field that we traverse over time, but has become a medium to be dismantled and reassembled at will." [2] The photography work that is here described challenges time and space, and often uses the camera as a tool to create process-intensive work that goes beyond a static framed print mounted on a wall. Specifically, as a time-based artist, I work with photography as a tool (and not necessarily a medium) to create works that push the traditional boundaries of space and time with still images questioning how "still" they actually are. Typically, photography that moves beyond the pausing of time, and instead extends or challenges it is then considered film. Sequences of images are described through the lens of film (and not photography) and are critiqued in that light. Furthermore, seminal works like Chris Marker's "La Jetée" do not neatly fit into either photography or film. [3]

David Hockney's photographic collages and composite polaroids from the early 80s were a testing ground for new possibilities in photography and for a lot of the approaches in the era of digital technologies (both in cameras and in software.) His 1983 work "Photographing Annie Leibovitz While She Photographs Me" is both exemplary of this experimentation as well as a criticism on "classic" photographs. The far right side of Hockney's composition has a small square image that is the photo Leibovitz took of him. This juxtaposition illustrates Hockney's argument that a "single-eyed photograph" (as he describes Leibovitz's image) would never have the quality of a painting in "that you can go on and on looking at these pictures." [4]

Hiroshi Sugimoto's "Theatres" are a series of images produced by maintaining a long exposure while photographing a theatre during a film screening. The light from the film's frames light up the space, and the screen is white. This series "runs counter to prevailing conceptions of photography's relationship to instantaneity and to the photographic image as the record of a brief and transitory moment in time. Here the photograph is, in a literal way, the embodiment of temporal duration – in a manner that has rarely been so since the infancy of the medium – and equally it would seem to demand of the viewer a form of attention that also takes time." [5] Are works like this one truly still or do they have an extended duration equal to the film captured?

Finally, Bill Viola's "The Quintet of the Astonished" from his series "The Passions" is the perfect work to refer to the power of the still frame (in his case of slow motion video) as well as an expanded sense of time. Viola invites viewers to slow down their internal momentum, to pause and take the time to view his work that also takes time, since each video in this series has been slowed down – both a reference to painting from which the works are inspired as well as a refreshing critique of our moving image-saturated lives.

I have developed two techniques to challenge the before mentioned traditional notions of photography and to position it as a time-based medium (in which images are in between still and moving).

LIGHT BOXES

My works presented through light boxes are spaces captured over time through physically layered and transparent still images. I challenge the notion that "the photograph is thought to extract a moment from the flux of time, to cut out a slice of a time-space continuum and thus to have no duration of its own – in a sense a photography only lasts as long as we are looking at it." [6] Furthermore, the work challenges the classic notions that in photography one experiences equilibrium of our physical world's "rhythm." [7] Instead, each layer may be a time-slice, yet the superposition of images onto one another breaks the neat slicing, and the viewer finds himself or herself in constant motion – moving from one layer to the next as they experience one space over time.

Sequences of images that could be collaged digitally to create one print are instead presented as physically collaged, almost sculptural, backlit objects. A photo shoot (in which I take several photos, spaced at even intervals, from one same location although without a tripod) then translates into several prints on transparent film. I document spaces over time and present these images layered one on top of the other (the most recent in time closest to the front), and with a sheet of acrylic in between. This materiality gives the work a physical depth representing its temporal depth (the longer the total time captured, the thicker the work.) The last (or oldest in time) image is printed on a milky translucent film that allows the passing of light without revealing the light source behind the images.

These works can be described as cubist in that they contain "what was really occurring when Cubists broke up an image into multiple perspectives, thereby presenting, at one moment, a set of views that would normally be viewed successively over a period of time." [8] More importantly, it is in the relationship between the images (on various layers) that time is produced. [9]

This technique was developed after visiting Tokyo and photographing the rush hour chaos in the large train station Shinagawa. Upon reviewing my images (and frustrated that I did not have a video camera with me) I wanted to be able to represent this experienced motion through the still images and I first superimposed them digitally.

My practice intends to slow viewers' sense of time by protagonizing the everyday as defined by transient space and make them aware of their own quotidianity. It is my hope that the viewer will reflect on their own existence, and become hyper aware of the small moments from which we now quickly disconnect: the stranger passing by carrying groceries, the voicemail awaiting to be heard, commuters rushing to catch the train. The places captured (airports, train stations, subway platforms, entryways) are spaces which exist solely as transitional spaces – they have no function other than to facilitate the flow of people from one point to another, and it is this flow that heightens the everyday quality of the works.

HIDDEN CHOREOGRAPHIES

In "Hidden Choreographies" ("Pompidou from Above, 6 ½ Seconds" and most recently, "The Shops, 96 Seconds") I address the concepts of time and space in a single location. In multiple photographs, the repeated (and extracted) presence of figures in each frame demonstrates that these apparently different moments actually happened in the same place and at the same time. The chaos and complexity that one would not necessarily witness when viewing a transient public space, in which nothing seemingly happens, emerges through in the relationship between the images. Although shot in half-second intervals, viewers perceive the resulting piece through the expansion of time in transient public space. As de-

scribed by Michel De Certeau, "The act of walking is to the urban system what the speech act is to language or to the statements uttered." [10] The urban landscape is continually in motion (via its pedestrians) and it is this motion that this work documents.

The second body of work in this project is the 36 prints from "The Shops, 96 Seconds #1-36". These works are digitally collaged based on 42 original photographs taken in the span of 96 seconds from inside the Time Warner Center in New York City's Columbus Circle looking down on one of its entrances. The repeated (and extracted) presence of some figures in multiple photographs connects the thirty six prints as a series and demonstrates that these apparently different moments actually happened in the same place and at the same time. This technique has been described as "collapsing the law of physics on the gallery wall" [11] and it is precisely the uncertainty of what is real (and possible in our spatiotemporal frameworks) and what is not that I aim to question.

In this series I am interested in photography as a way to capture moments and, through their representation(s), extend their time. The thirty-six images of the series are digital recreations. Each of forty-two original photographs was studied, from which "actors" like the woman with the seeing-eye dog were identified and digitally removed. Then, a base image was selected and used as a "stage." Positioning the "actors" into several of their moments then composed each image. Each person appears where they were at some point during the photo shoot, but there are clearly overlapping moments. The viewer of the work is challenged to understand if people were digitally placed or repeated, or even if it was a staged documented performance. The resulting thirty-six images are the first of over a billion combinations of these "hidden choreographies" and it is this spatiotemporal transformation that shifts the series from a photo shoot about the everyday to something worth observing, remembering, and capturing. The collaging is what adds time to each print, instead of presenting the moments as "fixed, unmoving events that is the still photograph." [12]

An important process in this work is that these moments are actually not choreographed but found. This particular series was documented because of my interest in the framing devices I saw through the lens (the revolving doors as interfaces between the inside and outside.) Only once the images were in the computer did I select the protagonists of the work and found those moments that make the work interesting. The series is organized very specifically – first the empty stage, then a base stage common to all following images (with some people static), followed by the introduction of each actor – the woman with the straw hat, the janitor pushing a trash bin, the woman with a shopping cart, the tourist reading his guide, etc. Once all actors are introduced, they are combined in a variety of ways creating overlaps of time and space that didn't actually take place, but could have, such as the power mom with the stroller bumping into the blind woman with the seeing-eye dog.

In both "Hidden Choreographies" series, viewers have expressed perceiving contrasting concepts. On the one hand there are those who feel that the repetition of the people walking through emphasizes the quotidian in their actions, and the meaningless of each. Others feel that the repetition, and the extraction of select pedestrians as "actors" gives them a certain protagonism therefore heightening the importance of their everyday activity (walking home, going grocery shopping, meeting up with a friend.) I have been asked if the work is based on a particular piece of film or theatre. Although it is not, I do see a connection with Francois Truffaut's "Day for Night" in its opening scene, in which he is directing a movie and staging an ordinary city scene (pedestrians on a street walking, cars driving). You're seeing a film within a film and are very aware of the staging of pedestrians, cars, and their movements & interactions in public space. The other film to which I see a reference is Jacques Tati's "Play Time" in that it follows one man (potentially the "Man with the Red Suitcase" from my "Pompidou from Above, 6 Seconds") in

spaces of a city and the choreography of that movement in relationship to the built environment. Of my first series, gallerist Christina Ray has written that it has "no start, no finish, and no story. The artist simply stops time, putting a six second hold on the public and then releasing it to dissolve back into individual realities." [13]

This kind of work, if presented on a timeline (on video or in Flash, for example) would directly reference cinema (short animations, or even the more recent animated gifs) and even Muybridge's early photographic experiments. It is of interest, however, to challenge definitions of time-based media. Can a work such as this one, that includes moments from across a timeline, and yet is not presented on one, be considered time-based? And as prints, does it fall under the category of still photography?

CONCLUSIONS

In the culture of interruption in which we live, many people have lost the ability to sit still and lend their time to still and slow-moving images. Younger generations are growing up in front of interfaces in which messages from at least four sources are constantly streaming in and fighting for their attention. As an artist I am committed to promote an internal slowing-down of art viewers' momentum by creating works that contain a duration which require a similar time commitment from the viewer. Digital and physical collaging have served as my principal techniques to create still works that are in constant motion, and which challenge the traditional expectations of photography as a medium that pauses time. My light boxes and printed series exist in the moment in between moving and still images, and my hope is that that moment regains the spotlight and that viewers may be able to be still and really see what is in front of them, one frame at a time.

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TECHNOLOGIES OF MEDIATION AND IMMEDIATION

JANIS JEFFERIES

The word medium, media and mediation, have a strangely double aspect. On the one hand, a medium acts as an enabler connecting things that might otherwise be completely disjointed. On the other hand, a medium is something that palpably stands between.

The word medium and its cognates, such as media and mediation, have a strangely double aspect. On the one hand, a medium acts as an enabler, as a bridge, connecting things that might otherwise be completely disjointed. On the other hand, a medium is something that palpably stands between. Mediated experience is always second--hand; mediated experience is, by definition, not immediate.

Even air as a medium through which we apprehend the World distorts. David Hockney, the painter, was concerned about this aspect, for example. In the late eighties he preferred photocopiers to cameras as he felt that the images produced by the latter were largely pictures of the air between the camera and the subject.

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ECOTOPIA, TOWARDS AN ECO-SOCIO-MORPHOLOGY

Bin Jiang & Sara Franceschelli

This paper presents a urban design project of insertion of a restoration system into the city to accelerate recycling and regeneration of the system. This restoration system consists of a series of eco-machines which are not isolated from each other but are making up an "eco-tribe", that could rehabilitate the urban ecosystem with eco-technologies and eventually could be integrated into the urban environment.
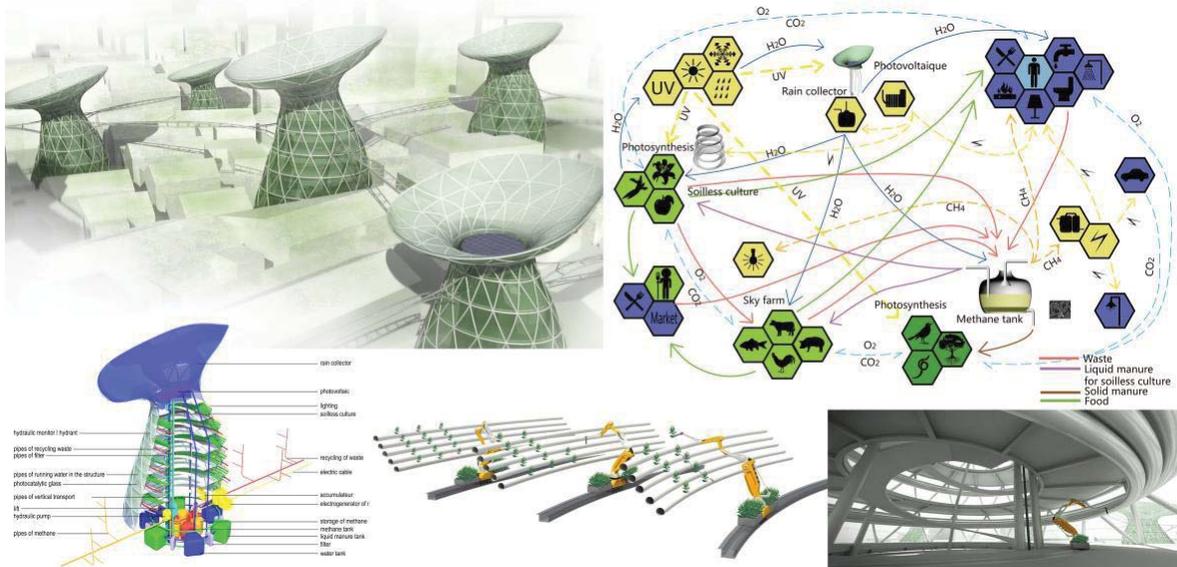
Fig 1. ECOTOPIA, 2008, digital image, Copyright Bin JIANG.
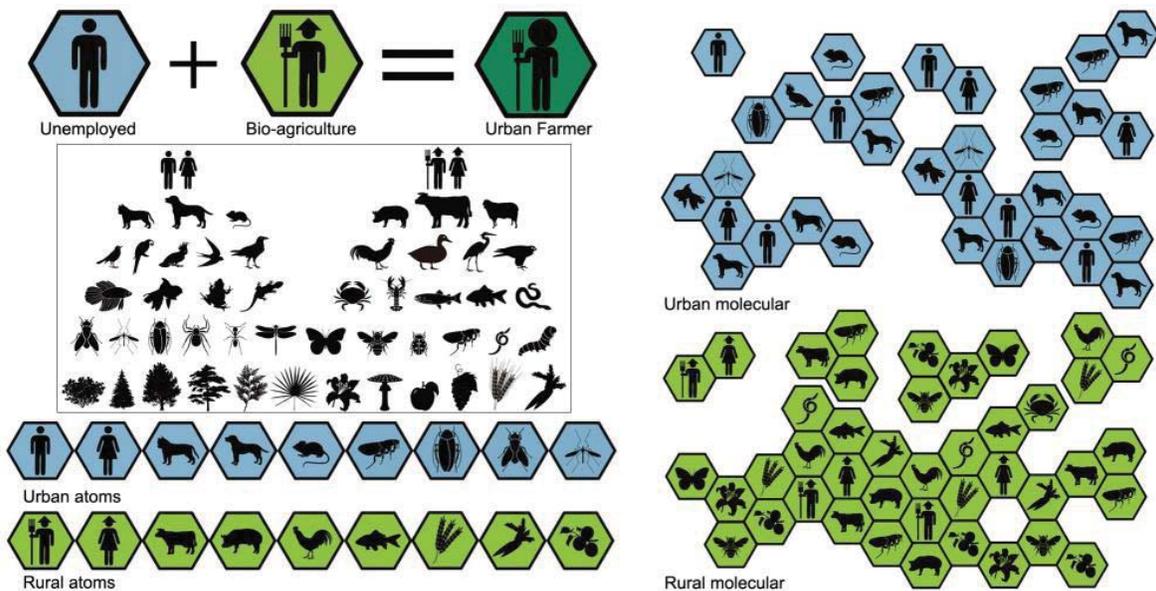
Fig 2. Semiotic system of ECOTOPIA, 2008, digital image, Copyright Bin JIANG.
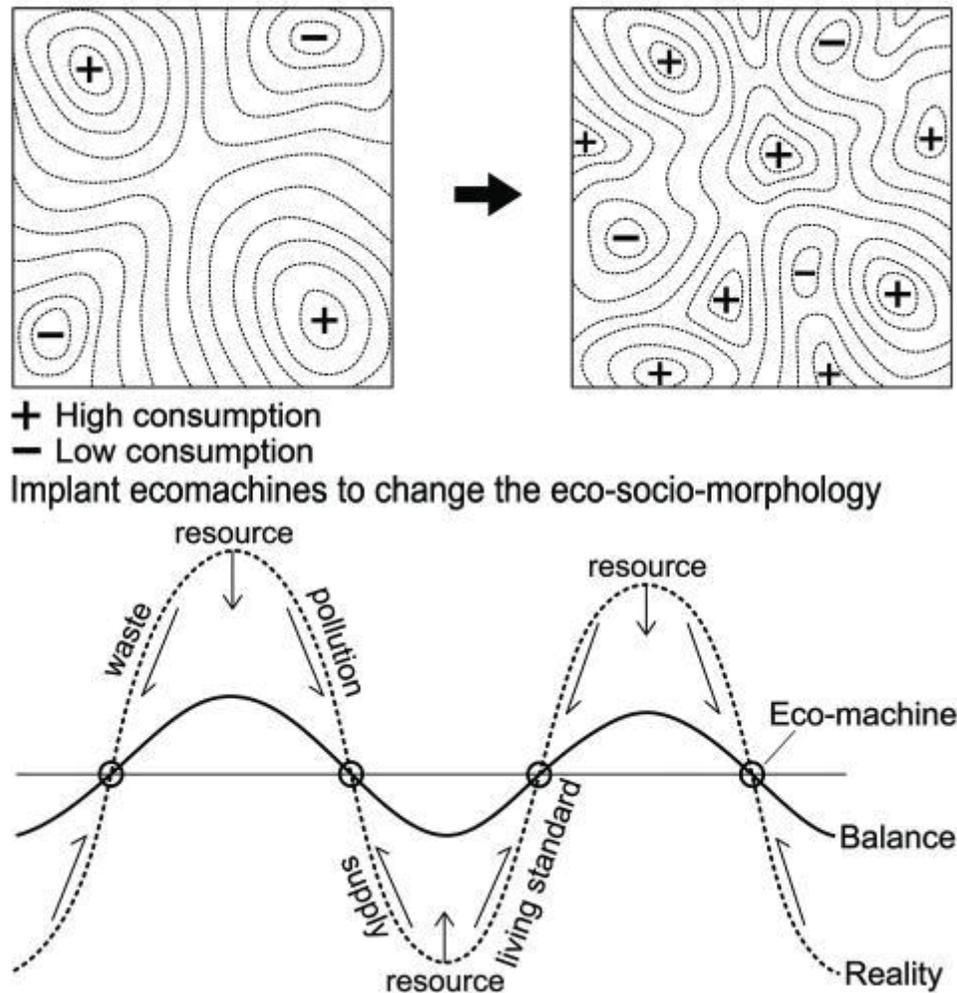
Fig 3. Implant ecomachines to change the eco-socio-morphology, 2011, Copyright Bin JIANG.

Today the ecosystem is suffering serious damages, due to the unbalanced state provoked by human intervention. This is the starting assumption of this paper.

We are first going to illustrate the ECOTOPIA project proposed by Bin JIANG in 2008. [1] The idea of this project is to insert a restoration system of eco-technologies in the interior of the city, where the living environment is deteriorating, in an attempt to accelerate the system's recycling and regeneration. This restoration system has been proposed together with a semiotic system, interpreting the relationship of various representative organisms in the urban, rural and wild environment. We will present the functions and the advantages that such a system should possess.

Secondly, in order to question and develop this proposition, we are going to formulate the working-hypothesis that the restoration system could be seen as a network of dynamical perturbations injected at a certain scale into the city, intervention that could modify the ecosystem of the city as a whole. We will develop this idea on the basis of a structural – although dynamical - interpretation of the metaphor of landscape, coming from theoretical biology. Without taking into account the semantic connotations that could be associated to this metaphor, in the context of theoretical biology. We consider looking at the initial ECOTOPIA project, structural and morphological properties of landscapes.

The Gaia hypothesis, [2] a theory announced by James Lovelock in 1969, but also exposed by Johannes Kepler in the 17th century, alleged that living organisms on our planet worked according to certain self-recycling rules which can satisfy their own needs within a gigantic organism called Gaia (named after Gaia, Greek goddess of the Earth). Two centuries later in 1924, this theory got backed by the concept of "biosphere" [3] raised by Viadimir Vernadsky who had also realized for the first time the undeniable connection between deforestation and climate.

The natural ecosystem possesses certain self-restoration abilities and this kind of restoration needs a certain period of time. The traditional agricultural production is based on cycle of nature and natural re-source processing, which is a mode of production conforming to the nature's rules. On the contrary, we have entered into the industrial era which is developing at fast pace. Under such circumstances, the pressing production cycle does not allow the necessary duration for the nature to restore itself, which means that the producing capacity of the industrial society has gone far beyond what the nature can bear. In the long run, the serious ecosystem imbalance is inevitable.

The industrial production can devour natural resources of huge volumes in a short period of time and furthermore, it can change chemical structures or biological genetic structures of natural materials. As a result, the nature is also overwhelmed to achieve the self-restoration in time. Though some damages are irreversible, at least during one generation, the project of inserting urban ecosystem into the global natural ecosystem as a part of industries, could make a change. The industrial society and the environmental pollution actually coexists with each other inseparably. Without any doubt, the problem of pollution arises along with the rapid development of industry.

The ECOTOPIA projet intends to insert a restoration system into the high density city. The leading idea of this project is that the eco-architectures forming the restoration system should be curative, intervening as living machines. They should be inserted into cities and be interdependent with each other, in order to develop sustainably, as in a transplant of new artificial organs to a withering ill body. [fig1]

The idea is to bring the eco-agriculture into the city as a treatment measure, in another words, to insert the eco-agricultural system into the urban ecosystem as a restoration therapy in order to cure the industrial society by the agricultural production.

This restoration system consists of a series of eco-machines which are not isolated from each other but are making up an "eco-tribe". This could rehabilitate the urban ecosystem with eco-technologies and eventually could be integrated into the urban environment. The organized restoration system is a break-through from the existing patterns of the community, simulating the operation of natural ecosystems, will be inserted into the wrecked urban ecosystem and connect all communities to take effect in the range of the whole city. With self- reproduction and duplication, the system could constantly grow and evolve along with the city's development and technology innovations.

Le Corbusier said: "The architecture bears living organisms.They present to the space, the light, ramify themselves and extend as a tree or a plant.The freedom is researched around each part." [4] My design concept for the eco-architectures is derived from the sea anemone structure. The unit of the system is a kind of recycling tree tower, called "Sky farm", which seems like a stretching sea anemone facing to-wards the sun. It will be inserted into the existing communities. In the high density city, it is difficult to find much available ground space; therefore, I choose to develop the agricultural cultivation in the verti-cal space. Each tower, at a certain distance from others, is connected by an overpass in the sky which exchanges energy and materials. Several tree towers form an Eco-tribe whose unit is community. In this

way, these implanted eco-agricultural machines not only could resolve many environmental problems such as reducing the emission of CO2 and other harmful gases, eliminating organic waste, supplying clean water sources and energy, but could also satisfy food demand of community residents directly. As a result, these eco-tribes and local communities could make up a brand new harmonious and efficient eco-community without pollution.

A semiotic system interpret the relationship and composition of various representative organisms in the urban, rural and wild environment, is introduced. In order to present this semiotic system, some definitions will be useful. [fig2]

Natural Ecosystem: The biosphere is a kind of global self-sustained ecosystem. It integrates all the living organisms through various biological chains and classifies them into 3 categories: the lithosphere, the hydrosphere and the atmosphere. All of nature's movements alter the appearance of our planet by ceaseless circulation and recombination of elements.

Urban Ecosystem: The human activities have been changing the earth's appearance. Cities have come into being along with the concentration of population. In the same way, other living beings in cities have gradually altered themselves to adapt to the urban living environment. The urban ecosystem exists as an artificial link in the whole natural ecosystem and has the great impact on the latter one.

Rural Ecosystem: The rural area is a buffer zone between the natural and the urban ecosystems.

In the semiotic system introduced together with our eco-architectures, different organisms are symbolized by a representative atom. In the urban environment, residents, domestic animals and other smaller parasites relate with each other, building up an urban molecular chain. These chains combine together, engendering more complicated and gigantic compounds among which the biggest one is the social system. As for in rural environment, peasant is the basic atom, along with farm animals and agricultural plants, composing the rural molecular chains and their compounds. While in the wild natural environment, the basic unit is trees, which constitute the natural ecosystem with other wild animals, plants and insects.

On the basis of this semiotic system, some more general 'equations' can be imagined, that should define and produce the constitution of the Eco-city:

- Architect = Organizer of the production
- Architecture + Eco-technique = Eco-machine
- (Eco-machine + Bio-agriculture + Urban farmer) x n = Eco-tribe
- Eco-tribe + Existing Community = Eco-community
- Eco-community x n + Eco-system = Eco-city

The constitution of the Eco-city should perform the following functions:

1. Developing the urban eco-agriculture and restoring the urban ecosystem .
2. Initiating the system operation with the solar power in the early stage, and then maintaining the system and the supply for communities by bioelectricity: first, recycling sewage and organic waste produced from daily life and agricultural production; using the waste liquid from the methane reactor as the nutrition of soilless cultivation and livestock feed, while the waste

residues as fertilizer of public green space; generating electricity with the clean methane to meet the needs of household fuel gas, public illumination, power supply for the electricity bus and so on.

3. Sky farm: introducing the bio-agriculture, soilless cultivation, livestock breeding in a vertical space, perfecting the urban biological chain and supplying predominant food.
4. Lighting of the farm: the loop bracket of soilless cultivation turns around driven by electricity, like a revolving restaurant, in order to let all crops receive light evenly by adjusting the way of revolving and its speed according to seasons and time.
5. Tree towers with water line in them constitute a group of fire control towers in the high-density community, ready to alarm and fire-fight any time; possible to spray water directly from the tower to the house on fire or draw the fire-fighting lance to put out the fire.

The fact of transplanting countrysides in the city should provoke a restructuration of the society frame. The eco-community alters the former concepts of community, unifying the traditionally separated communities and promoting the trans-community exchanges. In addition, insertion of the eco-agriculture into the city will result in a new social type called "Urban farmer". Thanks to the leverage effect of eco-technologies, fewer farmers could provide more products, compared to the traditional agricultural production. Furthermore, the urban farmer also shoulders the responsibility of maintaining the virtuous circle of urban ecosystem.

On the other hand, the popularization of urban eco-agriculture, as a vivid textbook, would facilitate those who grow up in the city to approach the nature and comprehend the movement of natural ecosystem, thus make them realize the importance of protecting the nature and restoring the urban ecosystem to intensify their sense of belonging to the nature.

How do these desiderata can be realized? Are these 'equations' producing the emergence of new, balanced, equilibria? We think that the design of such an eco-city should comprise an analysis of the balances of the different, unstable equilibria in town. How to we switch from the point of view of the designed objects and their functionalities (expressed by the 'equations') to the point of view of the resulting equilibria in town? We follow here a line that takes into account some aspects of the figure of landscapes in theoretical biology, discussed in the framework of the Dynlan-Dynamic Landscapes research program. [5] In our research program, we are interested in the structural, although dynamic properties of landscapes. Thus, even whether we refer to images coming from the history and the theory of contemporary biology, we do not consider the semantic connotation of these figures in their original contexts. We consider them as structural dynamic images that can help in asking questions and setting scenarios. We are encouraged on this way by the structural and holistic attitude that moved Conrad Hal Waddington in the introduction and heuristic use of his image of epigenetic landscape. [6] For example, Waddington could introduce the notion of genetic assimilation on the basis of both of his experimental work and of the potentialities of landscapes images. Of course, even in our case, this work of abstraction is a first step of the research, and should be accompanied by empirical, situated, studies.

With the help of the hilly surfaces of landscape images, we want to move our discussion from the plan of the project ECOTOPIA in the actual space of the designed objects, the space of the city, to the plan in which the different equilibria. In order to grasp this second plan, we consider a metaphorical phase space. [fig3]

Could the global morphology of landscape, representing the global equilibria portrait, be affected by an external perturbation? How could one alter landscape equilibiria, especially if they define too important

discrepancies between different consumption regimes? The idea is that the introduction of eco-machines as perturbations could modify the socio-eco-morphology of the landscape.

Inspired by the well-known image of Sewall Wright landscape, [7] here the idea is that the hills of the landscape should represent picks of higher or lesser consumption, a quantity that is both a socio and ecological indicator. How external, cyclic, autonomous but interconnected interventions could modify the global form of the landscape?

We use the landscape metaphor, as a heuristic tool, a mental image to help in reasoning. We are trying and look for balance processes in phase space as an approach to conceive an urban system able to actually produce these equilibria. In order to come back to the empiric world, with this hypothesis and questions in mind, and to evaluate the pertinence and the fruitfulness of this approach, at this step of our research we are exploring the field of studies from the territorialist school, [8] to the field of sustainable change researchs for example Babalis. [9] But we are also interested in the approaches that look at the town as a complex system and propose mathematical models and simulations. [10]

Eco-socio morphodynamics produces a modification of the landscape profil. In conclusion, we assume that the post-industrial society would completely enter into a new era of intelligence in decades when green technologies would become prevalent and the eco-agriculture would accomplish totally automatic and efficient production. Furthermore, the urban eco-community would be duplicated and extended constantly to maintain the urban ecology and the natural balance. In particular, the whole ecosystem could come into the virtuous circle.

A structural use of the landscape metaphor, suggests that morphological and morphodynamical aspects of the echo-city could be studied in the phase space, as a global approach to equilibria and changes in equilibria. However, in order to cope with complexity of eco-social system, we think that moving from the traditional hilly surface representing a landscape, to more plastic, morphologically variable objects, could help our future reflection.

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E-PARTICIPATION - ENGAGED PARTICIPATION

Michael Johansson

At the "Collaborative media Lab" participants with a background in academia, design and in art, strated a lab to work with design of new technology and its application with a user-centered perspective in both real, virtual and mixed media settings. We point out the need for a more profound relationship when and where to use digital materials and tools and how to recognize and support participants in different kind of collaborations.

Three design environments - non 3d, michael johansson

At Kristianstad University the informatics group have founded the "Collaborative media Lab" including participants with a background in academia, design and in art. The aim of the lab is to work with design of new technology and its application with a user-centered perspective in both real, virtual and mixed media settings. Having worked with participatory design and 3D/virtual realities in several design/research project, we have seen the strength of collaborative design tools that allow newcomers to design and work with 3D. They were able to engage in designing in relation to rather complex scenarios and spaces, and in that way explore the design challenges that are offered in a particular context. This has typically been done in groups located and working together in the same room. But now with the social web including distributed and shared collaborative environments these setting can be used for engaging participants in a dialogue of future urban design challenges in new ways.

In our former research we gained a lot of knowledge and experience of how to use computers and software as tools when directing and conceptualize traditional productions, but we still have a lot to learn when it comes to seeing digital material as a design or artistic material in itself, especially in the area of collaboration. However it is not so strange, as digital design is not yet as mature as traditional design. Digital material have characteristics that differ a great deal from those with which most people are accustomed. Digital materials are usually more complex and flexible, less transparent and tangible. We have to point out the need for a more profound relationship when and where to use digital materials

and tools. We believe that increased complexity in creative development calls for both disciplinary depth and integrative skills.

E-participation is a way of letting the public into planing and decision processes. The keyword here is "processes". Rather than e-democracy, e-participation is about creating dialogues, and being able to contribute with new suggestions and ideas. Working in the research field of design, we stress the importance to give the co-creators a common and grounded point of departure, as well as a common surface for interaction, communication and feedback.

We therefore use a mix of fiction and facts in our planning and writing process, to provide relevant and engaging background information. This is later are handed over as scenarios to the invited participants. The scenarios provide detailed and specific data, which then the co-creator can use as reference material for their future action. The scenarios acts very much as constraints, but also as a first generator in a chain of associative design work that follows, producing a shared proposals. Based on scenarios our model of exploration starts in a believably territory, were all of the co-creators put forward, experiment and establishing iterations between the themselves and the scenarios in a collaborative 3d setting. The scenarios. provide knowledge to the different stakeholders and influence their development using this shared 3d environment as the surface for exploring concepts and communicate them amongst the participants in an constant dialogue. A Collaborative 3d environment can be an effective environment for expanding ideas and gain a better understanding of the design task. Totally untrained persons are able to build rather complex spaces within short time limits. It is playful, fun and stimulating to use, promoted innovative thinking and in that way activating the design process. We have worked with similar question in many different projects. In an ongoing art and research project, the city of Abadyl we made these observations, that was descibed in an earlier Paper called Fieldasy.

The role of scenarios in design has been that of writing narrative descriptions of use. Other cultural domains have generated more speculative methods for collaboration. Originating from the idea of autonomous writing the surrealists borrowed methods from academic disciplines such as sociology, anthropology and psychology to elaborate methods in the form of games for exploring the mechanism of imagination and intensifying collaborative experience. They subverted academic modes of inquiry to undermine rationality and invented playful procedures to release collaborative creativity. The role of procedures and systematic strategies, while still being playful makes a creative constraint. Research on creativity points to processes, which not stems from a vacuum in the individual mind, but that they are a result of serious and known strategies. This applies to many aspects of artistic work. Changing a constraint might be at the core of creative thinking. Other researchers stress the process of association, how one item by acts of creative association creates a new item.

The scenarios acted very much as constraints, but also as a first generator in a chain of associative artistic work producing the artefacts.

We use written scenarios. These are handed over to the invited temporary citizens and co-creators. They can then act out the scenario, in and by themselves chosen environment that in the end helped them produce the artifacts. Our scenarios tries to bring field studies and fantasy together, to slowly create a discreet dynamic tension and/or displacement between persons, things, times, places, and events that are not usually - if ever – associated into new and surprising conjunctions. By using scenarios we are able to provide detailed and specific data, which the co-creator can use as background material for their action. Hopefully the co-creator themselves imports qualities into the world, which do not and cannot stem from the City of Abadyl itself.

Example: An interview with one of the participators revealed that; "Imagination was tickled by the knowledge of being part of a networked mapping I didn't know in detail. The scenario got me going, but I felt no repressing obligation towards it and also felt more liberated that in the situations of my own work where I'm the responsible and potential object for critique"

By placing "hard-to-answer questions" in a scenario, where the respondent is not fully in control of or responsible for his or her actions, he or she can eventually take on responsibility for such questions and find ways and means to act out the given problem in a shared enviroment.

When we are involving participants in complex and/or controversial questions, in a shared dialogues about future issues, it is important not to forget to clearly state what level of influence their participation will have, and process wise, what kind of output, feedback and final result they can expect. Otherwise we will have people playing around with future emerging possibilities with no idea how it will be used or communicated.

Our conclusion is that this is due to the fact that E-participation and the actual design of virtual spaces can support participants and stakeholders to combine different ideas, negotiate and prioritize. In this way the shared environment deepened the understanding of designing in the context of future and complex urban spaces.

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TOWARDS A TAXONOMY OF INTERACTIVITY

STEPHEN JONES

In this paper I take a critical look at the notion of interactivity; an inadequately defined term. It has very deep roots within the world, both as it self-organises and as we construct it. I offer an analysis of inter-action based on the notion of "relations" as a general term for the interconnections through which all interactions occur. I examine the degrees of relations that operate so that information flow between entities is enabled.

When one looks critically at a great deal of the contemporary new media art that is described as interactive, one finds a huge variance in its formal manifestations such as

1. the form of the artwork and its technical constructs; *i.e.*, whether it is an installation or a performance, a sculpture or a software application
2. the location and accessibility of the artwork; whether it is standalone or networked, situated in public space or gallery space
3. the kinds of interactors; whether human or machine, audience or individual, or even computer to computer.

These kinds of categories constitute the taxonomy being developed by Katja Kwastek and visualised by Evelyn Munster for Ars Electronica [1] and no doubt others. However this kind of taxonomy does not investigate the actual processes of interaction itself, *i.e.*, it does not explore what happens in terms of the flows of information and signs between entities, human or machinic, when engaged in these kinds of interactions. It is the intention of this paper to develop, in a preliminary form, a taxonomy of the kinds of relations through which information and signs flow in the actual activity of interaction, where relations constitute the connections or linkages between entities.

Interaction – and its co-relative, participation – have a very wide range of structures. Interactive artworks occupy a wide range of levels between the potential fully conversational robot and the video re-play that simply switches on when the spectator enters the gallery. These run the gamut from the 'inter-action' in the mind of a viewer in their active mental interpretation with an entirely passive artwork (a painting or sculpture) through to detailed and creative conversation between individual people and possibly between people and machines. It is the notion of the conversation that for me constitutes the full concept of an interaction.

In order to come to grips with an understanding of interaction in contemporary art and its range from the entirely one-sided to the fully conversational, I want to assemble an understanding that is as general as possible, so that it is not restricted in its application simply to human-machine interaction, but is operational over the full range of processes that can be described as interactions, be these the exchange of chemical products between micro-biological entities or the possibility of having a truly conversational relationship with a robot in the way that you and I might interact when we are having a conversation. This generality should then allow us to go even further, to the point where we might engineer truly conversational relationships between machines. I use the term 'conversational' because it entails a notion of inventiveness, which we might think of as the capacity to generate new behavioural repertoire and by which we might be able to produce a true artificial or machine intelligence, *i.e.*, a creative machine, one

that can not only trick us into believing that it has passed the Turing Test, but can truly generate new and creative ideas.

Interaction implies reciprocal actions or influences of two (or more) entities upon each other, where an entity is some kind of organised object of multiple components that has some degree of autonomy and agency. Thus, interaction takes place between entities that possess the capacity to act for themselves. It also requires that these actions alter the internal (cognitive) structure of each. At the most basic level interaction is fundamental to life, since it is the means by which an organism deals with and adapts to its environment. [2]

While this paper examines the interaction between an artwork and its spectators, in general the entities that engage in this reciprocal behaviour may be biological, social or machinic. Of the biological, at the lowest possible level of entity are single-celled organisms, at the highest possible level are whole societies or even whole ecosystems, though I will discuss human organisms for the most part. Machinic entities are artificial or constructed, *e.g.*, technical and computer driven installation art, robots, and other forms of potential artificial intelligence. These devices must be, in some sense, adaptive, *i.e.*, able to change their state to accommodate changes in their environment. This is a necessary first condition that has to be possessed by any entity that will undergo interaction.

There seem to be two general terms that apply. One, participation, though not usually thought of as involving relations with some kind of machine or constructed object, may be characterised as one-to-many, and involves engagement with a group of others in an event of some sort. To participate is to place oneself in the context of some process and to engage with whatever it offers that allows some kind of entry into the overall event. One becomes part of some larger thing or event that is the participation, *per se*. These can be happenings, theatrical events, and events in which the spectator has to supply at the very least their presence so as to complete the work. There will be multiple processes of connection developing over time producing a wide spectrum of activities.

The other, interaction, involves engagement with, usually, a single other entity (person or machine), and is commonly one-to-one. Again the work is not complete without the interaction, but here the focus is on reciprocal relationships and their development over time. To interact is usually considered to involve engaging with devices of varying kinds through the exercise of controls or sensors or other data gathering attachments that provide information as to changes in local conditions, and thus permitting the spectator, as user, to participate in the process of some 'thing' so that some kind of reciprocal relationship develops with it.

A distinction is often drawn between participation and interaction. This has an historical basis in that the word participation applied to early (1960s) forms of happenings and other event based art, whereas an interaction is usually thought of as being between a computer-driven or other machinic device and a person. In English usage, one 'participates in' but 'interacts with' some thing. However, in both situations it is the coherence of some larger process – a product of all the entities involved and greater than each entity when each is seen as an individual – that one experiences. As Pask has noted:

"an observer who comes to know the system must be a participant in the system. The boundaries of the system, far from being pre-fabricated, are created by the activities of the system. This is a prescient notion of autopoiesis, or organizational closure." [3, 353]

The use of the term 'participation' arose in the period of the happenings of Allan Kaprow or, for example, Nam June Paik's *Participation TV* (c.1963). Apart from the obvious person-to-person interaction required in a happening, I suspect that this distinction has lately been drawn through a need for a formal distinction between works produced through the use of analogue systems and works in which the computer is the locus of the choice-point selection process that is seen as interactivity in much recent contemporary art. Thus, participation and interaction can be shown to have a very similar set of characteristics whatever the technological means.

If participation was analogue and interaction is digital then given that they are both means by which one develops some kind of relationship with an other; be they animal, human, significant, analogue or digital machine (computer), environment or any combination of these, then are they not two words for the same thing? The key is that some sort of communication transpires; a reciprocal exchange of (generally 'meaningful') information that endures because of that meaningfulness and its reciprocation. Thus I argue that the separation between participation and interaction is meaningless, artificial, and misdirecting.

But what exactly are the processes of interaction? What are its characteristics? Firstly, whether the process is direct – through the exchange of chemistry (*e.g.*, in biology), or mediated – through language or any of the extensions of our capacities that are embodied as analogue or digital technologies; a body, or some material functional object the states of which are alterable, must be involved. Thus, interaction must be embodied. Interactivity, being medium independent, needs some sort of physical channel through which information transfer can occur. These channels function as relations to the other and could as easily be speech as they could be a camera sensing people walking into the gallery. Ultimately what counts is what is recognised in the sensing and that, like it or not, is analogue.

Interaction is the relational dynamics that occurs between an entity – an organism or device – and its environment.

An organism is any coherent biological entity that metabolises energy in order to maintain that coherence (its organisation) within an environment, to gather and process information about its environment, and to permit its reproduction. At the machinic level are devices that are in some sense adaptive, *i.e.*, that can change their state to accommodate changes in their environment. The need to be adaptive is a necessary first condition that has to be possessed by any entity that will undergo interaction.

An environment is all other organisms and the physical, social, cultural and machinic context that constitutes the experiential space of an organism for any duration. Every thing that is in some sense other to (*i.e.*, not) an organism is its environment. Only the most sterile of environments are entirely passive or neutral; thus interaction and its corollary, adaptability, are necessary for any entity that has to survive in an environment.

To any organism its environment is 'active' when other organisms interact with it by competing with it for resources or by generating outputs (signals) into the environment which may or may not be useful to it. Its capacity to adapt to changes in its environment is essential to its continued coherence and its reproduction. This adaptive capacity is tested by its capacity to use the resources in its DNA, or program, and its stored experience to handle day-to-day changes. But to 'know', in any sense, about those changes it must be able to sense its environment and effect internal changes that accommodate those

sensed external changes. These processes are structurally fundamental to interaction, and they constitute the primary level of the process of communication. [2] Further, they require the two orthogonally related conditions of 'autonomy' and 'agency'.

Autonomy implies that an entity can stand alone in some sense, making decisions based on its own knowledge of its situation. Its etymology is from the Greek *auto* for 'self' and*nomos* for 'law', *i.e.*, self-driven or self-governing and, thus, self-regulating. Based on this we might think of something like a static autonomy, for example an object such as a painting or a sculpture that is complete in itself, through to an active mobile autonomy best represented by a living organism that is capable of moving, feeding, sensing and, overall, making decisions for itself. The notion that a static object, something that just sits there and does nothing is autonomous seems trivial but it stands as the lower bounding case of autonomy. We normally think of autonomy as applying to an entity that is in some sense self-sustaining; that has the capacity to sense its environment, operate on it, and thereby make decisions for itself, and thus we start now to see a merging with the notion of agency.

Agency is that property of an autonomous entity that is its capacity to act in or upon the world. That is, having made a decision it has the capacity to carry out (or execute) that decision.

The kinds of entities that have both autonomy and agency will be both biological (living) and artificial (constructed), *e.g.*, robots and other attempts at artificial intelligence, and our chief interest here, installation artworks.

Adaptation by an entity to its environment both requires and supports its autonomy, allowing the organism to behave independently of other organisms, survive on its own and enact its own decisions. An organism's autonomy requires internal feedback relations in which aspects of its internal system can enact the regulation of its local environment in intentional ways. When these relations spread beyond the organism's boundaries you get social environments in which organisms communicate, sense and have intentionality and from this comes interaction. [4]

There are degrees of relations that may develop when a spectator encounters an artwork. These may manifest in several possible ways.

Degree 0: The artwork may be entirely passive and the only interaction is that process of the interpretation of an artwork that the viewer has to make to be able to see it and render it meaningful to them. Such action takes place entirely within the viewer, and although it is dynamic it has no impact on the artwork, which is itself entirely passive.

Degree 1: It may be triggered to start some playback of a pre-programmed sequence. Obviously interpretation on the part of the spectator is involved, but now the work becomes, in a very limited way, active. However there is no further impact on the artwork beyond the commencement of its pre-programmed trajectory.

Degree 2: It may respond with an action of some sort which will in turn draw further behaviour from the spectator. The artwork can now be said to be interactive. This is the common 'interaction' that occurs when the actions of a spectator elicit some sound, movement, visual or other event from the work that, *crucially*, causes the spectator to make further moves that are sensible to the artwork, thereby elic-

iting different sound or visual events from it. It is the kind of interaction that a musician has with an instrument, and the spectator may in fact be able to develop some skill with the artwork so as to be able to play it like an instrument. However here, the artwork's responses are all preprogrammed in the sense that a particular movement or action will elicit one particular response from the object, or may force a selection from several possible responses depending on, say, a contingent branch in the program flow.

Degree 3: If further movements of similar type are produced, a changing range of responses (*e.g.*, new sounds) may be produced, since, having made one response the machine may then 'know' to make a different, albeit preprogrammed, response when given a similar stimulus.

The above classification is not dissimilar to that of Cornock and Edmonds. [5] For them interactions could be:

1. static: allowing no opportunity for interaction
2. dynamic-passive: change in response to environment, but not influenced by users
3. dynamic-interactive: "generate outputs that correspond directly to input from audiences."

and more recently Edmonds, Turner & Candy's addition of the class: dynamic-interactive (varying): "distinguish[es] articles that change over time, either through automated learning or through updates from the artist." [6]

However they do not go far enough, thus:

Degree 4: By any measure the peak class of interaction is conversation – an ongoing, inherently stable, multi-sided, adaptive process of information transfer, that consists in alternating, reciprocal production and transmission of information and response to that information, through consideration, recognition (of signs), understanding (of their meanings), development or extension of 'ideas' embodied in the messages and the production of further transmissions. Conversation must involve understanding which is a function of a mutually agreed, or learned, set of signs (language) that convey the meaning.

Conversation necessarily involves feedback; the closing of the loop through the response by the second party, which is in turn considered and responded to by the first. Thus a continuing cycle of feedback undergoes temporal development as the conversation continues, and each party is, at least, able to utilise its existing repertoire of behaviours – ranging from language and gesture to the demonstration of objects and processes or the operation of machines. This cybernetic feedback relation, though largely neglected in contemporary art over recent decades, provides a framework of immense value in understanding how interactive systems can work, and it is the circular feedback system that renders the conversation something greater than what exists within each party, such that its coherence gives it a mutually embodied autopoietic presence.

More interestingly, in any intelligent entity (living or artificial) the learning of a set of signs to convey meaning will require the development of new behavioural repertoire through a process of adaptation. The interactive context (the environment) will make demands on each entity and place constraints as to the effectiveness of any behaviours, moulding the development of any new repertoire.

In sum, while none of this is strictly 'new,' little of it has been spelt out and incorporated into contemporary art practice. Pask's work would be the only counter example. Regarding conversation, and paraphrasing him [3, 358–360]:

1. Conversation between individuals occurs over time and alters the mental contents of each individual over that time.
2. Conversations have a start and a finish and unfold over time, although they may run in parallel, supposing more than two individuals are engaged.
3. The conversation is in the the union of the minds of the individuals engaged. That is, it exists as a superstructure that is not contained exclusively in either mind but necessarily is a function of the activity of both.
4. There is a process of feedback that gives conversation its unifying character.
5. There is a "transfer of tokens" (language, signs) between each individual within the conversation.
6. These 'tokens' must be mutually understandable. However, the interpretations of the conversation are nevertheless a function of each individual mind.

While many interactive artworks demonstrate some level of "reciprocal production" I know of none that have achieved a truly conversational level of interaction. This I suppose is due to the intractable problems of building a true artificial intelligence. One of the nearest approaches to this status is in Stelarc's work, the *Prosthetic Head*, [7] which has also been the locus of a great deal of work intended to produce various aspects of this capability under the framework of the Thinking Head project. [8]

Finally, I list the component sequences (i.e., the dynamic relations) of the process. What interaction needs is

- A potentially dynamic system in some environment.
- The entry of an interlocutor and a stimulus generated by that interlocutor.
- A response to that first stimulus, functioning itself as a first return stimulus.
- A further response to that first return stimulus followed by a further response on the part of the second party.

This must develop into an ongoing loop of stimulus-response sequences. Ideally it should follow a coherent line of development, and it might stimulate the production of new behavioural repertoire. Thus begins the process of developing a creative machine, in the way that we are creative.

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ENGAGING DYNAMICS

FRANCES JOSEPH

This paper addresses some practical and theoretical issues arising from the development and implementation of a pilot programme of new works for an interactive screen environment sited within a performing arts complex. The notion of performance as embodied practice functioning both as a metaphor and an analytical tool activates a series of social, technological and cultural framings.

This paper addresses some practical and theoretical issues arising from the development and implementation of a pilot programme of new works for an interactive screen environment sited at The Edge Performing Arts Complex at the Aotea Centre in Auckland. The 'Digital Art Live' (DAL) programme is an initiative supported by The Edge in partnership with CoLab Creative Technologies Research Centre, which is based at Auckland University of Technology (AUT).

Struppek (2006) has written about the differences between public and individualised forms of screen display. She has suggested that the zones between virtual and physical public spaces could be used more constructively for 'the creation and exchange of culture and the formation of the public sphere through criticism and reflection.' [1] She recognises that new co-operative relationships are needed to enable new approaches and to challenge conventions. The collaboration between The Edge and CoLab is exploring some of the opportunities and requirements needed to support such cultural exchanges in Auckland, New Zealand.

The location of DAL in the Owens's Foyer of The Aotea Centre outside the ASB Theatre is distinct from urban screens in public squares, from interactive art in gallery spaces and from interactive games that are increasingly found in educational and domestic environments. The environment of The Edge as one of New Zealand's leading performing arts, entertainment and convention facilities, engages many different communities and introduces some particular considerations and opportunities. The notion of performance as meaningful, embodied practice that functions both as a metaphor and an analytical tool, activates a series of distinctive social, technological and cultural framings that the DAL pilot programme has set out to explore and analyse.

Earlier in 2010 The Edge council reallocated some funds earmarked for buying more traditional artworks like painting and sculpture for the theatre foyer for the purchase of interactive screen technology. At a meeting between CoLab and The Edge in mid 2010 the potential of both organisations working together to establish a flexible technology platform and a sustainable exhibition programme of interactive works was recognised. While The Edge management had already made decisions as to the type and configuration of the screen, there were several critical issues that required further consideration. Firstly, the curation of a programme that would not only present new interactive art works, but might relate thematically or formally to the Edge's ongoing performing arts programme including city wide cultural events, such as festivals. Secondly, the development of a content management platform that could support a range of different software and approaches taken by artists. Thirdly, while The Edge was keen to support the development of an ongoing programme, it needed to identify what was required to do this. It was decided to run a year long pilot programme, supported by The Edge, CoLab and AUT, to research, develop, test and evaluate strategies for engagement, content generation, funding and programme organisation of the interactive screen environment. With the screen scheduled for set up in the foyer in

December 2010, an initial test programme to open in February 2011 as part of Auckland Festival was proposed. A more formal programme would be launched in April.

The Digital Art Live interactive screen consists of 12 x 46 inch Samsung thin flat screens organized into a large composite screen. Each screen panel measures 1025mm x 579mm including the bezel. The overall size of the wall is 4100mm x 1737mm. It's a 12 screen display layout, being 4 screens wide by 3 screens high. Each screen has a 16:9 ratio, but the overall ratio of the entire screen is 21.3 x 9, or 2.37 (cinemascope is 2.35 so it is close to this scale). Each screen has a native resolution of 1366 x 768. However the screens can support a splitting system by stretching the image across the entire wall. This means that the overall resolution of the screen is 1366 x 768 pixels. The initial set up included a Logitech HD webcam C510 positioned below the screen. It was agreed that additional sensor and input devices or camera configurations could be considered for incorporation into the system. Subsequently a ceiling mounted camera has been added. While the multiple screen set up presents certain challenges for artists, it has other advantages including the clarity and definition of image, and the opportunity to produce single or multiple screen works. The grid format of the screens echoes the grid in the history of painting.

Inquiries made by CoLab identified iion, an Auckland based company involved in designing an interactive management system. 'Media HD,' which had been developed for the advertising industry. It supports presentation across a wide range of file formats and interactive modes, to provide programme options to ensure continuous delivery and viewer analytics. A basic platform would be provided and additional functionality to support different software and hardware inputs would be added as required, supporting the programme roll out. Processes were put in place to appoint a part-time interactive programme curator. In the meantime, the DAL management group, made up of representatives from CoLab and The Edge, began the programme development.

Three emerging artists were identified and invited to exhibit between mid February and mid March 2011 in a program me titled 'Screenplay at the Edge' as part of the Auckland Fringe Festival. The programme included: 'The Ruru' by Naomi Lamb and The Wanderer Productions; 'Speaking Trees' by Anselm Bradford and 'Magic Garden' by Robert Carter. These three works used very different interactive strategies and presented diverse challenges related in part to the short timeframe, the different levels of experience of the artists in exhibiting interactive content and to the set-up and testing of the Media HD platform. For example one work used a text interface on an iPad. This limited interaction as audience members first read from the iPad rather than experimenting directly with the work. While each work had its own integrity, collectively they did not work as a coherent programme. The Media HD platform functioned well in supporting a range of software applications and hardware devices and the automatic, sequential display of each work (programmed to show for one hour at a time) while also allowing the audience to manually select from the programme. However the Screenplay event presented a number of problems, notably some confusion for the audience in understanding the three different interfaces and interactive strategies of these works. While printed information was provided, it was realised that a simpler strategy, presenting a single work/type of interface in an exhibition would be more effective. It was also recognised that the particular space and configuration of The Edge system would inevitably require some adaptation by iion to support the presentation of new works, particularly if they used software that needed to be added to the system. However a distinction needed to be made between this necessary level of technical adaptation/system development and a more fundamental need to support artists working in other media forms in developing greater understanding and experience working with interactive media. CoLab was in the process of setting up an interactive media suite for teaching and research at AUT. The Media HD system was installed as part of the suite for artists, students and researchers to access for workshops, experimentation and testing of new interactive work.

In April 'Chirp' an original interactive work by Wellington based artist Stewart Foster, was presented at the formal launch the interactive wall. Stewart's work explores real time interactive environments infused with bodily sensations and computer technologies. These hybrid spatial environments explore the limits and interface between physical and digital space: 'We are entering a new realm of digital connectivity where our bodies are extended into digital networked space. The ubiquity of mobile internet connecting devices, electronic displays and social networking spheres all contribute to the rupture from the corporeal body into a constructed digital self.' [2] The work used camera vision and live feeds from twitter. Tweets that included the word 'happy' were automatically harvested and displayed. Motion tracking traced the outline and movement of people moving in the foyer space, plotting a series of blue circular shapes across the screen. The representation of participants in the work was important in that it gave them insight into one of the works interactive strategies. The conceptual impetus of this work and its aesthetic demonstrated Stewart's long-term involvement with interactive media and prior experience in developing large-scale public interactive digital art.

In May curator Nolwenn Hugain-Lacire was appointed to direct the DAL project as a one-year pilot programme. Confirmation of the next two exhibits was set in place, with exhibitions confirmed by Auckland artists Kim Newall and Clinton Watkins. The Edge agreed to an artist's fee for each exhibitor, a policy that the DAL committee saw as fundamental to the longer-term sustainability of the programme. A curatorial strategy was formalised, which included a public call for artist's proposals as well as a summer season of work by students and workshop participants. Supporting the call for proposals, a technical manual for artists was published. The call for proposals invited artists to create work that supported engagement with a public audience through technological experience. It identified a special interest in work that responds to gestural input, supporting performative interaction between the user, the physical space and the onscreen content. It also encouraged works that involve text input, audio, real time or social networking technologies from artists or collectives producing professional creative works. [3]

Planning has also been initiated for a series of workshops to be conducted at the CoLab Interactive Suite in 2011 and over the summer break. It was recognised that emerging artists and those working in other media that they might wish to extended into interactive formats, would be more effectively supported through a workshop programme. The DAL pilot programme will present innovative creative works that were conceptually and technically resolved in order to establish and promote support for a long-term programme. Experimentation and capability development, supported through the CoLab workshop programme is crucial to developing a broader community of practice. A process outline was developed to ensure dialogue between the artist, curator and iion, to be followed by a series of tests of works-in-progress at the Interaction Suite to trouble-shoot any issues ahead of the opening date.

The DAL pilot project is a work-in-progress. Organisationally we are learning through this process. Documentation will soon be available in an online archive on Cola's website. While it is too early to provide a fuller analysis and evaluation of the programme some insights have been gained to date. These include the increasing levels of positive audience feedback and audience response, the formalisation of support provided by The Edge for artists fees and recently from Creative New Zealand for funding to commission new interactive work as part of the DAL programme.

We are currently exploring a number of different strategies including corporate and institutional sponsorship, as well as international cultural programmes to contribute to the ongoing support of the programme. There is potential to commission interactive works for specific cultural events like the New Zealand Readers and Writer's Festival or the Pacifica Festival, which are closely linked to The Edge's ongoing programme. These events present opportunities for the exploration of different performative

modes (for example poetry or dance) and for extending beyond the spatial and conceptual limitations of a 2 dimensional screen into multi-dimensional cultural forms and spaces. The potential for ongoing research into interactive forms, interfaces, curatorial strategies and cultural enterprise, supported through academic funding, is another area that can contribute to the outcomes and value of this initiative. In a small country like New Zealand, a multifaceted approach that builds on institutional collaboration and local networks is essential.

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RELEASING THE GHOST : RELOCATING AN ONLINE EXPERIENCE INTO THE CORPORAL WORLD

Nedine Kachornnamsong

The article is a part of an ongoing research project aimed to transfer and recreate an experience found in online interaction into a spatial setting. By applying the concept of technology appropriation, together with the idea of the ghost in the machine, Yes / No / Maybe (2009) is an interactive art event, a social experimentation, which transferred an online dating experience into the physical world.
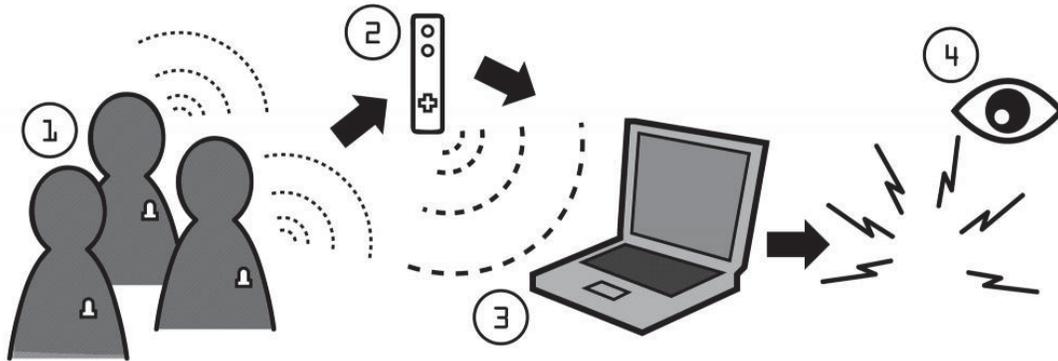
Fig. 1. Yes / No / Maybe: interactive system diagram, Illustration, Copyright: Nedine Kachornnamsong.

Fig. 2. Participants are waiting to be registered into the system, Photo copyright: Helena Bozic.

Fig. 3. The atmosphere of Yes/No/Maybe (2009) event by Nedine Kachornnamsong, Photo copyright: Ljudmila.

After the Essence

Personal computers, mobile phones and closed-circuit television, to name but a few digital devices have become everyday objects. Unlike their mechanical predecessors which utilized motion and kinetic force, these machines excel, mainly, in computing and data processing. They aim not to aid, but to empower. While the older machines are big and clumsy, the ones of the new era are neat and dynamic. Completely encased, clean and static, their capacity is not limited to their functions, but incorporates as well, modes of cybernetic operation which are expansive and abstract.

In the world of digital omnipresence, electronic signals are sent, retrieved and consummated. They respond at the speed of light; a vast network of machines lies invisibly. It is not the speed of the machine but the speed of change that painted the image of our future living with technology. From Mary Shelly's Frankenstein to the ongoing Star Trek fiction, these popular depictions are based on either utopian or dystopian view. This is an unapt dualistic approach, seeking to interpret the role of technology into good or bad by either ignoring the influence of technology or rejecting our responsibilities towards it. [1] Since our relationship with technology is mutual — we create technology and technology creates us — to engage in such binary classifications, one would need to be as naïve as to uphold the separation of humans and technology.

Enframed by the good and the bad, we see only the two sides of the same coin and not the object as a whole. Perhaps it was Heidegger who first called for a more holistic view of modern technology. He claimed that the only way to critically reclaim technology is to denounce its instrumental aspect and take a look into its essence. [6] As now, the coin is more or less recognized, I would like to further explore its comparative value at use; to reach beyond what technology could be, and instead consider it as a notable source of understanding. This is because technology is our portrait, it projects how we want to appreciate ourselves in the world.

THE USE OF METAPHORS

My first attempt to apply forms of knowledge found in the use of technology was during the site-specific project 'In Place-spective' (2005-2006) in Copenhagen airport, Kastrup, Denmark. Similar to many other airports, it is a space of security, control and standard; a space to go through — always the start but never the destination. Its characteristics of in-between space and homogeneity make up for its lack of meaning and detachment. [4], [5] Even though, a number of theses on 'place', from fields as diverse as philosophy, geography and architecture, were applied to improve our experience at the airport, their solutions are still far from satisfying. After a week of 'quick and dirty' ethnographic research in the transit area, I found the attempt fascinating; trying to redefine a sense of place using influences from another perspective, to find something never been implemented by any airport operators.

I became interested in online communications, where a sense of place exists without the need for physical space. Blogs, web-boards, chat rooms and fora are not only 'spaces' for people to socialize or hang out, they form a complete 'place' when community, attachment and belonging are created among their users. Unlike virtual reality, a cyberspace is primarily constructed through the use of metaphors, instead of the real world mimicry. Graphical User Interface (GUI) is a metaphorical application used to associate visual representation with literary meaning. It involves terms such as desktop, window, page and anchor in order to convey how the elements of the interface and system should be used and navigated, respectively. Another further extension of the metaphor is normally used as an implication, for example, to make understood the purpose and expected activities delivered through the internet portal. [7] This latter type of metaphor such as online market, internet forum, electronic library and (cyber) space, do not refer to physical representations but rather, higher level abstractions — concepts of online space. In other words, we need to establish our own "personal cosmologies" [8] by coupling online possibilities with activities that exist in the real world to be able to fathom the system's uses. [11] Hence, the sense of place we establish within online communications is another strategic ontology imported from the material world to act as a framework for our online interactions. [9] Evidently, without the help of online technology, it would not be possible for us to disassociate the concept of place from the spatial setting.

TECHNOLOGY APPROPRIATION

The difference between an introduction and an appropriation of technology is very well known within the implementation of cybernetic technology. Scientists, engineers and designers may suggest how the technology should work but people are the ones who choose how to use it. Despite the fact that a few people have foreseen the ubiquity of Short Message Service (SMS) or the success of social networking sites, to the virtual reality communities like Second Life, these unexpected receptions of new technology resulting from the meaningful process of 'making use'.

Consequently, the development of any technology depends on both the makers and the users. An example of people unconsciously making place out of virtual space is not simply a coincidence. It is a preference we express, a choice we make through the use of technology. This predisposition will, in turn, reshape the coming creation of technology. And since technology is governed by our determination, it would be unseemly to indicate that it is either unintended, or untrue [3] or reduce it to an accident. [10] And if we are to be more mindful in the fabrication of technology, it is crucial for us to recognize our responsibilities inherent in the role of users.

The Ghost in the Machine

The thought of recognizing ourselves in technology is intriguing especially when it comes to digital applications. These are the machines that have earned the title of being 'smart', crossing over between intelligence and physicality. In A Cyborg Manifesto (1991), Donna Haraway refers to the disappearing border between humanity and cybernetic machines, which "have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. [2]" In other words, the cyborg problematizes the dualistic concepts that are commonly used to define humanity. Still, the rigid structures in most of societies leave us no alternative but to comply with this dualistic framework.

Even though, from the view of cyborg politics, it seems absurd to engage the division of 'either and or' as such, reflected by the In Place-spective project, I found that the ghost in the machine approach was invaluable for my thesis of technology appropriation. This is because for every machine, I believe, there is a ghost. And what we are haunted by is nothing but the ghost of our own desire. Only with our will can technology and machines move forward; technology without appropriation is nothing more than an already forgotten memory, which no longer paves our path to the future.

RELOCATING THE GHOST

The idea of integrating technology appropriation came into place in 2008 during a discussion with my then colleague Vadim Dubrov. We were exchanging our views of socialization when I mentioned the concept of a "traffic light" party I had come across a few years earlier. In this particular type of party, organized mostly among college students, the participants are required to dress in one of the traffic light colours which signify their level of dating preference — green is available, red is not available and yellow is undecided. I have never attended one of these parties as such, but I found it is amusing in terms of social interaction. Yet, it is not putting on different coloured clothing that provides traffic light's attendees any new opportunity. Rather, it is through 'making a statement'. Since yellow group participants have an 'unknown' status — the basic state held by any partygoer — the only group of people who benefit from this are those dressed in red, as they will be less disturbed by the green group which has a better chance with those at the party who are keen to have a date.

This prioritization of the declaration participants' dating interests found in "traffic light" parties, is similar to online dating. By looking into the structures of dating websites and combining them with the "traffic light" concept, there seemed to be an opportunity to transform an online dating experience into a material setting. Since love and (romantic) relationship is one of the greatest convictions found in human history, this is a challenging opportunity to bring forth such desire – a possibility to bring the ghost back into the world.

FROM THE ONLINE TO THE OFFLINE

To transcribe this particular desire into an everyday setting is to deliver an online dating experience in an offline location. Thus, the different of people's behaviours from the two settings is needed to be considered in combination with the concept of the traffic light party. There are principles of dating websites which are the keys to delivering the online dating experience that do not apply in the sphere of face-to-

face interaction. Firstly, in order to optimize the search process and increase pairing opportunities, participants need to be able to indicate their level of socializing preference (e.g. just looking, looking for friends, looking for dates, etc.). Secondly, while pursuing their interests, users must have the opportunity to either reveal their personal information or remain anonymous. This possibility for obscurity is what encourages people to become more open and active in their online social interactions. Thirdly, the playful element of online-dating sites represents an informal atmosphere that enhances the socializing opportunities where the users can feel more relaxed and casual.

Nevertheless, declaring a level of dating interest is successful in the online dating because cyberspace is designed for multitasking — one searches in parallel with many others. Thus, it is effective to provide users with an easy way to filter more than one interesting candidate out from the pool of online accounts. It is not only that multi-tasking is rather difficult to do in the real world, but also that such an approach is considered to be unpleasant according to conventional social norms. To succeed in transferring an online dating experience into the material world, the interactions between people have to be more dynamic. Therefore, an interactive installation was chosen as a tool to bring these two domains of interaction in to compliance.

In order to apply the above characteristics of online communication into a physical setting, this project consists of the setup of the event venue and the introduction of a new social environment.

- The venue: the setting and location where the project will take place needs to have a good atmosphere for socialization. A form of social gathering will be arranged and opened to public participation.
- The socialization strategy: the new social situation will be initiated by transferring elements from cyberspace interaction into the physical world. Therefore, the objective is to create an environment in which participants can recognize other people's level of socializing interest while their exact identity remains unknown.

An interactive system will be created as the means to simulate the informative environment that will roughly show participants the level of socializing interest in their surrounding area. Still, this indication shall only represent an average measurement to avoid a 1:1 relationship where the identity of participants and the type of socializing interest can be matched.

Yes/No/Maybe

It is crucial for a participatory project to begin with a period of pilot testing that emphasizes implementing the concepts rather than aiming for an inclusive outcome. While focusing on creating a platform for social experimentation based on the frameworks of internet dating, the main objective of Yes/No/Maybe was to produce knowledge — an analysis of the data collected on the participants' flow and movement — which could be used for further development.

This pilot project was realized during a joint residency program with Ljudmila and MoTa in Ljubljana, Slovenia as an interactive art event. In order to foster an atmosphere conducive for mingling and socialization, it took place in the café area of Moderna galerija, Ljubljana where there was music, DJs and a bar where drinks and refreshment were available for purchase. The registration process was divided into two steps in order to maintain participant anonymity. First, before entering the event, each participant had to specify his/her dating interest for the evening as a 'yes', 'no' or 'maybe' in a paper form. This was

then, folded and exchanged for an electronic tag containing microchips with a unique identification. Afterward, the pairing and registration of dating choices with the tags were carried on by project staff.

TECHNICAL SOLUTION

The technical part of this project was under the supervision of Luka Frelih from Ljudmila. Since it was a pilot project constrained by timeframe and budget, instead of mapping participants' movement using Wi-Fi or long range RDIF technology, a more practical solution was to use IR emitters and Wiimotes for the tracking input. Our ID tag design was inspired by Graffiti Research Lab's Throwies which are small, cheap and aim for temporary use. In each tag, two LR44 batteries powered two IR emitters and an Atmel ATtiny45 micro-controller which was programmed to flash a unique ID signal. Six Wiimotes were hung from the ceiling to cover the whole area and receive the signals sent from the IR emitters in a different time interval. Using the information from the Wiimote sensors, the computer software then mapped the movement of the tags (and the owners) into physical space by changing the LED lights which represented the average value of the socializing level (green, red or yellow) of individuals in that particular area.

THE RECEPTION

The public response to the project was more than we had expected. The event was originally planned to be of moderately sized, but turned into the evening's biggest event. After 40 minutes, all of the 75 ID tags we had prepared were given away. And since Moderna Galerija is a public institution, we could not impose a restriction to stop people from entering the event. At the highest point of the evening, the number of visitors reached an estimated 300 people. While I was astonished by the project's reception, at the same time I understood that it was unfortunate for my research. With only 25 percent of the participants actually connected to the system, the data was inadequate for the analysis. However, if there was any conclusion to be drawn from the event, it would be that the ghost (in the machine) is our desire and the thought of an unrestrained desire had drawn people together that night. In other word, we were all eager to release the ghost from the machine.

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DIALOGUES WITH DECAY: TRACING NARRATIVES OF DATA SPACE IN PAT O'NEILL'S "THE DECAY OF FICTION"

Kristy Kang

This paper outlines the formative dialogues that emerged during production of the experimental film *The Decay of Fiction* and its interactive counterpart *Tracing the Decay of Fiction: Encounters with a Film by Pat O'Neill*. The project was a collaboration between filmmaker Pat O'Neill and The Labyrinth Project–a research initiative on database documentary directed by media theorist Marsha Kinder at the University of Southern California.

Installation view of "Tracing the Decay of Fiction: Encounters with a Film by Pat O'Neill" by Pat O'Neill, Rosemary Comella, Kristy H.A. Kang and The Labyrinth Project, DVD–ROM, (Copyright 2002, photo by Kristy H.A. Kang).

In 1993 experimental filmmaker Pat O'Neill was introduced to the Hotel Ambassador. Built in 1921 in the center of Los Angeles' Wilshire corridor, the formerly grand hotel was a famous nightspot that hosted the Oscar award ceremonies and became a magnet for dignitaries and Hollywood luminaries in its heyday. Later made infamous as the site of Robert F. Kennedy's assassination in 1968, the Ambassador closed in 1989 and was left vacant, its abandoned spaces periodically leased as a location for movie shoots. Today the site is home to the Robert F. Kennedy Community Schools. O'Neill was given a tour of its spaces long after its doors were closed to the public and inspired by this urban ruin, he began filming, capturing the way light would move through its surfaces. This collection of shots (captured using a combination of computerized motion control and time-lapse photography) was edited with a temporary soundtrack from noir films and became the basis for O'Neill's 2002 film *The Decay of Fiction*. While working on the film in 1997, O'Neill was invited to collaborate with The Labyrinth Project (a research initiative on interactive narrative at The University of Southern California directed by media theorist Marsha Kinder) on a digital media project that would be based on his film. This collaboration resulted in an interactive DVD-ROM published in 2002 called *Tracing the Decay of Fiction: Encounters*

with a Film by Pat O'Neill. [1] This paper will outline the history of how the digital iteration emerged from O'Neill's film and explore the dialogues that developed while these two forms of *The Decay of Fiction* were being produced.

Since 1963 Pat O'Neill has been creating a body of experimental films that cannot be easily categorized as belonging to any singular strand of cinematic style. His work exhibits an intimate mastery of image processing techniques conventionally used to produce special effects in cinema, but the layered landscape of sound and moving images he composes extends beyond the limited language of traditional effects. [2] Rather than creating seamless optical illusions, O'Neill foregrounds the gaps between his densely layered imagery to orchestrate a different kind of illusion – one of unlimited associations in the mind. A poetics of associative meaning is awakened when watching O'Neill's films and it is this matrix of imagined trajectories that corresponds to one of the characteristics shared in film and digital media discourse – non-linear narrative.

During a workshop hosted by The Labyrinth Project at USC's Annenberg Center for Communication in 1998, media scholars and artists were invited to discuss the possibilities and challenges in creating an interactive non-linear narrative based on *The Decay of Fiction*. O'Neill (who had no prior experience working in digital media) was invited by Marsha Kinder to collaborate on this project because their close friendship created a foundation of mutual respect and trust from which one of the first Labyrinth Projects emerged. Moreover, Kinder had written about O'Neill's work in the 1970s and wanted to collaborate with someone whom she admired and whose work had great potential for interactive database narrative. The goal of the collaboration was to make an interactive work that would be emotionally engaging while both experimenting with and retaining the pleasures of cinematic narrative. Kinder defines narrative "not just as the idea of the well-made story with a three-act structure but…as a cognitive way for contextualizing the meaning of perceptions. It's a combination of data that's selected from a bunch of different databases and put together in interesting ways. And I think Pat's film have that kind of structure." [3] In the computer world this modular architecture of non-linear narrative typically takes shape in the form of a database.

In his book *The Language of New Media*, media theorist Lev Manovich traces the origins of the database to computer science and defines it as "a structured collection of data. The data stored in a database is organized for fast search and retrieval by a computer and therefore, it is anything but a simple collection of items." [4] This idea of data as a "collection of items" corresponds to the way in which O'Neill collects material for his films, identifying himself as "a kind of scavenger that looks through a lot of existing material and finds items that spatially or in terms of feeling have connections to the basic piece." [5] The modes of selection made by the computer or by O'Neill, can be considered non-linear in that items are chosen randomly from a constellation of possibilities. The difference, however, is that computer data exhibits no intrinsic value or associative meaning. The machine does not choose, judge or make cognitive connections between items but reduces them all to identical, sterile bits of information. Although the database evokes a very contemporary notion of computerized consciousness, it connotes a lack of corporeal presence and an absence of the kinds of sensual pleasures found in O'Neill's narratives. Rather than a database that fetishizes computer consciousness, I would like to imagine an embodied *data space* – one that is grounded in human consciousness mapped onto spatial trajectories.

The orchestration of space is central to the narrative trajectory presented in *The Decay of Fiction*. Space takes precedence over action, as opposed to action forming the underlying architecture in most traditional storytelling. The 73-minute film traces a pathway through the decrepit hotel, dripping with the

kind of nostalgic traces that abandoned spaces evoke, a pathway that O'Neill describes as a "choreography for the camera." [6] This feeling of nostalgia is heightened by the superimposition of noir film soundtracks onto the contemporary ruins of the hotel spaces evoking what O'Neill calls "the decay of storytelling or how storytelling merges with the environment or with a space that's foreign to it but somehow attracts it". [7] It is as though these stories are written onto the body of the hotel and watching O'Neill's scenes of sped-up-time, we are witnesses to this decay of fiction.

Conceiving the network of noir inspired action that would take place in the environment occurred after the empty spaces had already been captured on film. Having recorded the camera moves using a customized motion control system, O'Neill was able to later shoot his actors while repeating the same camera movement. Then through the process of optical printing, the foreground action and background spaces would be combined to form a composite image in which black and white figures inhabit a contemporary landscape shot in color. By compositing the present with the collective memories of a vintage era of Hollywood's past the Ambassador's remains become a repository of cultural history and imagined interactions represented in the film by a layer of ghostly fictional characters playing out noir inspired narratives. These narratives are periodically interrupted by animated interludes that seem to emerge from a parallel dimension formed from a repository of surrealistic moments. These parallel spaces converge as the film culminates in a carnival parade of performers whose dance of overlapping bodies blurs the boundaries between past and present. On one level, the film is an imprint of the hotel as artifact – a fossil of the past housing not only the imagined fictions invented by O'Neill but the public and private histories of Los Angeles' memory.

In the DVD-ROM, the hotel's history is an additional dimension that is only hinted upon in the film. In the film, as the camera pans across the hotel's ballroom we are reminded of the Robert Kennedy assassination as we hear excerpts from the speech he gave shortly before his death. Though this is one of the few moments in the film where historical memory materializes, it maintains a peripheral distance to documentary that haunts the edges of the screen. In the DVD-ROM, as the viewer navigates through the ballroom, additional material about the assassination is made accessible through a click of the mouse. This documentary material includes news clippings, archival footage surrounding the shooting, radio broadcasts of conspiracy theories and contemporary interviews with historians and witnesses offering their insights on this historical trauma. These documents are embedded within the surfaces of the navigable space where they remain hidden unless activated. The film de-emphasizes the "artifactual" dimension of the Ambassador hotel as a repository of history and although O'Neill initially struggled to incorporate his historical research of the space into the film script he abandoned his efforts, realizing that he "wasn't doing a documentary but a choreographed camera move with action." [8] Collaborating on the interactive iteration of *The Decay of Fiction* opened up the possibility to include not only historical material O'Neill had intended to include in his film, but additional material researched by Kinder, myself and others during the four year period in which the DVD-ROM and film were being produced. These included moving image archives of social events and publicity stunts hosted at the Ambassador, photographs of the hotel and its surrounding neighborhood from 1920 to 2002 and contemporary audio interviews providing different and sometimes conflicting perspectives on the history of the area. All these alternate layers of narrative possibility exist on the fringes of O'Neill's fictional spaces and can be accessed at any time. While exploring the hotel in the DVD-ROM, one encounters a diversity of data spaces and it is up to the viewer to choose which allegorical vector to follow.

Tracing the Decay of Fiction expands upon the uncanny qualities of place and memory that are present in the linear film by transforming the film's linear spatial trajectory to non-linear spatial navigation or "navigable space" – what Manovich identifies (along with database) as "another key form of new

media." Although Manovich refers to 3-D computer generated virtual space as a model to illustrate the exploration of navigable space, the same description could be applied to illustrate spatial exploration in *Tracing the Decay of Fiction*. In the hotel, the viewer can activate any of its static interior spaces by placing the cursor over the edges of the screen, animating the still image into motion and following the camera moves that give the illusion of spatial navigation. Near the end of production on the DVD-ROM, Rosemary Comella invited Manovich to view the navigation system she had designed and programmed for the interface allowing the viewer to move within and between the hotel spaces. Manovich discussed his conception of "navigable space" but admitted he had never seen it realized in this particular way.

Another attribute that differentiates the DVD-ROM from the film is its use of "the image as interface." Manovich states that "The new role of an image as image-interface competes with its older role as representation.…a computer image is situated between two opposing poles – an illusionistic window into a fictional universe and a tool for computer control." [9] The role of the image as both "window" and "tool" is illustrated in the DVD-ROM when the viewer pauses on a still while following a camera move through the hotel. Doorways, walls and windows become links to historical and fictional interludes. However, I hesitate to assert that the use of image as representation and interface are in opposition here. Rather, the immersive beauty of O'Neill's cinematography is foregrounded and the navigational devices are intentionally integrated to minimally distract the viewer. Furthermore, in the work of experimental filmmakers like O'Neill the image does not always function as "illusionistic window." Rather, the illusory quality of the image is frequently challenged using the very techniques used to maximize illusion in the special effects industry. While discussing the industrial apparatus that O'Neill re-uses to develop his own aesthetic, he states, "the by-products of the processes of special-effects work.…that which undermines the illusion. That seems to be a very powerful thing – the illusion and the denial of the illusion, both present at the same time." [10] Similarly, the binary poles of image as illusion and instrument are not in competition with each other in *Tracing the Decay of Fiction*, but are "present at the same time".

Another nodal point of dialogue between the film and DVD-ROM is the differing role that montage plays in each. In the film, the viewer is introduced to O'Neill's choreographed sequence of narrative spaces – the viewer sees an authored mix and a pathway arranged by its author. In *Tracing*, the viewer *participates* in the mix and editing is replaced by navigation and choice. In the film, a sequence of moving images is arranged over *time* while in the DVD-ROM the moving images are spread out into *space*. The viewer's choices in that space are arranged into a spatial montage. Spatial montage is made explicit on the DVD-ROM by allowing the viewer/performer to control the "choreography of camera movement" from a selection of rooms in the hotel. By moving the computer mouse over indicators on the edges of the screen the viewer can control specific camera moves or slide into adjacent spaces. Alternately, one can choose a different space by using the original blueprints of the Ambassador's architect Myron Hunt as a map to locate the spaces to explore on the DVD-ROM. While navigating the camera moves, the ghost-like characters that inhabit these spaces can be activated over the moving image with a click of the mouse. During the production of the DVD-ROM, there was a debate about whether to include the noir characters or to leave the navigable spaces uninhabited in order to retain the uncanny quality of the hotel and invite the viewer's consciousness to inhabit its spaces. [11] It was a question of how closely the DVD-ROM sequences should mirror the film. While describing the period when he was first filming the Ambassador, O'Neill said, "as you walk around an empty building – especially when you know about who inhabited it and what happened there – you always expect you're going to run into these people as you go around a corner. I mean its haunted in your own mind…so it was this quality that I was trying to figure out how to synthesize." [12] While this haunted quality is made explicit in the film's layering of ghost-like characters, in the DVD-ROM the viewer *can select either option* – either she can explore the empty space or inhabit it with characters from O'Neill's fiction. Periodically, however, the

choice of combining foreground action and background space is automatically generated whenever an "earthquake" occurs. At these moments, the viewer loses control of the interface and a random collage is generated from the database of foreground and background elements. By alternating the layer of characters off and on or by viewing a randomly generated mix of multiple layers, the emptiness of the hotel takes on a heightened quality of mystery as you realize in your mind, that there is another hidden narrative frequency that haunts these spaces.

In summary, I have outlined the formative dialogues that emerged during the production of *The Decay of Fiction* and its digital hybrid *Tracing the Decay of Fiction*. First I explore the role of non-linear narrative in both projects and show how the complex network of associations created in O'Neill's films corre-spond conceptually to the way non-linear narrative is structured in new media. This structuring takes the form of a database, a collection of items, or an index. The indexical nature of O'Neill's process is re-flected in his view that his films are like a journal, a synthesis of disparate units, "a collection of entries all by the same person but at different times and places." [13] I propose extending the notion of the database to a data space in order to address the role of spatial navigation and spatial montage. Spatial navigation as a mode of organizing narrative footprints resonates in O'Neill's observation that his films serve as "a record of an individual who wanders the land and from time to time stops to comment on it." [14] I also explore the dual nature of image both as interface and mode of representation both in the film and DVD-ROM. All of these dialogues converge in the ruins of the Ambassador and in the end the hotel becomes a metaphor for the exploration of data, narrative, memory and history. Finally, it is a tracing of decay that is embodied in the haunted orchestration of spaces written on celluloid and en-coded in digital space.

References and Notes:

1. My role in the DVD-ROM was as co-director along with Pat O'Neill and Rosemary Comella. This involved working on the conceptual development, researchand production including the digital compositing, interface and graphic design of the collaborative project.
2. It should be noted that longtime collaborator George Lockwood contributed his expertise as sound designer to many of Pat O'Neill's films.
3. Labyrinth Project workshop, USC Annenber Center for Communication, February 28, 1998.
4. Lev Manovich, The Language of New Media (Cambridge, MA, The MIT Press, 2001), 218.
5. Labyrinth Project workshop, 1998.
6. Ibid.
7. Labyrinth Project workshop, 1998. The addition of noir dialogue came through the kinds of signa-ture chance encounters O'Neill welcomes in his work. During early editing, O'Neill was listening to the television when he heard a passage from the noir film "The Big Sleep" and realized that the dialogue fragments had an evocative affinity with the spaces he had shot.
8. Labyrinth Project workshop, 1998.
9. Manovich, 290.
10. David E. James, "An Interview with Pat O'Neill," Millennium Film Journal, nos. 30/31 (Fall 1997).
11. From a conversation with Rosemary Comella in 2006.
12. Labyrinth Project workshop, 1998.
13. James, "An Interview with Pat O'Neill."
14. Ibid.

THE UMBRAGE PROJECT

Heather Kapplow

Umbrage responds to US media focus on cyberbullying. It is a creative application of frustration-aggression theory to interfaces intended as intermediary steps to live customer service in commercial interactions. The hypothesis is used to look at the recycling of aggression in the mundane activities of capitalist culture and at what individual experiences of frustration might say about where feeling lies within human-machine relationships.

Frustration is one of a small collection of emotional states that is as easily accessible in interaction with technology as it is in interaction with humans.

I am presenting work-in-progress audio and video documentation of several artistic experiments, collectively called "Umbrage", that are being produced and exhibited at various locations in Boston, Massachusetts (USA) between January 14 2011 and January 14, 2012. Each experiment-piece deals in a different way with the experience of frustration in the context of human-machine iteration.

"Umbrage" was conceived by four Massachusetts-based artist-curators (Jed David, The Novotny Collective, Jane Shapiro, and myself) in subtle response to the American media's focus on cyberbullying after a teenager from our region committed suicide on January 14, 2010. [1] Its aim is creative, critical exploration of frustration-aggression theory (Dollard, et al) focusing in particular on the type of digital interfaces that are intended as an intermediary step to live customer service in commercial interactions. [2] The frustration-aggression hypothesis' main principal – that personal experiences of frustration are the direct cause of the kind of targeted aggressive behavior known as scapegoating – is creatively tested and observed within obviously constructed, but still familiar contexts. These works were commissioned out of a desire to talk about the displacement of collective frustration and the recycling of aggression in the mundane activities of capitalist culture, but have begun, halfway through their duration, to offer interesting commentary on what the individual experience of frustration might teach us about human-machine relationships, and where feeling lies within them.

Of particular interest in each of the pieces that I will highlight here are expressions of the tension between dependency on technology and feeling threatened by it. A fundamental manifestation of this tension occurs in circumstances where a computerized interface must be used in order for one to be acknowledged, but must be transcended in order for one to be understood. That such a profoundly human liminal state – being caught between being acknowledged and feeling understood – can be drawn into such sharp focus in automated commercial interactions is at the core of what "Umbrage" addresses, and (I propose,) might be at the 'heart' or 'root' of an improved bond between humans and the technological interfaces that they interact with most commonly.

In the works we are presenting through "Umbrage", each moment of the time between the sensation of acknowledgement and that of feeling understood is broken down and examined as a potential stumbling block on the path to deeper machine-human connection. Each step of the process of automated acknowledgement brings the definition of acknowledgement into question and either lessens the likelihood of being understood by a machine or lessens the likelihood of being understood by another

human. In these experiments, the premise is often that either the technology will reduce the human to one of these two states of isolation, or that the human will reduce the machine to a pile of rubble.

In Matey Odonkor's "NerveAna", you interact with an automated system and there seems to be both acknowledgment and burgeoning understanding, but then acknowledgement breaks down for both the 'customer' and for the 'automated system' and your digits are regurgitated back out at you. [3]

Some of the strongest works in this collection are aggressive efforts to break through the muti-layered language barrier and button-pushing of human-machine interaction, drawing out through pure force of will (or human-driven collaboration) something more humanistic in the machine than what it has been programmed for.

In Jenny Asaranow's "Julie The Amtrak God", the automated voice of Amtrak is brought into service to resolve existential problems, and it very nearly works. [4]

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What I've included above is the beginning of a paper about a fictional curatorial project that is not really being assembled by the fictional curators mentioned above – though I am beginning to consider actually curating something on this theme and the two artworks referenced are both real. The first draft of the

paper that you are reading now went on for several more pages, continuing with the simulated technical difficulty until it hit the ISEA paper submission character limit. [5]

This subterfuge was created to hide the fact that my presentation about "T he Umbrage Project" on the ISEA 2011 panel "Emotion Studies in a Contemporary Art Debate" was not actually going to be a presentation at all, but a performance by the same title.

Here's the truth. I'll start at the real beginning:

When I was a child, I was an actress. Not a professional actress, but a local, semi-professional one. I loved it. I was in a number of plays – mostly musical theater productions, but also some dramatic ones, and a television pilot. I did voiceover work, and even one opera. Then, when I was eight, I was in one play that I can't even remember the name of, and it was my last play: two weeks before the production was to open, the director came to my house and told my mother and I that I was being let go because my personal life was interfering too much with my professional life. Though at the time I could not even quite grasp what that meant, it was the end of a career that I had imagined would carry me well into adulthood. Though I have no idea what my trajectory would have been, I saw many of my friends and peers from that time make it into national television series and movies.

I was very serious about acting. My audition piece was a dramatic monologue (involving a dead cat) by the character Dagmar from the 1945 play "I Remember Mama." [6] My competitors were usually auditioning with comic-book-like monologues from a Broadway hit at the time called "Annie." [7] My greatest aspiration in those years was to play the part of deaf-blind activist and author Helen Keller in "The Miracle Worker" and in particular, I wanted to perform a tantrum that the blind-deaf-mute central character has while resisting efforts by her teacher to help her communicate with the outside world. [8] [9]

Most heartbreaking about the end of my acting career was this: the girl who replaced me in the show that I was removed from was noticed by a talent scout during that production and cast in a touring production of "The Miracle Worker." I believe she went on to play a supporting role in the film production of the musical "Annie" as well... [10]

When I started doing performance art work as an adult, I didn't see any connection between this work and my childhood acting. I was performing at first to aid visitors in interacting with installed works that I was creating, and then realized that this was also a good strategy for getting people to engage with video works rather than just absorbing them passively. Everything performative that I have been doing has been reactive and site- or context-specific. I did not think of making anything explicitly autobiographical until I got the call for works and papers for the panel at ISEA.

Here is how I responded to it:

"Subject: Emotion Studies in a contemporary art debate at ISEA 2011 in Istanbul

Dear Ms. Rauch,

I am an American performance artist who has been looking for many, many years for the perfect setting in which to throw an enormous, incoherent, uninhibited temper tantrum. I am wondering if doing so might make a perfect fifteen-minute position (one not likely to be taken by anyone else!) summary

within your panel discussion – to be followed, obviously, by discussion with other panelists. What I think I could add to such a discussion is a visceral emotional experience in a context that is designated as intellectual (often read as non-emotional) space – for contrast and simple emphasis.

Thanks for considering the notion…"

And here is how Barbara Rauch, the panel's chair, responded to my proposal:

"Dear Heather,

Wow, this sounds like a great idea to shake the panel and the audience. I love the idea that people will be empathetic, annoyed etc. Of course we will have to see who else we get and when the right moment for this intervention would be.

I suggest I will be in touch by the end of the week to update you on the panel. Do you have a short bio and a brief statement that we could use? I will send you the format length and more details by the end of the day on Friday."

This began a series of exchanges between Ms. Rauch and myself about how to do the piece without giving away what I was doing while meeting ISEA's requirements for bios and abstracts etc. Though I believe that the original tantrum that inspired my proposal raises profound questions about technology and addresses issues of mediation in an oblique way, since the performance was to be surprise, I developed a fictional set of ideas that could tie my behavior at the panel to technology more overtly, without being untrue to the themes of the tantrum in the play and its significance in my life.

Here was my description of the connection between the performance and the fiction in a grant application that I submitted in an effort to get support for the development of the piece and travel to Istanbul:

"I am seeking assistance in support of the development of a performance consisting of a fifteen-minute, double-time (in terms of speed) and double-length (in terms of time) solo re-enactment of a scene from William Gibson's mid-20th century play "The Miracle Worker". The famous scene, known as 'the breakfast scene', is the beginning stage of a process of breaking down the blind-deaf-mute central character's disconnection from the world around her via the 'technology' of sign language. This scene was chosen, and is being altered or 'remixed' for the ISEA technology and emotion panel as a visceral means of demonstrating the tension between wanting to connect and the fear of connection – a tension always echoed in our reactions to frustrating interactions with technology. Because the main character in Gibson's play is an isolated teenage girl, the piece is also meant to stand in symbolically as a venting of the frustration that bullied Massachusetts teenager Phoebe Prince – a victim of perpetual peer-harassment since immigrating to the US a year before – committed suicide over rather than express to those who might have protected her."

As the idea evolved, I moved away from trying to mimic the exact gestures from the fight scene in "The Miracle Worker" and began watching children's tantrums as well as autistic 'meltdowns' on YouTube. I worked with vocal and performance coaches in an effort to approximate a tantrum like those on YouTube, without doing harm to my body or vocal cords, in a manner that was somehow more adult than infantile. [11] After months of practice, I came up with something partially improvised and partially

structured, but it took a full fifteen minutes of buildup to get to the peak moments. Here are some of my progress notes from this point in the piece's development:

"Was planning on doing warm up exercises and then trying to choreograph or stage intro possibilities, but instead things devolved pretty quickly into something that could definitely qualify as a genuine tantrum. It was not loud or stormy – feeling too conscious of upsetting the neighbors upstairs so I didn't want to stomp and holler. Instead, it became a kind of sweaty, heavy breathing, rolling around on the ground, squealing, limb shaking kind of thing. There were even a few tears. I don't know what it looked like, but it felt like an adult (rather than a childish) version of tantruming – slower, quieter, but without any kind of reasonableness. Very sad-feeling, but also – maybe because of all of the breathing – very calming or releasing. I'm making a very big effort to keep my face relaxed, but it is hard – muscles for breathing and emotions tense up the face. I don't know if I slipped into it so quickly because I've had an emotionally exhausting last day or so, or because I did something with my body. Didn't feel connected to Miracle Worker or project narrative in any way. Felt more connected to the sights and sounds of my day than to the past..."

And again on a different date:

"Was able to get to the emotional part again pretty quickly this time. Some movement around the room, some rolling on the floor in slow motion, and then I flopped down on my back (getting low and flopping back seems to help) and was easily able to lie there crying and mumbling a bit. But I didn't actually feel sad – just the physical part of sadness somehow. I was saying 'what is wrong with me?' out loud to my-self in a way that felt both like part of a breakdown that someone might be trying to stop and like me saying to myself 'what is wrong with me that I would think I should be doing what I'm doing right now in a public venue full of intelligent people who are working and thinking hard about serious things?' Also, did think a little about Helen Keller and acting back then a bit this time. Trying to remember what I really wanted when I wanted to throw that tantrum... Starting to think about Barbara's question about inter-vention and working some things out with her in advance. I think it might be okay to agree to have her come over to me and try to help if people seem to be getting concerned. I'll just wave her away with 'no!' or 'leave me alone!' or whatever. Also, since I may have trouble keeping track of time, we might want a code for that. Maybe I can ask her to see if she can calm me down by offering me a glass of water when I'm getting close to the time limit or if she feels I need to end things more abruptly. Actually, ac-cepting the water might be a nice natural route out of the situation as well."

Midway through plotting the choreography of the fifteen-minute piece, I heard that the timing of each slot on the panel was being reduced to under ten minutes. I was relieved at first, because less time flail-ing and fussing sounded easier, but in practice it was actually harder to get into things and gain momen-tum. I came up with some mechanisms but they did not feel natural and raised new questions.

"Last night when I was practicing, I could not find any logical way to move from the slides to the mo-tion/emotion. Even with motion, I couldn't find any emotion. I couldn't/can't remember my motivations for wanting to do this, and I couldn't/can't find anything to get worked up about...I timed how long it took me to get from trying to launch the slides to a tantrum that felt like it couldn't go any further and it was about 22 minutes. I am likely to have less than 1/2 that amount of time. How do I speed up and/or force the process? I realize also that I will need to be talking at first. So I am working on that. In last night's version, I tried to talk about a first piece I was going to show and about other curators I was sup-posedly working with and realized I need to make up some fake names etc. I think (if I can feel) I can

break down by trying to talk without working slides, but not if I don't have any content for this pre-pared! ...I may need to watch tantrums again on line, and also to reread my earliest writing about this/Miracle Worker."

A few days before the paper deadline, I had another Skype call with Barbara, the panel's chair. It began with her decision that it was unethical for me to do this piece without informing the panelists com-pletely (and the audience to a lesser degree) about exactly what I was doing. I explained why I thought this would make things much harder for me, and then she suggested that I don't do the performance at all (or maybe only do a sample snippet of it) but instead have a five to seven minute dialogue with her about the development of the idea and how she got nervous about it at the last minute. Her idea was that this discussion would inject emotion into the panel as much as a performance would without mak-ing people feel tricked or criticized in some way.

Here are my notes from after that conversation:

"I feel like crying. I just got off the Skype with Barbara, and it sounds now like she doesn't want me to perform. No, that's not it—she wants me to perform, but not to throw a tantrum. No, that's not it. She wants me to talk in dialogue with her about not performing, and maybe to demonstrate a little bit of what I would have done if I had performed. She is frightened of distressing the other panelists/breaking the panel's trust, and wanted to let them in on what I would be doing as well as to warn the audience. When I expressed my concern about how I was relying on the tension of their expectations of normalcy to create a breakdown in such a short amount of time, and explained how I was no longer planning on flailing/kicking/screaming but just to lose my emotional grip. I tried to talk her out of telling them, but her fear is losing the trust that needs to be built for a successful, open discussion.

I actually am crying! It feels like the disappointment of my childhood all over again. Like being asked to leave the play again right before opening night. Why am I going so far if I'm not going to be performing? I don't think I've ever spent so much time or energy or money on anything or taken as much risk in my life as I have in preparing for this and it was because I felt I was uncovering a path from my past which seemed like it could take me someplace far more interesting than I could have imagined it would back then. Now I have no idea what I am doing. But I do know I have to write a REAL paper for it by Satur-day...

Between now and the last time I wrote, I came up with a little bit of a setup, a prop that made more sense than a slide clicker, a dynamic (trying and failing to speak from memory rather than using slides) for breakdown that felt more naturalistic, and names/some simple dialogue to get started with. Maybe I can still do some of it in reaction to the dialogue with Barbara. I think she doesn't want to take responsi-bility for my behavior, but maybe I can still do whatever I want as long as I am the scapegoat?"

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FROM IMAGE TO IMAGO - FLORA'S & FAUNA'S ARRIVALS AND DEPARTURES

Katerina Karoussos

This paper analyses the conceptual media of late antiquity which have built the entire imaginative sphere of the time and seem to be profound and flexible enough to meet the recent imagery strategies. Antiquity images are comprised of elements that have been chosen for the sake of their significations, as data of mutation not necessarily characterized by their aesthetic values but rather as aggregate spaces which could serve telematic mechanisms.

Fig.1.'La Primavera', Botticelli (1445-1510) Galleria degli Uffizi (Creative Commons license)
http://www.arteyfotografia.com.ar/1397/fotos/9259/

Fig.2. Polygnotan Vase 430 BC. License by Creative Commons.
http://www.flickr.com/photos/peterjr1961/5168147253/sizes/z/in/photostream/

Fig.3. 'Laoccon' Royalty Free Stock Photos http://www.123rf.com/photo_590906_the-statue-of-laocoon-and-his-sons-also-called-the-laocoon-group-is-a-monumental-marble-sculpture-no.html

From Image to Imago - Flora's & Fauna's arrivals and departures

Visual Tendencies

In De pictura (1435), Leon Battista Alberti famously initiated to consider the frame of the painting as an open window. Alberti's single-point perspective has been, for most of the twentieth century, the dominant form of the image. Imagery has been operated as a single image in a single frame. However as Joseph Masheck points out "Alberti's window shares a larger problem of the so-called postmodern culture that deserves to be faced; hence the failure of postmodernism to defend its claims to the culture of the past, resulting in its closure and containment as just another movement".(Masheck, 1991).

The most important thing concerning this failure is the interpretation of things and phenomena according to terms of length, width and high, using Cartesian coordinates with one vanishing point as viewpoint. Consequently, as the development of technology and science required a more extensive vision for interaction and immersion, the concept of image, as it has been established by Renaissance and Enlightenment, has been proved inadequate. Actually, from pre-historical period up to Renaissance there is a completely different approach of visual aspects and even though it was inherited and implemented during 16th to 20th centuries, it was subject to persecution, being regarded as inferior to Modernity's brand new ideas.

However, with this narrow, one perspective, vision it is very difficult to understand the words of Chloris, the Nymph and mythological figure who said, while her lips breathe spring roses:

'I was Chloris who I am now called Flora'.(Ovid, 8th c BC)

Chloris, as a mythological figure presents the uprising of spring thus the celebration of life against the death. Did Ovid wrote a tender poem while Chloris in her description said that she was raped by Zephyrus? She said:

'It was spring, I wandered; Zephyrus saw me, I left. He pursues, I run: he was stronger; and Boreas gave his brother full rights of rape by robbing Erechtheus' house of its prize. But he makes good the rape and I have no complains about my marriage'.(Ovid, 8th c BC)

In Botticelli's "Primavera" one can see the scary face of Chloris as Zephyrus trying to grab her. Even if he extent his arms in a polite way as if he wants to embrace her, his face and his chest assure that he will going to catch her up as she was his victim. From the other side the ghostlike figure of Chloris testifies the impending rape. So Ovid's poem said that a girl was raped and a house was robbed. Is this a manifestation of life? Is Chloris a symbol of revival and joy just because she is surrounding by flora? In the same view, is Duchamp's urinal also corresponding to a source of life because is called fountain? (fig.1) Accordingly, we can say that frescoes in Lascaux caves are a celebration of nature, since they depicting fauna and flora. The evidence suggests that there were not merely decorations but codes of communication with others, humans and spirits. Additionally, those who create Nazca geogliphs in Peru they were thinking of just a decoration that is visible from the sky? Undoubtedly the purpose of these designs related to astronomy and cosmology but with a perspective which is different from our common spatiotemporal interpretations.

Aggregate space

Images – which includes fauna and flora and by fauna I include the human genre - comprised of elements that have been chosen for the sake of their significations, as codes of something not necessarily implied of their effect as works of art, or arrangements of forms and colors. They devised from different aspects than that which is termed aesthetic.

In his Treachery of Images, Rene Magritte was more accurate from Botticelli's Primavera. He said: "This is not a pipe". This is something absolutely true. It is not a pipe; it is an image of a pipe. It does not "satisfy emotionally" - when Magritte once was asked about this image, he replied that "of course it was not a pipe, just try to fill it with tobacco" (Spitz, 1994). Indeed, this pipe which is not a pipe has been traversed from its physical status to the sphere of a form or a figure. In a quick historical review one can meet the elements of an image as codes of signification.

As a matter of fact Hegel and Derrida referred to Natural Religious Consciousness thus the first stirrings of religiosity within the minds which saw Nature as God, or as a series of gods. There are today many religions which still insist upon a minimum reverence to certain animals and/or elements in their rites. He spoke about flower religion as a neutral state of unification. And this is what these images depict.

'The state, in which spirit sees itself outside, apprehends itself as its own proper object in a natural and immediate figure. The spirit looses itself and finds itself again in these external natural objects.' (Derrida, 1990)

From the standpoint of this concept all things known to us—men, plants, animals, planets—are unstable, and they differ by the magnitude of their fluxions. But the thing, changing continuously in time, sometimes very much, and quickly, as in the case of a living body for example, still remains one and the same. The body of a man in youth, and the body of a man in senility, these are one and the same, though we know that in the old body there is not one atom left that was in the young one.

The image of invisible in antiquity was succeeded throughout noetic rather than esthetic perceptions. The image space was an aggregate one, not following a systematic order; this of a coordinate system. The aggregate space that Panofsky points out is this stage that all elements (figures, landscapes, motifs, etc) are in juxtaposition as consecutive signs.

One can meet this kind of space in archaic reliefs such as the horsemen of Parthenon. In this frieze there are sixty riders arranged in ten ranks. Each rank is marked by a figure placed nearest the observer and not overlapped by another. It is important to mention that the original word translated in English as

"frieze" is "zoforos" meaning something that brings and/or carries life. Thus, it is about energy and flow. This of course refers to the entire image and not a piece of it. You cannot extract an object as a central issue because aggregate space requires an overall visual syntax, as a signifying composition on several levels. This is something similar to emergence as a spontaneous organization in which every element involving into it maintains its object orientation while it is a part of a unit.

Parthenon frieze was a very good field research for Aristotle who in his "Metaphysics" claimed that the whole is more than the sum of its parts. This concept formed the idea of Holism (from ὅλος holos, a Greek word meaning all, whole, entire, total) meaning that all the properties of a given system (physical, biological, chemical, social, economic, mental, linguistic, etc.) cannot be determined or explained by its component parts alone. Instead, the system as a whole determines in an important way how the parts behave.

In his book "Perspective as Symbolic Form" Panofsky said that:

'...the art of classical antiquity the objects were not merged in painterly fashion into spatial unity, but rather were affixed to each other in a kind of tectonic or plastic cluster …space was still perceived not as something that could embrace and dissolve the opposition between bodies and nonbodies, but only as that which remains, so to speak between the bodies. Bodies and the gaps between them were only differentiations or modifications of a continuum of a higher order. The represented space remains an aggregate space; it never becomes that which modernity demands and realizes a systematic space.' (Panofksy 1997)

The idea of this space is similar to the concept of a "stage"; or better to both its concepts, thus both of noetic layers in phases and of the stage as an area of performing. It is what Panofksy called: the lateral staggering; thus the disposal of all elements and their energy in a single unity no matter their position in time and space. Dickson's film with Sioux natives produced in Edison's Black Maria Studio , shows an organic movement of objects grouped together to suggest a unity of a single body. The idea goes back to ancient Greek drama and the chorus. The Greek chorus (or chorea) is a group of performers which are acting in one piece. The group comprised of twelve or fifteen members in tragedies and twenty-four members in comedies. They operate as intermediates in unison, in specific key frames into the play that considered of high importance.

The very same structure was used in visual arts. An important example is the Polygnotan vases. (fig.2). Here we can see the horses in a real time staggering;

'… all the body of the horse is presented in a single image, the rear elevation is placed alongside the front elevation, just as when entire figures are staggered.' (Panofsky 1997).

And in this united stage objects and figures operate in the same exact matter. Having a better look at those horses and bringing back in mind the Parthenon Frieze, one can indicate a kind of time- sequence and a notion of motion which is embodied in them as there is an inner principle that animated them.

In his contemplation on the Laocoon, Goethe states:

'To seize well attention of the Laocoon, let us place ourselves before the groupe with our eyes shut, and the necessary distance; let us open and shut them alternately and we shall see all the marble in motion; we shall be afraid to find the groupe changed when we open our eyes again'. This flicker effect that Goethe suggests is actually the mechanism of all the above images. Even if an image is one instant frame or a multiple of frames, they both comprised a mutable unity.   But is this a time sequence animation? It is more about a trace or a path rather than a structure of linear time sequence. This is something that can be easily understood through the stereoscopic analysis of movement by Etienne – Jules Marey.

'Marey though it necessary to reconstruct movement by making its physical wrapping abstract, based on a combination of visual formulas that do not preppose figurability, but on the contrary condition it.' (Micheaud, 2004)

Furthermore one can meet the whole concept in Duchamp's "The Nude Descending a staircase" (1912). Duchamp chose to depict the motion of his nude in a single frame in order to posed the idea that time can be frieze for the sake of an augmented image. Therefore if the stage is one and only –as the single horizontal line of Polygnotan vase- and the objects into it are all in one unfolded, there is no need of change or movement. In this energetic space the venture is that of the appearance and disappearance of scene's elements, just like the flicker effect of Goethe's description for Laoccon's statue; hence the effort to demonstrate its exclusion of physical appearance and its modification to an abstract form. So we can say that Flora who was once Chloris had traversed herself throughout her modification, rather than changed herself. What we see in the stage is her path, her trace and not her portrait.
The path, which is many time unsuccessfully interpret as serial movement, reflects the three stages that Hegel and Derrida raise in order to construct a unification.

'The concept of religion fills itself up, determines itself in opposing itself to itself, then reconciles itself with itself; in three moments that fulfill the absolute spirit. In the first moment, absolute spirit finds its existence in religion, but in a religion whose concept yet remains empty indeterminate. The second moment is that of natural religion which the spirit looses itself and finds itself again in these external natural objects.' (Derrida, 1990)

Media Res

The flower is neither an object nor a subject, neither a not I not an I, among all these opposites, the essence of the flower appears in its disappearance as a neutral stage. This absolute time of modification is depicted in all the above images and it is similar to the archaic concept of "in media-res".
 In media res or media in res means to be into the middle of things is a Latin phrase concerning a narrative technique in which the story begins most of the times in the mid-point in where there is the most critical point of the narrative. In the house of Dioscouri at Pompeii there were two significant frescoes that one can see them now at the National Museum in Naples. The first one depicts Laocoon and the second one portrays Media. (fig.3) .We know from the narratives that both characters were in a very bad position the very moment of their depiction. Laoccon is dying from the snake's bite and Media is going to kill her children after a second. Each image has capture a moment in media res in which all phenomena whose nature is suddenly to break out, disappear and appear again in another mental stage, presented as unified in an unconditional and unchanging duration. Media stands to the right of the composition, frozen forever rather too "posed" to be natural. Their condition reflects the theory of flower religion which is followed by that of sun religion. The latest concerns the stage in which "the sun does not set, or it sets immediately", like Goethe's flicker effect. Hegel placed this procedure in natural religion in where the sun is not yet a subject. 'In order to become a subject in effect' he said that 'the sun must go down.'' But Zarathustra, Laocoon, Media, Chloris and all the other elements that had been mentioned before, stand beyond the route that Derrida called: from orient to occident with its double meaning, that is they are in a media res stage in where orient and occident is included, birth and death, east and west, male and female and all other opposite doubles, with no reference in vector magnitude in their spatiotemporal circumstances. One can assign meaning to Chloris' words: 'I was Chloris who I am now called Flora' by replacing the concept of image with the concept of imago.

Conclusion

In biology, the imago is the last stage of development of an insect, after the last ecdysis of an incomplete metamorphosis, or after emergence from the pupa where the metamorphosis is complete. As this is the only stage during which the insect is sexually mature and, if it is a winged species, has functional wings. In conclusion, in a neutral time all elements in an image reached their pick, performing in a gestalt effect while their depiction is of their absence rather than that of their re-presentation. What is to be shown, is the traces of their appearance and disappearance throughout an organic process of their unified mutation.

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RE-MAPPING THE CITY IN THE DIGITAL AGE

Eva Kekou

The way we live and feel about the city is beginning to be affected by its information layer. Locative and mobile media can be regarded as an interface between the digital domain and the physical city. I investigate through media art case-studies the questions: How do people deal with this relationship between digital technologies and the city? How are cultural identities expressed through these projects?

Introduction

The way we live and feel about the city is beginning to be profoundly affected by its information layer. Today's cities are no longer limited to the experience of physical spaces. Cities are now characterised as 'Cybercities', 'Sentient or Hybrid Cities'. The digitization of the city, with technologies embedded into its streets and buildings and carried by people, has appended an informational membrane, which hovers over the urban fabric" [1].

We are seeing a change to the city where understanding its new behaviours and its interfaces is becoming as important as understanding its physical geography. The city's connectivity and networks now comprise the interaction between its wireless infrastructure, mobile phones, social software and embedded systems. Locative and mobile media can be regarded as an interface between the evanescent digital domain and the physical city, sending data from real world experiences back into the digital domain.

New communication technology and space

Social life in the 21st century is increasingly lived in media cities. During the last thirty years, the evolution of technology has added a new layer to the urban environment, challenging classical theories of urbanism and adapting it to the current ideas of the media. We can regard the contemporary city as a media-architecture complex, which has resulted from the proliferation of spatialised media platforms. While this process has existed at least since the development of technological images (in the context of urban modernization in the mid-19th century), its full implications are only coming to the fore with the expansion of digital networks. The term 'media city' is "designed to foreground the role of media technologies in the dynamic production of contemporary urban space in Lefebvre's sense of binding affect and cognition to space" [2].

The way we experience cities is shaped by the immaterial city of word, image and myth. It is through these that we learn not only to perceive cities, but also how to live in them. Today we speak of cyberspace and cybercity, which is more than a single integrated and ubiquitous entity revolving around the Internet. New technologies have revolutionized the way we communicate, interact, transport information and finally the ways in which we express ourselves. New technologies and new communication tools have the capacity to create new space for people to meet, interact and exchange ideas in what Habermas calls a "public sphere" [3]. Wireless communication technologies have also created new circumstances for 'locus' and 'time' and laid the groundwork for virtual time and place.

Urban life and society are related and narrated as artefacts, social problems, critical discourses in every era are reflected in society's artistic expressions. Such expressions reflect the way people live and are able to speak out, not only about themselves as individuals, but as a collective, through a number of public art and interactive media art projects. The new communication technologies have revolutionized the way people interact with each other and how information is transported. This is a result of a long process produced by innovation in telecommunication processes and other information technologies. The growing use of telecommunication systems is not only having far more influence on where people work and live, but is changing the character of activities that take place in the home, workplace and transportation. The diffusion of information technologies increases the complexity of cities by increasing both the number and type of interactions between individuals, firms, technical systems, and the external environment [4].

Most observers believe that technology will eliminate the need for cities as centres for interaction. The leading media guru, Negroponte has stated that the post-information age will remove the limitations of geography [5]. Digital living will reduce dependence on being in a specific place at a specific time, and the transmission of place itself will start to become possible [6]. While telecommunications technologies are certainly space-adjusting phenomena, the emergence of the internet, the growth of mobile telephony, and the diffusion of new information technologies are doing far more than rearranging the spatial pattern of activities in cities and metropolitan regions. New telecommunications systems redefine the fundamental elements of modern urban societies.

New technologies that are introduced every few months, reflect society's tendency towards globalisation. Services like Google Earth, Geographical Positioning Systems (GPS) and user friendly internet based Geographical Information Systems are widely used, making the most out of the wireless and mobile networks that exist in the cities. These are all ways of recording and imprinting our perception of space. The word geography has Greek roots. It comes from *gaia*: earth and *grafo*: write. These meanings have changed, together with our definition of geography. The term 'mapping' has changed with the notion of geography and the advances of technology. The geographical expression is entwined with its digitalized character.

Architecture and mapping are not only what is built. They are made of different aspects: material and immaterial. Architect Benedikt [7] saw cyberspace as the realization of ancient dreams of overcoming the impediments of matter. The design of cyberspace is the design of another life-world, a parallel universe, offering the intoxicating prospect of fulfilling - within a technology very recently achieved - a dream thousands of years old: the dream of transcending the physical world [8]. Novak shared a similar dream, arguing that the source of fascination with cyberspace is the promise of control over the world by the power of the will. In other words, it is the "ancient dream of magic, which finally nears awakening into some kind of reality" [9]. For Novak the sublime magic of cyberspace was characterized not so much by a loss of the body, but by an embodiment of the mind. But the body would be transfigured; not only without organs, but seemingly without limits. The rise of cybernetics coincided with a fundamental shift in urban thinking.

As Kittler points out, "the invisible city, with which Mumford concludes his world history as the history of the city, consists of more than mere information technologies operating seamlessly and at the speed of the light" [10]. New technologies, the hybrid conditions between virtual and physical, and electronics embedded into physical environments have also been considered as "non-material elements of architecture" [11]. The debate now is about how architects should respond and design within the contemporary

world, where space is constituted equally by conventional, material means, wireless networks and gadgets of new-technology. Taking further the notion of compression of space and time as introduced by Harvey, we speak of compression of work capabilities by the notion of cloud computing, which allows access to one's work from multiple geographical locations [12].

Aims and objectives

For the purposes of this paper, I have chosen projects to highlight digital mapping as developed through new communication technologies.

1. Athens by Sound

In order to highlight the idea of mapping the city in a multi-media digital era, I will use the project Athens by Sound [13], which was the National Participation of Greece in the 2008 Venice Biennale of Architecture. The project focused on mapping the city of Athens through the sounds everyday life created within it. The sounds we hear – but hardly ever listen to – can present the world around us as clearly as our vision. That is how people with visual disabilities understand and navigate normally in the city. We are just used to regarding vision as the dominant sense. The team of Greek architects responsible for the *Athens by Sound* project tried to focus on the aural impressions the city leaves on the visitor, by recording its sounds and presenting them to the visitors of the Greek Pavilion. They designed the dimly-lit space of the pavilion like a forest of hanging headphones, which transmitted the sounds of Athens. As the visitor walked randomly amongst them, he could put on whichever headphone he liked, without knowing in advance what he might hear. What he actually heard was a sonic fragment of the city, revealing aspects of its identity and atmosphere. The whole space of the installation in the pavilion was treated like an interactive sonic map of Athens; a map that allowed visitors to explore qualities and fragments of the city step-by–step, instead of offering the usual all-encompassing overview offered by the traditional way of mapping. The map attempted to capture the sense of the unexpected and the surprising of the actual city and incorporate it in the installation as part of the navigation process.

How do people deal with this emerging relationship between digital technologies and the city?

Omonia square, a focal point of the physical formation of Athens, was placed in the centre of a 10x10 grid, drawn up for the mapping process, that was stretched across the whole city until it touched upon its limits that were dictated by the natural environment (the sea and the hills that surround the city). It was a way of defining one hundred urban spots, whose geographical coordinates were then imported to a GPS system and assigned spatial and temporal coordinates, from east to west. The spatial distances were one and a half kilometres between the spots and were transcribed to one and a half hours on a scale of time. Each horizontal line of the grid was scanned and recorded from east to west within one day. When these recordings were presented in the installation, the visitor was able to trace the city, following random routes. Fifty sounds were chosen for the headphones of the exhibition and other sounds were transcribed and written in words on the corresponding spot on the floor. The visitor was expected to read them on the ground and reproduce them mentally. As in the actual city, movements, events and the complexities of the human presence were elements that constituted significant spatial qualities within the built environment, abstractly represented as the labyrinth of cables and screens. These kinds of functions and movements are what ultimately constitutes urban space. In the attempt to negotiate the non-representable presences of the urban space in a map, the installation was forming an urban space, as Lefebvre would probably argue.

The space was designed to be interactive:, with the presence and movement of the visitor activating the sounds and images in the installation. The installation included also twenty-five scattered prisms with video-screens that were activated by human presence. When the visitor got close to one of the screens, it automatically turned on and played video and sound. The videos were shot and directed in a way that referred to regions of Athens through sound, without aiming at a visual representation of its distinct architectural or physical characteristics. The random activation of videos and sounds within the interactive environment of the pavilion space produced in turn multiple sonic qualities, intensities, layerings and densities, creating the identity of this unique space and its dynamic relationship with the people. The visitor, like the inhabitant of the city, was responsible for the sonic environment constituted by his own actions and trajectories within the installation space. "The sonic environment of Athens is ultimately the outcome of a certain urban culture, the carrier of which is the visitor himself, each one of us, out there" was stressed by the team [14].

The investigation of *Athens by Sound* attempted to deal with the broader issue of space beyond the material in various way: in reference to the sensuous and senses beyond the visual; in reference to new technologies as parts of our everyday urban environment and as representational tools that open up previously unforeseen possibilities for mapping; in reference to human interaction within a space; and in reference to the non-representable aspects of urban space. Within our own relationships with the sounds of the city we inhabit, we can focus on our immediate perceptions of our sonic environment; we can isolate ourselves in our own sound tracks through headphones; we can have the sonic experience of what is here and also of what is there. We can consciously turn down the intensity of the sound of the environment and focus on our own inner thoughts, or on something that is spatially displaced. The unique perspective of *Athens by Sound* presents the city as a fragmented constructed space, a hybrid of electronically mediated and real spaces.

2. Coffee deposits: topologies of chance

Coffee reading is an old art of fortune telling which takes on a new twist today with the ingenious use of digital technology, as it is expressed in Bastajian's "coffee deposits, topologies of chance" project, available for view on DVD [15]. The team created small mobile coffee reading places where people could visit and have their fortunes read off of a cup of coffee. Fortune telling, however, propagates various impressions among people, some of them quite negative, leading to an unofficial notion that it is either sinful or illicit. The locations of the mobile coffee reading places followed a predesignated route and used GPS coordinates so that they might be easily attended. The result of this project was a map of the coffee reading locations that can be detected by the network community and a digital documentation of coffee readings accompanied by the people's stories. "Currently Bastajian and Manavoglu are developing locative «post-scripts» via QR codes, geocaching and AR tactics that expand the archive of Topologies of chance into public space" [16].

The old and superstitious art of fortune telling that evokes and is itself a sort of storytelling translates the space where it is performed into a mixture of emotional, ludic and topological locus. The presentation of the project through the use of an interactive DVD disk only enhances it as a documentary, proving that a combination of narrations can be viewed in various sequences for a different experience each time. In other ways a cinematic arises with interactions and new narrations according to the choices of the viewers. A game of uncovering secrets and documenting emotions that in the end ascertains the atmosphere of the space, "coffee deposits, topologies of chance" is a mapping method of human mentality in all its spectrum, employing traditional, mystical and esoteric practices which all imply a new type of cultural identity bound to traditional elements framed in a globalised digital culture [17].

3. Urban Digital Narratives [18]

This was a locative mobile artwork in street locations in central Athens created in the spring of 2011. The locative project was part of a workshop conducted by Rieser and Kekou in an inner city street where personal stories were constructed and developed by volunteers using *Empedia* [19] software to form trails triggered by GPS or QR codes. Video scenes or vignettes, based on documentary experiences of place and the communities in central Athens, were fleetingly revealed at different positions in the chosen streets by the scanning of QR codes. The video stories for display on mobile phones in the actual streets were created in a public engagement workshop in the city.

How are cultural identities expressed through these projects?

Digital Urban Narratives sought to address the powerless and the disempowered and attempted to map their stories, problems and trajectories onto the urban space of inner Athens using simple QR and GPS technologies, to give the widest readership for those with either smartphones or middle-range mobiles. The chosen area of Gazi-Keramikos was a very mixed inner city area, where gentrification had created a pleasure zone of clubs and cafes surrounded by established artisan communities and migrant communities to the North. These disparate elements faced multiple problems, above all a sense of powerlessness in the face of the ill-formed status for recent migrants and of displacement by rising property prices and rents in the south of the area, together with an influx of noisy and youthful revellers with hedonistic values into conservative working neighbourhoods. "After the Olympic games and given the absence of a program or plan to answer the pressing issues of a Mediterranean metropolis in transformation, the centre was almost abandoned to its fate. As a result, for many years, the city has resembled a ship tossed helplessly on stormy seas. As central Athens grew in the characteristic manner of a disordered Mediterranean city, the market forces privileged the creation of entertainment zones and we saw phenomena of arbitrary and ruthless commercialization by unrestrained private developers, instead of the creation of well-planned residential areas for the middle classes. The displacement of local inhabitants appeared as a clear trend, but in the long run it did not prove particularly advantageous for the upper middle class and their aspirations; instead, it created profits for short-term speculators and especially, the owners of nightspots and black economy enterprises" [20].

Multiple and complex narratives were recorded in audio-visual forms from all the disparate social groups. "Above all, immigration has played a determining role in the transformation of the city centre. Initially, internal migrants arrived looking for shelter and set up their coffee shops, groceries and associations. They gathered in and around Omonoia Square, met their kin and with other members of their social group to subsequently disperse around the city. After 1990, there are new arrivals. These are displaced urban nomads who had been moving around in emergency conditions. They start arriving from different locations. Due to its geography, the city of Athens was to become one of the main entrances of migrants directed towards Europe. Again we see the creation of gathering places, coffee shops and groceries, restaurants, Internet points and phone call centres. There is still no official reception policy for immigrants and asylum seekers. All they are faced with is a system of brutal arbitrariness" [20].

It is not surprising that Athens has become the focus of resistance to the imposition of draconian neoliberal disciplines on its economy and that it remains the flashpoint for any future European economic crisis and the space where the contradictions of the market and its effects on the contemporary city appear in their acutest form. The uses of digital technology can highlight, augment and interpret these contradictions, giving voice to the dispossessed but their solution remains a political one. Urban digital

narrative has been an artistic project which was not meant to be but has been developed to be a political one, although artist ,curator and participants all got apolitically involved.

Conclusion

New media have the potential to express personal ideas and emotions about the city and map them onto the spaces that inspired them for further public consumption. They can simultaneously remap the city and give another dimension of understanding to it. New technologies can make users/participants both interact with the piece and express ideas in a collaborative, authorial role. The form of these interactions need not be formalised. They can be mapped in a loose and humorous way, which connects cities in a globalised frame and environment by a human critique which prioritizes the personal and the different over the detached and homogenising forces of globalization, hence reshaping our notions of citizenship.

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DELAY AND NON-MATERIALITY IN TELECOMMUNICATION ART

RAIVO KELOMEES

My interest in delay concerns its ability to be part of the concept, when delay between sequences of creation, elements of time-based artwork, exposition and reaction or feedback becomes an integral part of the interaction with the artwork and inseparable from it.
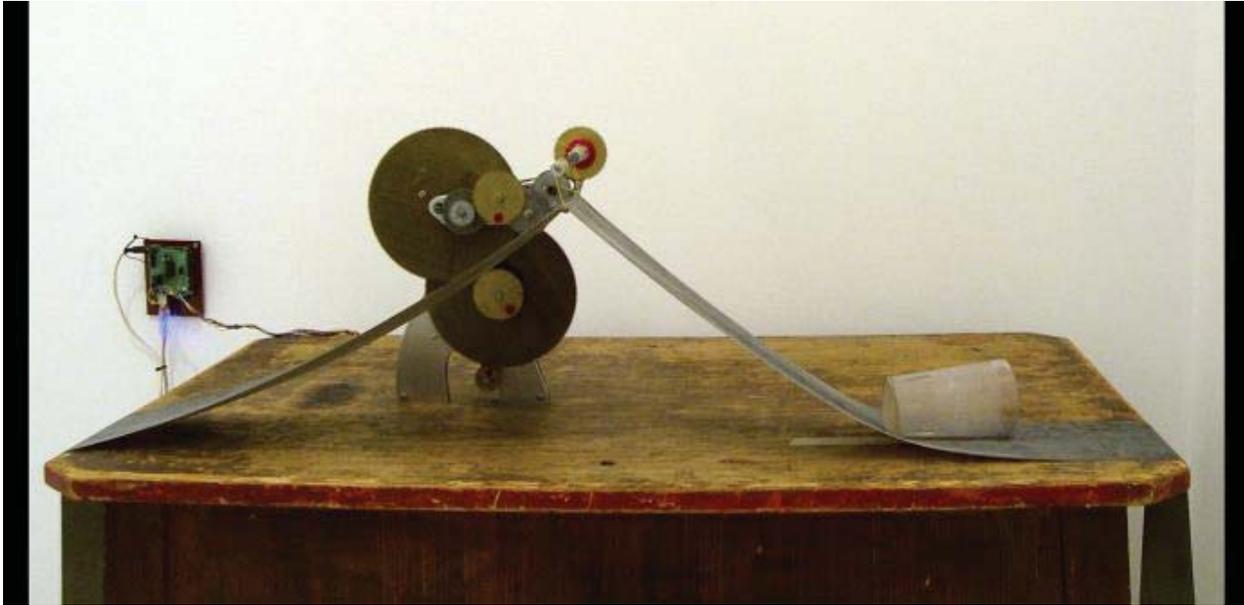
Nothing Happens, 2006, Nurit Bar-Shai, internet project, http://nuritbarshai.com/nh/nh.php

1. INTRODUCTION

We can describe art as an asynchronous delivering of messages over physical or time distance. It maintains presence from the past and from far away, distant presence. Masters have been making artworks which are perceived by audience hundreds and thousands years later. It could be, that the sender of the artistic message has not been in existence for millennia (like authors of cave paintings). In this case, interaction between sender and recipient is not possible, but still, the act of delivery exists as there is a receiver.

We could create an imaginary axis of reception divisions, based on delay, where there are works of art on one side, whose 'transmission' to the receiver has lasted for millennia; and artworks sent and received in real time on the other side. Although this kind of formulation points to the vocabulary of information theory and though this viewpoint has been considered, art in this presentation has not been dealt with in this way.

Delays between performative acts and non-materiality in participative works are substantial attributes in new media art, but there are many examples in earlier art practice and art of the 20th century, which belong to the rich history of non-material art.

My interest in delay concerns its ability to be part of the concept, when delay between sequences of

creation, elements of time-based artwork, exposition and reaction or feedback becomes an integral part of the interaction with the artwork and inseparable from it. Naturally, we can distinguish other episodes of delay, like one which is happening between creative intention of the artist and creative execution of the artwork.

2. FROM PAINTING BY TELEPHONE TO INTERNET ART

László Moholy-Nagy's "Telephone Paintings" were made in 1922 and were almost the first examples of early telecommunication art. Evidently, as historians write, he got his ideas from „Dada-Almanac", which was edited by Richard Huelsenbeck in Berlin in 1920. Huelsenbeck presented the provocative notion that images could be ordered by telephone. It inspired László Moholy-Nagy, who lived in Berlin. [1] László Moholy-Nagy wrote:

In 1922, I ordered by telephone 5 paintings in porcelain enamel from a sign factory. I had the factory's colour chart before me and I sketched my paintings on graph paper. At the other end of the telephone, the factory supervisor had the same kind of paper, divided into squares. He took down the dictated shapes in the correct position. (It was like playing chess by correspondence.) . Thus, these pictures did not have the virtue of the "individual touch," but my action was directed exactly against this overemphasis. I often hear criticism that because of this need of the individual touch, my pictures are "intellectual". [2]

We can say that in 1922 the first attempt was made to create and deliver a computer graphic picture over distance. The author was „removed" from physical result of his work.

If we think more deeply about the process of creation of Moholy-Nagy, then there are different steps, activity and delay sequences: delay between when artist is telling which square to colour and the factual colouring of it in the sign factory. Then, after the information has been delivered, an enamel painting was produced. There is a second delay between the second and third activity. After the physical paintings were sent to author, there is a third delay, or feedback which shows how the message was understood. Then, paintings are exhibited, the visitor/audience sees them, visual information is transferred directly to the viewer. The time between presentation and reception is the fourth activity sequence and delay.

We can describe this Moholy-Nagy´s order of telephone painting in the terminology of an information model: sender, message, transmission, noise, channel, reception, receiver and feedback. Moholy-Nagy, the artist, is the information source and sender of information, in between there is noise - which is irrelevant, as we see - information was received by the supervisor correctly.

According to traditional understanding, delay in aesthetical communication could be defined as time which lies between completing the artwork by the artist and the perception of it by the viewer.

What I want to discuss is the disappearance or shortening of the delay between when the creator has finished the artwork and when viewer perceives it; and the situation where (by means of interactivity), the act of creation and the act of perception belong to the performative telecommunication artwork. Another interesting aspect is the inter-relation and exchange between creation and perception, so that perception and action, where it leads, becomes input for the next act of creation. There is a situation,

where presentation of an art object becomes a performance between the artwork and the user; it becomes time-based art were both the artist and the creator and receiver are taking part and where feedback from the receiver becomes input for artist, for the next stage of his creative activity.

Also, I would like to show that the delay between action and perception, or different sequences of activity, could be an essential building element - it could belong to a functional part of the artwork.

We can mention the delay which lies between instruction given by the artist and the execution performed by the same artist or somebody else, similarly with programming code which is written by the artist and will be executed by the computer or user.

3. PRE-DIGITAL ART EXPERIMENTS

I would like to characterize the fact that delay has been point of interest in earlier electronic artworks, bringing two examples: Richard Serra "Boomerang" (1974) and Dan Graham´s "Time Delay Room" (1974). Works were done in same year and period, when experimental activity of artists´ was internationally at the highest point.

To describe Richard Serra´s work, I'll quote Rosalind Krauss sufficient description and interpretation, where she analyses artists' position inside the artwork, which is essential in video-performances built on feedback.

...a tape made by Richard Serra, with the help of Nancy Holt, who made herself its willing and eloquent subject. The tape is called "Boomerang" (1974), and its situation is a recording studio in which Holt sits in a tightly framed close-up wearing a technician's headset. As Holt begins to talk her words are fed back to her through the earphones she wears. Because the apparatus is attached to a recording instrument, there is a slight delay (of less than a second) between her actual locution and the audio-feedback to which she is forced to listen. For the ten minutes of the tape, Holt describes her situation. She speaks of the way the feedback interferes with her normal thought process and of the confusion caused by the lack of synchronism between her speech and what she hears of it. /.../
As we hear Holt speak and listen to that delayed voice echoing in her ears, we are witness to an extraordinary image of distraction. Because the audio delay keeps hypostatizing her words, she has great difficulty coinciding with herself as a subject.
 /.../
The prison Holt both describes and enacts, from which there is no escape, could be called the prison of a collapsed present, that is, a present time which is completely severed from a sense of its own past. [3]

Nancy Holt finds herself in the "prison of a collapsed present" and such "self-encapsulation" is visible in other video artists works, for which Krauss brings projects by Vito Acconci as examples. In this context this example shows the essential importance of delay, it belongs to the form and concept of the work. Delay between spoken and heard text deeply penetrates the perception mechanism of the speaker. The speaker is distracted to such extent that she is not able to form sentences. Additionally we can speak about a metaphorical level of being in the "prison of a collapsed present".

The delay in Dan Graham work "Time Delay Room" belongs to the same sense. Visitor enters the room, where on one monitor he sees himself with 8 seconds delay, on the other screen view to the other room

with same situation. Here the visitor will experience an uncanny situation where he sees himself as almost real-time feedback image and recorded image in the same one image.
Seeing himself as a delayed and mirrored image evokes intention to "freeze", allowing image to "follow" the object, and intends to identify himself with the mirrored image through movement and action.

A game with the delay is visible in the Graham´s work "Yesterday/Today" (1975). Viewers in one room see a transmission from the other room but the sound recording has been made day before. As a result we see accidental overlap and divergement between image and sound. This two examples show us importance of delay and accident in the artwork. As a result there is constantly changing artwork, which challenges the viewer.

4. MULTI NODAL ART

There is historical internet artwork - Refresh project (1996), [4] by a group of artists and referred to as "Refresh - Art Project: Multi nodal net art", more than 20 WWW pages located in many servers of Europe and the US were linked together in a loop through which the visitor would be „thrown" automatically after 10 seconds to another page. The project used a "refresh" meta-tag, a command within HTML. The command tells browser software of the PC of the user to automatically go to a particular page after a certain time. Refresh chain-pages take the user through all pages all over again. A refresh delay of 10 seconds is an integral part of the project.

Meta-tag looks like this:
<META HTTP-EQUIV="Refresh" CONTENT="10;URL=http://www.priss.org/fresh.shtml">

It brings user to the web site http://www.priss.org/fresh.shtml. But it could be any other site also, there where twenty of them.
Andreas Broeckmann wrote:

   ... the Refresh loop was designed to employ the interconnectivity of the computers and the software infrastructure to create one project that was simultaneously happening at more than twenty different locations, a genuinely distributed artwork whose experiential effect both depended on and transgressed the physical distance between the participants. [5]

Another example is "FragMental Storm 02" by Exonemo (2002).

"FragMental Storm 02 (FMS02)" is a type of web browser. It uses keywords to search the Internet and displays corresponding data onto the screen. In conventional web browsers the graphics and text shown on the screen are positioned in accordance with instructions included in the mark-up language HTML. In contrast, FMS frees text and graphics from their HTML, scattering them randomly over the screen. [6]

Before its use it should be downloaded to a local computer.
This work is constantly in redesign and regeneration. The result is changing, evolving and we can speak about another kind of delay, or waiting until the artwork complete (if the user ends it) or does not complete. It is endless - it is not repeating itself in detail, but still we can say that it becomes comparable, as it starts to look similar if we don´t intervene by clicking and refreshing it. It reminds us rather time based art, looping video installation and it has been exhibited as installation as well.

We can say that the delay here is rather traditional, not like in the Refresh-project, were it was an integral part of the artwork. Here the viewer or user is "requesting" visual composition. After that programmed code retrieves visuals and text from the Internet in real time and mixes them, it plays with them "creatively". The viewer in fact is "ordering" the artworks next phase and it is "performed" and "delivered" to him. Everything is based on functional software designed by the artist.

We can describe all artworks which are defined as "participative" or "interactive" in the same sense. Artwork changes or presents its variations after user input, it gives feedback, and it talks back. Dependant on the complexity of the software or hardware it could happen more or less interestingly. A dialogue is taking place between the artwork and the user.

5. DIALOGUE AND DELAY

For describing the specific quality of telecommunication art, Eduardo Kac has used the terms "dialogism" and "dialogical art". Kac [7] wrote that "there is a clear difference between dialogical art and interactive art (all dialogical works are interactive, not all "interactive" works are dialogical)". Also, he wrote: "dialogical aesthetics is intersubjective and stands in stark contrast with monological art, which is largely based on the concept of individual expression." [8]

Kac writes that the roots of contemporary dialogical art experiences can be traced back to this arc of experimentation ... —from modern avant-garde collaborations and interactive propositions to the dematerialized and participatory events of the sixties and seventies. [9]

Telepresence art offers dialogical alternatives to the monological system of art and converts telecommunications links into a physical bridge connecting remote spaces. [10]

After Kac reason for appearance of dialogical art is „... increased dissatisfaction with concepts of art centred on the individual and on romantic heroic myths..."

Shortly we can describe dialogical art as art which produces new content during interaction with it and that the artworks' physicality or visual, audible or other content is changing. The artwork is not the same in beginning as it is in the end.

I'll bring for example a work by Nurit Bar-Shai, an online performance in three acts - "Nothing Happens" (2006). [11] The author describes it as interactive telematic mixed media live streaming installation with custom made software:

Nothing Happens, is a networked online performance in which viewers work together to make a series of objects tip over. The performance consists of three acts, which are centered around staged environments - a high shelf, a cluttered tabletop and an empty floor. Each scene contains a central protagonist, respectively: a cardboard box, a glass full of water and a wooden chair. In all three acts, web-enabled physical devices, controlled by viewer's clicks, make these objects tip over. When this happens, the performance is over. [12]

The website allows physically distant observers a chance to participate. In one direction, the site displays live images in real time of the current as it unfolds. In the other direction, users are able to click a simple interface in order to manipulate the scene.

The key aim of interactivity in this performance, as the artist writes, is to create an immediate and understandable form of interaction, so that each click of a user is rightfully perceived as developing the scene further. [13]

In this work we see paradoxically real materiality elements which are part of the telecommunication artwork. The user and participant operate in a real time factual distant reality, like an operator is manipulates with hands of robots in space. The internet performance of things is linear, it has beginning and end. The result is predictable, but different in its speed. Naturally, real-time transmission or bandwidth influences the execution speed of the clicks and the speed of refreshed images on a website where we see tipping objects.

This discontinuity of internet performance, that it could be defined as an act-and-wait strategy, is similar with other interactive artworks where the user acts and waits for feedback. Here we see that the delay between images, which is defined by the transmission speed of the network, defines the activity of user. The slowness and predictability of the performance gives the user an opportunity to follow the process, it really fits with internet speed. We can expect a possible rupture of communication if the speed changes, if it gets faster and the view on the installation is not refreshed with sufficient speed. The user cannot follow the performance. Not this one, probably, as it is predictable, but some other event of remote controlling.

In case the user meets a non-predictable installation, each act of the user is defined by changes of the artwork. The same is happening in real dialogical situations in human communication, where questions and answers could be random, even the topic could change and new content could possibly emerge.

6. CONCLUSION

The speed of data transmission defines the delay between acts of communication (which could be an act of creation and an act of reception) as much as processor speed defines the execution of algorithms in a computer which allow selecting more complex tasks to realize. It means that images with higher resolution could be rendered or videos with higher frame rate could be edited. Higher speed of transmission and short delay in real-time communication gives the possibility to follow much quicker movement of a distant object and to see a much higher resolution of images.

Importance of delay in interactive and telecommunication art:
– Delay in traditional communication sequence, between creator, artist and receiver/user/viewer is becoming shorter and we see even disappearance of delay in this communication act.
– Viewers meeting/encountering visual art, interactive art and telecommunicative art is time-based performance, which could be divided into reception and feedback sequences, where delay plays important part. Length of delay influence content of artwork.
– Delay between different elements/sequences of time-based telecommunication art is integral part of the work, like pause is integral part of the musical piece. Time sequences where nothing is happening, where viewer is waiting (for feedback from artwork from local computer or distant server) is becoming part of the time-based interaction between artwork and the viewer/user.

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NEW MEDIA EDUCATION IN A CHANGING ENVIRONMENT OF PSYCHOLOGICAL, PROFESSIONAL AND SOCIAL CONDITIONS

RAIVO KELOMEES

I would like to look at new media education from the point of view of psychological, professional and social problems.

Is artistic imagination influenced by the medium of expression? Is imagination renewed with new media? I mean new media in general – new technology, new tools? Is talent specific to a medium or is it universal? If we call anybody talented, then his talent will appear anyway, despite technological or social conditions, or not?
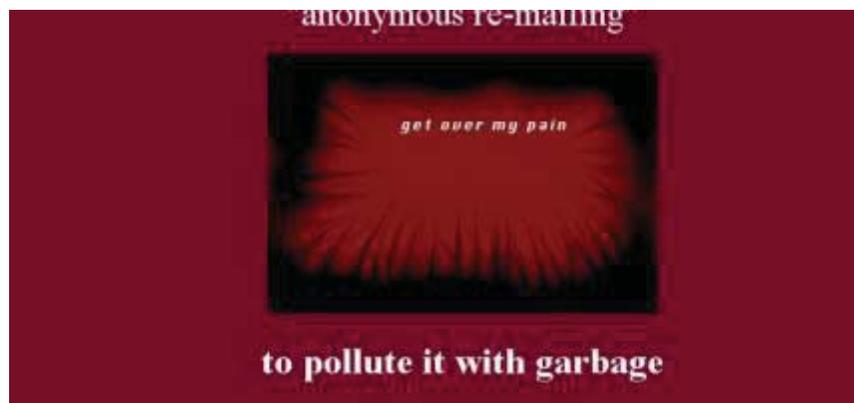
Net-Poetry 2, 1997, Nelli Rohtvee, Internet-project, http://lizard.artun.ee/~nelli/nellinet/net1.html

I will deal with the issues related to psychological, professional and social matters in art and art education in relation to new media.

1. Psychological problems

One question deals with the identity of the artist in relation to creative means. To what extent is the artist's imagination and thought process "new" because he or she is dealing with new media? Can we say that the artist's thinking renews itself after the emergence of new means of expression, that technology influences artistic expression? Can one say that if someone is talented, then there is no difference in what medium he or she uses? Is talent medium specific or is it universal? Can a talented person break through in any circumstances or does every talent require a certain configuration of conditions and means to blossom?

The artist's chosen medium influences how the artist understands himself. Art mediums are different from the point of view of the self–presentation of the artist, the difference being in how they "take in" and represent the author. Some means and mediums are better for observing and picturing the outer world and others are more as means of contemplation and self-observation. From time to time some

means of use of art mediums take on the parameters of mania or art form. A certain trend and movement emerges during which a floating manifestation is taken by groups of artists and it spreads as a virus.

One could notice manic manifestations in the 1990s when new media and digital technology entered the art scene. Artists were exited and the amount of production was unprecedented. Some works that surprised 10–15 years ago seem ridiculous. But some works that seemed ordinary and too simple with their "boring human problems" seem exiting now. They have stored the time and the people, showing us that irrespective of time and medium art deals with human existential questions.

Elation about the medium is natural when artists are excited about the nature of creative means. Subjective excitement about new means is similar to enjoyment that comes with new clothes, books, a car or a house. It is a time when things seem new, reality seems new and the whole life seems new. This is what factually takes place: the medium, the means and the creative environment that artists use does not only change them and how they see themselves, but also how they see the world.

Here we can recall McLuhan, who wrote that every society and time has its dominant medium – audible, written or visual. Mediums influence how people think of themselves and the world. When people started reading books, an opportunity rose to escape the earlier collective world, where they were connected by sound and sight. Books and new media at the time pulled them from the physical world to the imaginative and mental world.

In this sense art mediums are a means of interpreting the world and one's self. Using them, artists describe who they are and what the world around them is like. Artistic mediums can be seen as a shield, a screen of sorts and a tunnel, through which the artist sees the external world. The ambivalent function of the medium is obvious as a means of self-reflection – art as a mirror and a window. From this point of view we can describe almost any medium in art history: artists used these mediums to reflect themselves and view the external world.

Still, it seems that the most important parameter of an artist's identity is motivation, the willingness to be seen in action in his or her own field. To possess skills to say something is always possible, while to obtain willingness to say something is not. It either is or is not. Maybe this is "talent", without which it is impossible to describe the author? The author's motivation is this "author's blood" that makes it possible to separate those who are creators and those who are not.

2. Professional problems

Eternal questions: how qualified should the artist be in technically implementing the medium? How much should he know how to use software and have computer skills to work as an artist and author of new media?

We can ask the same about traditional art. How good of a drawer must a painter be to be a good painter? We can also ask: how much skills and knowledge must a new media artist have so that he could be called a new media professional, a "very good" professional?

How much does an artist have to have skills to express freely and forget the "weight" of technology? It is a question without an answer, the scale is not set. And the criteria are certainly not objective. The usage

of skills is lead by the artist's mental preparation, which leads the "dosing" of skills depending on creative needs.

The notion of "new media professional" is kind of pointless, but it could also be seen in a narrower meaning, without ascribing expertise the person in every sub-section. In an ideal case we are dealing with a multi-specialist – and there are few of them. The "multi"-domain contains elements such as sound, video, graphics, hypertext, and programming and if we add cultural competence and economic expertise, we get the attributes of a third millennium artist.

There are several viewpoints in the question of new media and technological competence. First, a lot of works have been created with a simple unique message, which is not so much dressed in means of new media, as it is born using means of new media in a very simple way. New media is not merely a carrier of information; it is also an organic environment where art is born. Take for example Olia Lialina's „IF YOU WANT TO CLEAN YOUR SCREEN"(1996) [1] and Nelli Rohtvee's („Net-Poetry 2", 1997). [2] Remarkable works of art have been created by top technological specialists and work groups, that "speak to" the universal and the human and are not hermetic, meant for a circle of experts. A fitting example is "Osmosis" (1995) by Char Davies.

3. Social problems

I have dealt with this issue in the article "The Forum of Latera E-Mail Group," [3] which described art social transformations in the Estonian art of the late 90s. Art collided with new "hot" digital mediums. People that had earlier set in the art hierarchy could not find anchoring points. But here one should stress the part of art education and changes taking place in the social environment that influence art education.

If in a political and economic sense it is accustomed to view the last 20 years as "liberation" and "renewal" then in a mental and social sense one set of rules has replaced the other. From the viewpoint of eternity there is no estimated valence. The main parameters that describe the social set of rules are three domains: the distribution of information, resources and reputation.

All of these we have seen before but the present society is different, as these have been remarkably integrated with art education. The same has happened in the art life as a whole. This integration means that the fight in this field has obtained a meaning of existential fight. The most important goal of achievement is the ensuring of meal and survival. To observers this seems as a specialized, professional or pedagogical activity; as a very refined, thoughtful and cultural activity.

In the landscape of information gathering and reputation creation the fight is being fought over guaranteeing maximal resources for one's own activity. The connection is definitely direct, but not absolute. The borders exist because whatever highly reputed pedagogical initiative does not automatically serve maximal resources; will not find reward nor living space from society; if its existence even remotely damages the interests and territories of existing artists.

There seems to be space but it is not handed out. At some point a situation of power play emerges – who is after whom? Who has a louder voice and a better lobby has a better chance of winning. The content is of secondary importance. The persuasion of the public and the deciders of one's advantages is the core of the game. Activity and aggressiveness can achieve a lot on this level.

The entrance of new means of creation to the field of art education in this way is characterised by three everlasting spheres where change and changelessness can be noticed: the psychological, professional and social aspect. These are the self-determination questions of the author, the questions of defining the level of professional activity and the social influence to the previous. Definition battles in the field of the creation of meaning in society directly affect the artist's identity and the assessment of the quality of his or her actions.

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CALCULATING THE CURVATURE OF CROCHETED PETALS – A POST-MEDIA EXPLORATION OF DOMESTIC CRAFT-BASED TEXTILE PATTERNS

GAIL KENNING

This paper explores opportunities for extending the possibilities craft-based textile activities, through dedicated software tools to explore and interrogate textile processes. It reports findings from an experimental art project to produce software as tools for creativity in craft-based textile activities and advocates a rethinking of craft-based textiles beyond 'fixed media'.

 Digital media and new technologies are ascribed a seminal role in the perceived increase of craft projects, do-it-yourself (DIY) culture, the production of user-generated media content, and user-led participatory practices (Gauntlett, 2011; Jenkins, 2006). The rapid development and accessibility of sophisticated audio visual technologies has reshaped media production and consumption enabling amateur photographers, film-makers, writers and musicians to utilise digital media not only in the production of their work, but also in its storage, dissemination and consumption (Jenkins, 2006). Digital media also offer the potential to extend and reconceptualise craft and DIY projects including domestic craft-based textile activities such as knitting, crochet, weaving and lace making that have been considered and seen as limited to physical 'hands on' activities.

Digital media and new technologies allow expansion and reconceptualisation of these types of craft activities in four ways. They facilitate the distribution and sharing of project templates, patterns, instructions and 'how to' information across geographic, social and cultural borders. They also enable users to display images, videos and information about completed projects. Third, digital media create audiences and communities through online forums and viewing spaces. Finally, and most importantly, they offer the potential for the development of tools, such as software applications to allow users to extend and explore their own creativity.

This paper shows how digital media can extend and reconceptualise domestic craft-based activities using experimentation enabled by the production of dedicated software tools for craft-based textile practitioners. It draws on an ongoing experimental art research project which interrogates domestic craft-based textile processes in an effort to examine the creative potential of craft-based textile pattern forms and argues that there are potential social and cultural benefits from the development of tools for creativity that aid experimentation and exploration.

The project advocates a rearticulation of craft-based textile activities beyond 'fixed media' and embraces the non-media specific nature of craft-based textiles which have operated as text, in diagrammatic form, as threads, and more recently as pixels, bio-materials, mathematic functions and computer code.

Craft-based textile activities have a long and complex history. The textile fragments that have survived inform our understanding of the development of techniques and pattern forms. In addition, woodcuts, booklets and magazines, paintings, photographs, and notebooks and journals reveal craft-based techniques, patterns and styles and attest to the longevity and importance of craft-based textile activities as a creative practice (Shepherd 2009).

The mass media play a role in promoting craft activities and DIY projects in relation to fashion and trends through magazines, pattern booklets and 'how to' styled TV and radio programmes (Greenhalgh, 1997;Johnson, 2005; Schofield-Tomschin, 2001). In observing that "both the amateur arts and crafts are undergoing what has been described as a 'boom time'" (2004, p269). Turney suggests that this renewed popularity is due to increased levels of education, participation by women, an ageing population, and

more access to leisure time as a result of the changing nature of societies and their workforces (Turney 2004).

These activities are what David Gauntlett (2011) describes as acts of 'everyday creativity' and are important to both individual participants and society as a whole. Jenkins (2006) suggests that they bring about "a changed sense of community, a greater sense of participation, less dependence on official expertise and a greater trust in collaborative problem solving". Craft activities and DIY projects fulfil a desire to make or be involved in a creative process (Gauntlett, 2011, Turney, 2004). They may be seen as expressions of symbolic creativity: of the drive to create. Turney (2004, p276) argues that "symbolic creation is an essential part of everyday life and a demonstration of the real and ideal self" (2004, p276). Certainly in relation to domestic craft based activities, there are many reasons for promoting the continuation of these activities at a grassroots level. Craft-based textile activities have been cited as being important in the continuation of tradition, the development of creativity, in providing a sense of community, in the construction of personal identity and for healthy ageing (Schofield-Tomschin, 2001; Johnson, 2005; Minahan, 2007; Turney, 2004). These acts of 'everyday creativity' are self-driven, self-directed and self-fulfilling activities (Atkinson, 2006). The number of practitioners, the level of commitment, enthusiasm and labour invested in 'everyday creativity' without tangible reward suggest that these activities are driven by intrinsic motivation – that is "for its inherent satisfaction rather than for some separable consequence … for the fun or challenge entailed rather than because of external prods, pressures or rewards" (Ryan 2000, p56).

However, while these acts of 'everyday creativity' are in abundance, the level of creativity involved has been subject to criticism. Craft-based activities, including textile activities, are accused of being 'low', repetitive, manual, non-creative, non-challenging, requiring little or no skill, and of little value in relation to the arts (Atkinson, 2006, Greenhalgh, 1997, Turney, 2004). Turney suggests that "the marginalization of home crafts from academic discourse is largely based on an understanding that both practices and objects are 'uncreative', repetitive and mundane, existing outside the world of the innovative, creative, challenging avant-garde" (2004, p268). These activities draw criticism because of their seeming culture of duplicating, copying, and the recycling of pre-existing forms, and their reliance on pre-designed kits, patterns, and templates (Turney, 2004, Atkinson 2006) suggests that kits patterns and templates are in effect 'dumbing down' craft, which he suggests is part of their attraction.

This culture of copying causes concern in relation to the standardising effect it has. For instance, Pen Dalton says "the encouraging of dependence on projects from women's magazines, patterns and pre-designed kits, however well designed and demanding of the patience and skill of the housewife, has had a standardising and largely detrimental effect on craft practice" (as cited in Atkinson, 2006). My PhD thesis argued that the continual recycling of crochet lace patterns and the focus on the production of an object had seemingly resulted in a stasis in the pattern form and that the creative potential of the activity is yet to be fulfilled (Kenning, 2007). While mainstream radio, TV and magazines contribute to the seeming renewal of popularity, there are concerns that they also contribute to the standardisation of these activities as a result of the scale of production and distribution of kits, patterns, magazines, books that encourage the construction of similar popular patterns and projects (Beegan, 2008). Websites, blogs, television programs, books, and magazines encourage and promote craft activities by providing 'how to' articles, templates and patterns, and instructions for 'personalised' rather than experimental or self-explorative craft projects. Such projects equate creativity with the customisation or individualisation of prescribed forms.

This paper proposes that it is to digital media and new technologies that we might look for new tools for creativity, and that they may offer the potential to extend these forms of activities and reveal a form of 'everyday creativity' uninhibited by the strictures of the template, the pattern, and the seductions of the mass media.

Before examining how experimentation can be introduced through the use of digital media, it is useful

to explore why there is a seeming lack of experimentation and acceptance of this culture of copying in 'everyday creativity'. Jenkins (2006) suggests that these activities emerge at a grassroots level, are learned through informal education, and arise out of shared traditions (Jenkins, 2006). This gives rise to a sense of responsibility in relation to the continuity of these traditions which inhibits experimentation. In addition, both Jenkins and Turney suggest that the lack of innovation and experimentation may be due, in part, to many 'everyday' craft practitioners being educated to primary and secondary level and having an institutionalised view of what constitutes art, design and craft and what is considered acceptable experimentation within those fields (Turney, 2004). Such participants often need to be given 'licence' to extend their creativity beyond the conforms and confines of their formal or informal teaching, pattern books and kits.

Recent developments in craft-based textile activities have resulted in young participants applying innovative approaches to craft activities in the form of guerrilla crafts, S&M knitting and yarn bombing (Kenning, 2009). However, for the most part, these experimental approaches remain in the minority.

The impact of digital media on acts of 'everyday creativity' involving filmmaking, photography, video, music, and so on, has been discussed at length and is evident on websites and social media sites across the Internet (Jenkins, 2006). However as previously discussed, domestic craft-based textile activities have until recently primarily used digital media as communication tools, and it is only now that we are beginning to see the development of software applications that may be used in the production, rather than distribution, of domestic craft-based textile activities. Developers of these software applications and digital media tools, include craft-based textile practitioners who want to speed up the design process; craft product suppliers who wish to extend their range of products or increase sales; software developers that have recognised a growing market for applications that can visualize craft forms; and open source developers who are interested in sharing both craft instruction and code.

Examples of digital media developments include mobile applications that are being used as aggregators of news, information and videos about craft projects and techniques. Another software application, Knit Visualizer represents text instructions in diagrammatic form to enable quick referencing during physical construction of textile objects (Foundry, 2010). Some applications translate text instructions into computer code to visualise and modify patterns online (http://stitchworkssoftware.com/). One open source project knitml aims to standardise knitting instructions and create a mark up language for knitting to enable any knitting pattern to be rendered and visualised. However, many applications continue to act as communication tools or visual design aids. In these examples the media (code, algorithms, pixels) used do not manipulate or influence the pattern outcomes unlike in the physical environment where the media, the choice of threads, hooks, technique etc impact on the final form produced. In addition, these software applications neglect the processual and procedural aspect of domestic craft-based textile activities and do not engage with the processes inherent in both craft-based textile activities and digital media. Thus they do not provide a platform for true experimentation.

With limited approaches to experimentation the risk remains that domestic craft-based textile activities will continue to copy and recycle pre-existing patterns forms and projects, and will fail to escape the ongoing criticism regarding their lack of creativity and not achieve their creative potential. Whereas the digital environment can offer valuable insight into the making process, and the potential to provide a greater understanding of how craft-based textile activities and patterns can develop, and how creative possibilities can be extended (Kenning, 2007).

In discussion of textile activities in relation to digital media, domestic craft-based textile activities are frequently positioned as physical, material and tactile and contrasted with digital media which often cited as lacking physicality, materiality and tactility. While this view is contested and arguments have been made for the materiality and tactility of digital media, it is not within the scope of this paper to explore these arguments in detail (Munster, 2006).

When participating in domestic craft-based textile activities engaging with the media, that is physical

threads and fabrics, is often assumed to be the motivation. However, research suggests that the issue is more complex, and while engaging in a process is important the construction of a physical artefact is not the primary reason (Atkinson, 2006; Johnson, 2005; Minahan, 2007; Schofield-Tomschin, 2001).

This tension between what we might consider the creative process and the output occurs in other activities. Activities manifest in a range of media other than what would be their expected material form. For example, materiality produced using chemicals and paper is no longer required for photography. For many, only the skeumorphic click of digital cameras and Photoshop icons remain as clues to past physical processes. Similarly, architecture such as Liquid Architecture has no intention of realising the architectonic forms as physical structures. In addition, we might also think of the relationship of the musical score and the written play to the performance. The score and the play can and do undergo rigorous critique in absentia of the performance. These examples point to potential for creative opportunities beyond a single medium.

Freed from the constraints of being manifest in physical threads, domestic craft-based textile activities participants are free to explore not only the processes of domestic craft-based textile activities but also computational processes of the digital environment to exploit algorithmic variation and explore mathematical functions. My PhD thesis identified that craft activities can draw on computational possibilities for AI and explore potentially evolutionary and emergent possibilities in the digital environment and in the physical realm. This enables new forms, patterns and shapes that have been difficult to make, imagine or understand before sophisticated computational possibilities to be modelled in a range of digital media applications and realised physically through hardware and peripherals such as 3D prototyping.

This ongoing experimental art research project to explore creative possibilities for domestic craft-based textile activities has undertaken a variety of approaches. A range of findings from the project have been presented at the Textile Society of America Symposium, ISEA 2009 in Belfast and, more recently, at the Subtle Technologies festival in Toronto.

Initially the project took the form of a software application to mate and mutate domestic craft-based textile activities patterns. However, limitations were imposed, not by the media itself, but because of the teams' understanding of what constituted craft-based textile patterns and their expectations. The application enabled users to mate and mutate patterns, but the parameters were restrictive because they initially focussed on the appearance of the pattern forms. In addition, aesthetic judgement was applied too early in the process and prevented patterns developing beyond conventional forms.

The second stage involved aligning the algorithm in digital media with the decision-making process undertaken in physical construction of the patterns. This involved, in effect, neglecting the final form and focussing on the placement of individual stitches or motifs in relation to the last stitch or motif made whether the position was correct or not. Thus, glitches and errors in any part of the process were embraced and often became exaggerated in subsequent rounds, leading to the creation of seemingly random forms. It allowed for the creation of pattern forms that could not be created without the use of digital media.

Both of these areas of investigation are ongoing. However, the more recent developments have focussed on the construction of motifs in order to reveal the unacknowledged mathematical formulae that underlie many of the shapes used in Irish crochet lace. The work identified mathematical formulae that create visually similar forms and then used these functions to manipulate the motifs and extend the form. A crochet lace collar from the Powerhouse Museum lace collection in Sydney was used as the source material. The lace collar, which was crocheted in 1850, consisted of four primary motifs repeated at intervals. The motifs were representations of nature, the daisy; shamrock; rose; and spiral form, and can also be described using mathematical formulae such as $y=n\,1.4$ As simple mathematical formulae, the variables can easily be changed allowing for the overall patterns to be manipulated quickly and effectively. The pattern becomes a product of the design of the maker and computational processes.

Thus, pattern-making in the digital environment allows for a range of systems to impact, interact, inter-twine and intervene with each other and can harness generative possibilities, mathematical systems computer code, and craft-based textile techniques to stimulate domestic craft-based textile activities and create new possibilities.

A post-media approach opens up new possibilities, affording potential for experimentation in a form of creativity that has not been previously examined in this way (Manovich, 2002). It allows for the discovery of new forms and new ways of making and creates new sites of 'everyday creativity'. For those not familiar with digital media or computers, digital media allow exploration from a position of strength by focussing on DCBT processes already learned. For those familiar with digital media, experimentation enables users to explore new ways of making and may stimulate interest in making new pattern forms in the physical realm. As well as its implications for creativity, development of craft-activities beyond the manifestation of physical objects also has potential health and welfare benefits as it frees users from the requirements of materials and physical dexterity, affording whole new ways of working which can be particularly important for the elderly and those with injuries or disabilities.

These creative processes can be made readily available to older participants who have an in-depth knowledge and understanding of craft-based activities both in terms of a tactile engagement with materials and in the construction of textual instructions and diagrams, but have limited dexterity. For them it offers ways of stimulating the mind and hands through ongoing making processes through for example patterns generated through voice recognition or sound. These participants are often keen to remain both physically and mentally active. Therefore, digital media tools for creativity present opportunities to prolong involvement with pattern making activities promoting both physical and mental stimulation. In addition, digital media offer the potential for work in groups through networked activities and for example interactive table-top.

Digital media tools for creativity may provide benefits both physically and mentally. This is particularly advantageous when we find that people are increasingly identifying themselves in terms of their creative outputs, and symbolic creativity rather than their job (Castells, 2000).

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ENTREPRENEURS, SQUATTERS AND LOW-TECH ARTISANS: DIYBIO AND HACKERSPACE MODELS OF CITIZEN SCIENCE BETWEEN EU, ASIA AND USA

Denisa Kera

The global spread of alternative R&D places outside the universities and corporate labs offers an integrated model for art and science cooperation and public participation in science. These places (Hackerspaces) and projects (DIYbio) offer a direct involvement of citizens in the R&D process in term of translational and participatory research. What are the opportunities and challenges of these novel institutions across the globe?

The research for this paper was conducted as part of a grant from the EU centre in Singapore "Participatory policy model for emergent technologies: comparative study of alternative R&D spaces in Singapore and EU."

While media, government, non- and inter-government organisations were speculating on the size of the Fukushima Daiichi nuclear disaster and discussing issues of nuclear safety, standards and policy measures, individuals and small groups of citizens involved in grassroots science activities around the world were measuring, monitoring and crowdsourcing real-time radiation data over DIY tools and sharing data over the web. [1] This agile and resilient response to a situation of insecurity and lack of data was initiated by people around the Tokyo Hackerspace [2] and their friends from Portland and Los Angeles with connection to the global Hackerspace community. [3] It resulted in creation of a platform, Safecast.org, over which data on radiation are gathered from almost 300 nodes [4] and which also serves as platform for supporting creation and distribution of DIY Geiger counters.

Hackerspace community is just one of the examples of Do-It-Yourself (DIY) and Do-It-With-Others (DIWO) initiatives that are emerging in recent years everywhere around the world challenging our views of citizenship vis-à-vis emergent technologies but also disasters. Fukushima disaster in April 2011 showed how this informal network of Hackerspaces around the world was able to react and coordinate efforts in developing low-tech tools which Akiba, the uber-hacker from Tokyo Hackerspace, poignantly named "Humanitarian Open Source Hardware." [5] These DIY tools were distributed over another recent prototype of a service, a community market for open source hardware, InMojo. [6]

This immediate, decentralized and global response to a disaster goes way beyond the common but also imagined forms of solidarity and innovation. Crowdsourcing not only ideas but also materials for building DIY Geiger counters and even prototyping and designing new tools such as the Kimono Solar Lantern Kit, a hackable solar powered lantern for $12 named after a bar next to Tokyo Hackerspace, or iPhone Radiation Dock (iGeigie), portable Geiger counter, present a new type of global and participatory design which combines solidarity and innovation. [7]

These prototypes directly connect technological standards (open source) with deliberations on social action in a global and day-to-day context via various DIY and experimental management techniques. They bring together politics, technology and nature in a direct and transparent way that offer resilient and open structure for participation and decision making. Control and decision making (in terms of monitoring, reflecting and self-organising) are instantly connected to scientific facts, laws and technological

standards via design prototypes, which are political, social and technical at the same time. Design in the case of radiation data becomes a form of participatory but also global and collective action redefining the relations between lay people, science experts and political representatives. Furthermore, the speed of the response, including the actual design of the prototype and the launch of the participatory monitoring of radiation platform over Safecast, took impressive 72 hours of work by enthusiasts from several Hackerspaces around the world. [8]

The Hackerspace infrastructure that made possible the citizen science response to Fukushima was already in place long before the disaster and it is used not only in the case of software and hardware innovation but also in the case of so called DIYbio research specializing on various aspects of biotechnology and even medicine. Similar movements and places define an alternative R&D structure that uses design as a convergence of social and technological innovation. These small scales, experimental, alternative R&D structures represent a convergence of several radical ideas around development of open source software and hardware (Hackerspaces), [9] cheap and open source, digital fabrication (FabLabs), [10] citizen science labs crowdsourcing biotech research (DIYbio), [11] innovative coworking and management structures (HUB). [12] These innovative, coworking experiments paradoxically combine the squat and publically funded culture of the EU art centres with the market driven entrepreneurship rhetoric of the US start up scene to envision research and innovation outside the traditional professional settings of universities and corporate labs. The insistence on low-tech solutions and open source technologies democratizes the whole R&D process to a degree that it makes it possible for developing countries to join as we can see in the case of Fablab in Africa [13] and Afghanistan [14] or the now famous "House of Natural fiber - Yogyakarta new media art laboratory" (HONF)" from Indonesia. [15] HONF founded in 1999 is not only one of the oldest alternative R&D place outside of EU or US, but also the most original, because of its unique combination of influences and its relation to the local community and culture. It is an artists' run organization that is occasionally funded by EU (for example their recent Fablab) thanks to their global art network connected to a festival of new media art which attracts the EU crowds with access to money. However, it is also a coworking space and privately funded organization that is supported by its members in a manner similar to US based citizen labs and Hackerspaces with occasional contact to the local universities and companies.

While in 2008 and 2009 the whole alternative R&D movement gained a momentum in terms of popularity thanks to various citizen science research projects related to Hackerspaces but also DIYbio labs and the Maker's community, the 2010 marks the start of the global movement which proved its usefulness and resilience in the recent Fukushima disaster. The global movement is defined by various events around the world that identify with the idea of citizen science projects, low-cost and low-tech protocols, lab equipment based on open hardware and shareable and reproducible kits. The common strategy of connecting the DIYbio labs to the local Hackerspace communities is widespread even if it is not the only model. The more socially and critically involved hacking similar to EU art and DIYbio centres is typical for most of Asia DIYbio and Hackerspace scene while Singapore seems to follow more the US orientation to entrepreneurship and personal enhancement. Experimental forms of research, investment and even artistic creativity show clearly how the "low-tech but high-impact" logic of the DIYbio and Hackerspace movement operates in various contexts and how it can connect science, culture and society in ways that traditional policy and public participation in science research could not even imagine.

The artistic and scientific solutions and protocols are affecting but also involving large groups of citizens and stakeholders in the process of the research, creation and innovation. Whether in US, EU or Asia, the Hackerspace revolution involves open source laser cutters and other open hardware tools that can create cheap lab equipment, enable synthetic biology recipes and other protocols to spread like cooking

recipes, self-organized clinical trials and other community related projects that are challenging not only in technological but also in social sense. The strategies and interests of these groups are slowly converging into one informal network between Asia, US and EU enabling very different flows of knowledge and expertise. It also paradoxically embraces, develops and combines two extreme strategies of R&D, on one side the market driven entrepreneurship model following the US, on the other side, the anarchistic, underground model of the EU based squats.

Various forms of bottom-up organizations that appear in recent years around emergent technologies, DIY subculture and novel forms of investment in innovation and entrepreneurship provide interesting case studies for studying the relation between politics and design, new technologies and social movements, emergent "non-humans" in Latourian sense [16] and transforming society. Whether we are speaking of alternative "R&D labs" that are part of some existing cultural and art centres such as Ars Electronica in Linz, ZKM in Karlsruhe, FACT in Liverpool, Laboral in Gijón, or alternative incubators like Hackerspaces, HUBs, MAKE fairs etc. we can witness the crucial role of radical design and politics play in connecting humans and non-humans and experimenting with new networks. The emergent networks are not simply explored by these institutions but actively performed and created by novel forms of research, investment and even artistic creativity and social experiments around open source laser cutters and other hardware, synthetic biology recipes, sharing and discussing DNA data, self-organized clinical trials, various types of performance software, robotics and any simply any emergent technology. [17] Communities of people monitoring, sharing and making sense of various "objective" and "scientific" data in their everyday life are actively exploring and performing the future symbiotic relations between various types of agencies across scales. The true cosmopolites of today are people actively involved in platforms such as Patchube, [18] Carbongoggles, [19] DIYbio list [20] etc. exploring the emergent, often surprising connections, networks, and mashups between different actors and scales.

From nano- and bioart exhibitions to annual new media festivals, various museums of the future and alternative incubators we are witnessing public involvement with emergent sciences and technological inventions that go across business, art and research. The various functions of such spaces from the more obvious like popularization and presentation to the more professional like investment in innovation to the more creative and experimental like envisioning our common future the goal is similar to the early ideas and vision of science, technology and art interactions. It is to foster and accelerate the ability to connect various actors in new networks and ecologies across scales. [21]

The strange paradox in this new type of DIY, citizen science projects and institutions is how the increasing involvement of the public goes in parallel with the as intensive emergence of new actors across scales. The non-humans seem to talk a lot lately via various data that we are able to generate, gather and visualize in the citizen science projects that involve low cost monitoring, sharing and interpretation of various data but also in various hacker and maker projects. The public interest in data defines these new communities intimately connected to their environment on various scales from molecules, DNA and cells to institutions and cities (BioWeatherMap, [22] EpiCollect, [23] and CamMobSens [24]). We are even starting to witness large, bottom-down projects envisioning the future cities as microstates and software platforms performing such new ecologies and systems (Digital Cities, City 2.0, Intelligent Urbanisation, Cities-as-a-service, Smart+Connected Communities, Cisco's New Songdo, IBM "Smarter planet", HP "Central Nervous System for Earth"). [25] The cosmopolitical future is in connecting actors across scales via data and creation of new dependencies, metabolisms, systems, networks which do not make a difference between the organic and non-organic actors, between the social, political and biological, but create new relations across scales.

These interactions across various scales and not only actors (atoms, molecules, cells, humans, institutions, cities, planets) seem crucial in terms of connecting design and politics. These networks between heterogeneous actors and across various scales hold the key to any future hybrid communities which we are starting to witness with the alternative R&D. While most projects dealing with future communities and issues of sustainability and/or biodiversity still concentrate on the scale of animals, plants and large ecosystems, the interest is slowly shifting to more complex interactions between humans, microorganism and molecules on the micro-level that often defines new communities and micro-ecologies through sensor data. The data we gather about our bodies (for example DNA), society (like mobile use, consumption etc.) and nature (CO_2, radiation, whether, bacteria) are integrated over various platforms and interfaces to help us understand the unique equilibria but also develop and create new habitats. The various functions these experiments from the more obvious like popularization and presentation to the more professional like investment in innovation and more creative and experimental connect politics with design, social innovation with prototypes. These DIY and alternative places perform, foster and accelerate the ability of science and technology to serve different purposes and connect various actors in new networks and ecologies. The very democratic form of these institutions that support bottom-up and citizen science projects defines them as true cosmopolitical laboratories and defines cosmopolitics not only as experiments with novel networks between actors but more importantly between various scales. The main issue of cosmopolitics for this reason is not a problem of the subject-object, animate-inanimate relations but issues of interaction between scales, relation between parts and newly defined wholes.

Furthermore, all these citizen science and bottom-up projects that gather various data, actors and connect scales strangely revive the pre-modern ideas on human and non-human interaction like bestiaries and cabinet of curiosities and the original project of the "Academy of sciences" envisioned by G. W. Leibniz that also speak of such radical hybridity. [26] These novel forms of community organised and financed science and technology labs revive the original idea on science, technology and public interactions envisioned by G. W. Leibniz in his famous "Odd Thought Concerning a New Sort of Exhibition (or rather, an Academy of Sciences ; September, 1675)." In this original vision of the academy of sciences Leibniz ceases to discuss the advancement of sciences and technology in terms of metaphysical and philosophical issues of truth, limits of human mind or the nature of reality but defines science and technology by their ability to generate new ecologies of interest and influence, new institutions, networks and relations between different actors. Science, technology, business, art, entertainment, tourism are all part of an effort to raise human curiosity and wonder and transform the society. Leibniz's prophetic vision of cosmopolitics modelled after his ontology of monads and interactions between different scales is a reality today in the case of hybrid organizations such as Ars Electronica in Linz, ZKM in Karlsruhe, FACT in Liverpool, Laboral in Gijón, numerous small centres around the world and alternative incubators (Hackerspace, DIYbio, HUBs) that connect art, design, technology and sciences in often playful and unexpected ways. [27]

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SECURITY GATE 26.11

John Kim, Anthony Tran & Vasily Trubetskoy

Security Gate 26.11 is an electronic artwork that detects wireless emissions given off by individuals, including cellular transmissions, wifi, RFID, and others. By our participation in informational networks, we actively volunteer information about ourselves to forms of surveillance. Security Gate 26.11 renders visible these invisible mechanisms of discipline and control and documents our participation in possible tyrannies of our own creation.

AUTHOR(S)
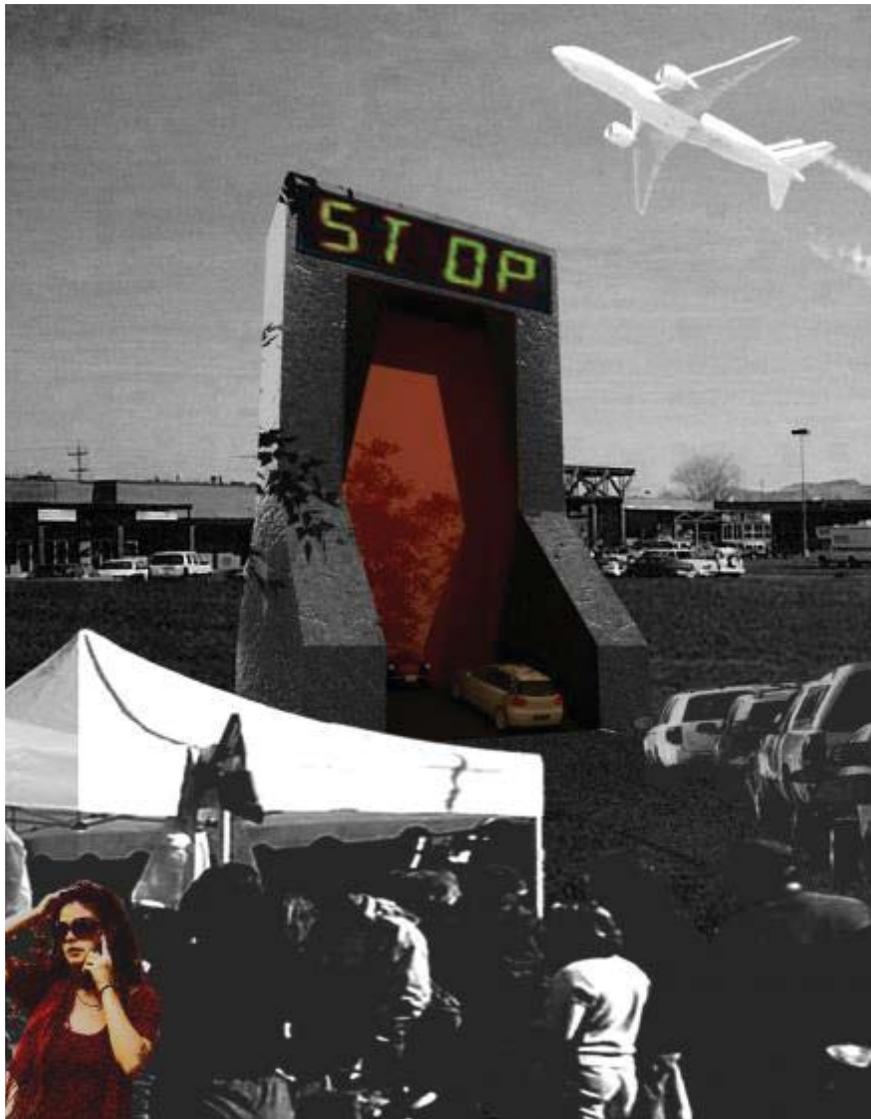
Conceptual rendering of Security Gate 26.11 by Molly Reichert.

Metal detecting security gates, such as those used in airport screening, are the sites of discipline leveled against the body. As recognized by Michel Foucault, on our bodies converge different mechanisms of control, as issued by the State, biomedical technologies, and capitalist pressures. For your average traveler, airports have become sites of inconvenience and embarrassment, because of full body scanners, "enhanced" pat-downs and lengthy waiting times. But for those who are profiled because of their ethnicity or political views, airports are sites of humiliation and indignation. This discipline is justified because airports are liminal spaces where the normal right to privacy is increasingly in suspension.

Security Gate 26.11 is an Arduino-based, interactive, electronic art work that detects wireless emissions given off by individuals, including cellular and smartphone transmissions, wifi, Bluetooth, RFID, and others. Security Gate 26.11 produces individualized audiovisual responses to these transmissions. Our lives are subjected to daily forms of micro-level surveillance via mechanisms that are not recognizable to us as such precisely because they are not visible. Today, wireless transmissions are the corpus of control and repression, as evidenced by sophisticated governmental systems of mass surveillance and snooping (Carnivore and its variants) and corporate monitoring (data-mining and software recommendation systems).

The internet provides us with indispensable communication tools in exchange for the ruthless commodification of our lives. Online we constantly volunteer intimate details about ourselves to capitalist appropriation and governmental surveillance. Facebook, for example, is a tool to share and communicate with your closest friends and family, but it constitutes one of the most extensive and detailed records of personal information ever collected about people. The disastrous political consequences of online disclosure have been demonstrated too many times in the last few years. Even when they pay lip service to privacy rights, corporations are in the business of making money and have with only with token resistance handed over private information about its users to governments out of fear of jeopardizing their bottom line.

Many of us know this already, and yet we continue to voluntarily subject ourselves to this pervasive scrutiny. Mark Andrejevic has referred to our knowing participation on networks of surveillance as the ideology of interactivity. It is personal self-disclosure as entertainment. Nineties' webcams have become today's social networks. The difference is that we no longer have a choice but to join these networks. They are tools that do not just enhance our ability to communicate with others, but have become integral to what constitutes human contact. To some, the fact that I do not post regular status updates on Facebook might imply that I do not have a complex social or emotional life, but to others, it simply means I do not exist. Our lives are the informational traces that we leave for others to browse.

We'd like to reflect further on details about the particular design of Security Gate 26.11, in particular, its detection of electromagnetic frequencies and the shift from analog to digital wireless transmission of information.

From an Electromagnetic Spectrum to Digital Presence

Access to information networks is increasingly done wirelessly (e.g. cellular networks and wifi), that is, transmitted via electromagnetic radiation. Since the explicit formulation of the laws of electromagnetism over a hundred and fifty years ago, scientists and thinkers have accepted the existence of electromagnetic fields as a natural phenomenon, despite the fact that they are not visible to the naked eye.

That is to say that the existence of electromagnetic fields is now acknowledged just as we accept the existence of atoms or stars.

The advent of digital signal processing has both abstracted information and also enabled a rapid expansion of the amount of data that can be wirelessly transmitted. Instead of analog's continuous signal, digital data is quantized and sent as discrete pulses; a signal, in effect, becomes independent of the medium in which it is transmitted and becomes simply information. Because data is abstracted in this way, digital signals are no longer legible in the same way as analog's modulation of frequencies. Each frequency can be used as a carrier of binary information, dramatically improving the capacity of electromagnetic waves to carry information. This change has facilitated the development of pervasive and always on wireless digital communication devices.

Conclusion

We are not in control of our digitally enhanced lives. We are unaccustomed to thinking about the informational traces we leave about ourselves. Many of us have yet to wake up to the realization of how extensive and pervasive our lives are subjected to constant monitoring through our use of communication technologies. Security Gate 26.11 renders visible the invisible information that we give off about ourselves. The Gate confronts us with our digital presence in the form of aural and visual feedback to the electromagnetic frequencies that we give off.

A second reading of this situation, already implied in this paper, is more pessimistic: we already recognize our predicament, yet we have no choice but to participate. In April of this year, for example, Apple was forced to admit that it collected and stored a year's worth of information about our physical location and movements, a database constituting a record of unprecedented micro-level surveillance. The public's shock at this revelation seemed disingenuous. That Apple was doing this wasn't at all surprising (it is well known that many of the electronic devices that we carry around in our pockets facilitate extensive monitoring), but the public, nevertheless, registered shock as a kind of toothless protest at the disclosure of this level of fine grained monitoring. Apple's response, that it needs to collect this information in order to provide the services we demand, is, to some degree, accurate. Heightened disciplinary monitoring is necessary for the functioning of pervasive and always on digital communication technologies.

In both these readings, the conclusion is the same: we have no choice but to participate and render our lives transparent to pervasive surveillance. Security Gate 26.11 brings to light the costs of our participation in digital networks by rendering visible these invisible mechanisms of discipline and control. The Gate demonstrates our voluntary participation in possible tyrannies of our own creation.

Short video of Security Gate 26.11: *http://bit.ly/q07SX8*

BODY GRAFFITI: EXPRESSIVE WEARABLE ART THROUGH BODILY PERFORMANCE

YOUNGHUI KIM

A wearable art itself can be an expressive media platform and when it is worn by a performer, it elevates expression of body language combining two forms of media that have been so close to art and technology - wearable and performance. This paper introduces "Body Graffiti", a performance wearable art project that uses the illusion of POV (persistence of vision) technology to create ephemeral graffiti via bodily movement.

Fig 1. Body Graffiti Performance with B-Boy Crew, Last For One, HCI Korea 2010, Younghui Kim

Fig 2. Body Graffiti(Testing Prototype, hand sewn electronic circuit with LilyPad Arduino), 2009, Younghui Kim

Fig 3. Body Graffiti v.2, The Swing Boots, 2011, Younghui Kim

Introduction

Like many fine artists with technological background, modern & experimental dancers in the age of digital media have been early adopters of wearable technology. It seems obvious as the wearable itself can be an expressive media platform and at the same time, worn by a performer, it elevates expression of body language as creating a stronger media platform combining two forms of media that have been so close to art and technology - wearable and performance. This paper introduces "Body Graffiti", a performance wearable art project that uses the illusion of POV (persistence of vision) technology to create ephemeral graffiti via bodily movement. The artist creates and utilizes this newly developed wearable platform in order to express and communicate her contextual messages and suggests the significance of creating a "wearing" technology art project by presenting the creative development process, as well as future variations of "Body Graffiti."

Background

About a few decades ago when wearable technology was introduced as a new form of human-computer interaction, a small group of media artists with technology background paid a great attention to it as a new form of expressive media to explore. Today, wearable technology has become more accessible to designers and artists and wearable has become a new subject of research for its abilities to transform physical interface of information technology into clothes to wear. While they were in search for innovative new flexible technology solutions, many found out that wearable computing facilitates a new form of human-computer interaction because the user can compute by one's body while wearing it. Furthermore, interaction can be operated by simple bodily gestures or its surrounding elements such as noises, temperature and WIFI signals while walking or doing various activities.

There have been great interests by artists in wearable as a form of new media art since it brought out innovative significance in communicative art. Especially in interactive dance or performance like N.I.M.E. (New Interface for Musical Expression) artists can take full advantage of expressive choreographies of wearable technology media. Diverse experimental wearable projects have been showcased at the international exhibitions like ACM SIGGRAPH Cyber Fashion Shows, FutureFashion Event, Seamless, Social Fabrics and more during 2000s.

At a glance, Interactive wearable computing seems to be a natural adaptation of physical computing as clothing is ubiquitous with physical interface. In a comparison with portable devices like mobile phones, one can see obvious behavioral difference between being 'wearable' and 'portable.' The computer being wearable introduces drastic changes in how we communicate and compute. Further more, fashioning element enhanced with interactive technology creates a new form of computing media that is more responsive and expressive for both creators and wearers. This shows that not only wearable media brings the new condition of wearing an actual computer on body but it also introduces significant changes in ways a user computes using one's body whether its a gesture or a temperature body emits. Therefore wearable art can be investigated for being a powerful means for expressionism of everyday life activities and performances through interaction.

Body Graffiti

The "Body Graffiti" projects started with a simple idea for a new performable digital media public art that doesn't require a stage set or a big screen in urban streets. Performers like B-boys(Breaking dancers) are originated from street art scene just like graffiti artists, and they can be defined as public art performers. There is no simple definition of street art yet, here is how the online publication; Art Radar Asia defines 'street art'.

With anti-capitalist and rebellious undertones, it is a democratic form of popular public art probably best understood by seeing it in situ. It is not limited to the gallery nor easily collected or possessed by those who may turn art into a trophy. Considered by some a nuisance, for others street art is a tool for communicating views of dissent, asking difficult questions and expressing political concerns. [1]

Graffiti arts are drawn in urban public space to communicate messages whether they mean political or not. You can find tap dancers or b-boys in public streets or parks in urban cities like Seoul or New York City, performing outside of structured theatrical environments. Combining elements of strong graphic message with the street performing art, the POV driven technological platform for "Body Graffiti" was invented in a wearable format using basic electronic technology with a microcontroller embedded hardware, Arduino. [2]

Observing the performers like B-boys who express in their fierce body language, the idea of enhancing their bodily expression using wearable media reacting to their dancing motion, was conceived in 2007 when the artist moved to Seoul to teach and research further in interactive art. She had been looking for new collaborators to experiment POV technology on wearable costume for dancers to test on POV displays with their movements.

In 2009, the WCU Digital Media Public Art Research Lab [3] was founded with a support by the Ministry of Education, Science and Technology through the National Research Foundation of Korea. As a participating researcher, the artist was able to develop the newest prototype of "Body Graffiti" wearable project.

The wearable project requires to be designed with a great knowledge in both art and technology combined. Thus, it requires a long process of researching in various materials and technologies as well as developing an actual working prototype in a breadboard and then, clothing. Especially for dance performances, the wearable garments had to be comfortable and durable from fierce bodily movement. Additionally, unlike of the other physical computing applications such as installations and interactive objects, wearable computing applications force artists to de-construct the conventional 2-dimensional electronic circuit system and rewire into a flexible 3-dimensional electronic circuit system transforming it to be integrated seamlessly into soft clothing design with strong wearability. [4]

The Body Graffiti for the b-boy performance had been an on-going collaborative project from beginning. There had been multiple prototypes of "Body Graffiti" in collaboration with the world champion b-boy crew, 'Last for One. In this performance wearable project, the artist tested the POV system interacting with specific dancer's movement with a couple of small testing prototypes first.

POV, Persistence Of Vision is the phenomenon of the eye by which an afterimage is thought to persist for approximately one twenty-fifth of a second on the retina. A common application is a flipbook animation. POV display is a technology that composes an image by displaying one spatial portion at a time in rapid succession (for example, one column of pixels every few milliseconds). In the project, "Body Graffiti" has used 2D POV display technology accomplished by means of rapidly moving a single row of LEDs along a linear or circular path. The viewer can perceive the image as a whole as long as the entire path is completed during the visual persistence time of the human eye. A further effect is often to give the illusion of the image floating in mid-air. [5]

With a technical collaboration from the fellow researcher, Dan Mikesell, the artist made a jump rope using 8 LED pixels at first. The POV image was somewhat recognizable in bare eyes during the jump rope swings so, she moved to the next version using a LilyPad Arduino with 16 smaller red LED pixels and hand-sew the whole circuit using 2-ply conductive thread. When wearable computing projects are involved, the Lilypad Arduino, designed by the Sparklab [6] and Leah Beachley, [7] conductive thread or fabrics, metallic connectors like snap buttons, and light batteries are common ingredients. The second small prototype was sewn into a pair of sneakers where LEDs were embedded on the outer layer. However, after the first meeting and rehearsal with the b-boy team, it was soon realized that POV display on the sneakers limits the visibility of the graffiti message because of the breaking dancers' certain angle of movements.

The next sewn circuits with an Lilypad Arduino was purposely made on the small pieces of fabric in order to attach on different spots on the performer's body since wearable has to be designed according to dancer's speed and angle of movements; rotation such as head-spin in the case of break dance. After test-rehearsals with two b-boy dancers who specialize 'head spin' technique, the research team soon found the best suitable spots on the dancers' bodies to perform "Body Graffiti" – chest, back and from ankle to knee part of both sides of legs.

Once wearable forms are decided to be a vest and a pair of leg shields for the better visibility of graphic and textual message to be conveyed, the whole new system was developed quickly. The new system

was built with the custom PCB (Printed Circuit Board) where electronic parts were hand soldered to control 32 LEDs with an Arduino Nano. The electronic circuit and software had to be redesigned and reconfigured to support more number of LED pixels. With this new system, the very first finished version of "Body Graffiti" was developed successfully and performed during HCI Korea 2010. [8]

During the performance, two main b-boy dancers wore the Body Graffiti system embedded in the vests and leg shields and expressed visual graffiti drawn in air, with their body movements. As b-boy dancers perform head spins, windmills and flares, messages programmed in the custom designed LED POV system was displayed. The visual messages for the HCI Korea 2010 performance were graphical icons like a pointing finger and a heart beat with words such as – 'HCI 2010', 'Open Creativity', '창조', a noun meaning 'creativity' in Korean, to emphasize the main theme of the HCI event, "Open Creativity". Therefore, one can say that the performance of the Last For One dancers wearing the "Body Graffiti" was meaningful for its collaborative and creative effort.

Future Projects

The "Body Graffiti" art projects continued to evolve in both contextually and esthetically after the performance with the b-boys. First, the system has been upgraded with more defined custom PCB design that has become thinner and more flexible with the doubled resolution of a vertical column of 64 LED pixels, where more detailed images can be displayed in the POV display. Also, newly designed PCB has become modular, so that each unit of 8 LEDs can be added up to 64 LEDs when connected together. Each unit can be connected with electronic wire or conductive thread through the connecting sewing holes on the PCB modules, in order to construct the electronic parts into a flexible wearable piece and also to fit better with 3-dimensional shape of human body.

The design variations of the "Body Graffiti" interface have been an on-going exploration. The second variation with the newly upgraded electric circuit system has become a pair of black boots with a column of 64 LEDs each, titled "Body Graffiti, The Swing Boots." The wearer can perform the POV graffiti display on the swing set like one that you see in the playground, or just swing her legs back and forth fast to display POV message. Contextually, it is still in an experimenting stage for the swing boots wearable project. During the exhibition at DALSMA 2011, an exit sign graphic following with a text of "RUN" was performed while swinging the boots. [9] On a swing set, the swinger wore the boots to display the POV graffiti images of a pair of wings on both legs along with a word, 'FLY.' One could imagine, when the "Body Graffiti" swing boots are made in multiple numbers, the wearers could be marching in a formation to demonstrate certain textual messages in public space as an urban performance.

For the newest variation of "Body Graffiti", the context of exchanging meaningful message matters heavily. The audience would catch the moment of movements of lights and remains of its prior existence; the existence of the brief visual text message created by blinking LEDs a brief moment ago. In this version, it is not actually a wearable for the performer but multiple numbers of objects that anyone can perform to throw – they are the "Body Graffiti" Frisbees, working titled as "Throw & Catch (Words)." Each disc will display two words when it is thrown up in the air to be caught. Words are carefully programmed and embedded into the "Body Graffiti" POV platform system by the artist. This project is to demonstrate the physical form of communication through bodily movement, throwing and catching certain words that briefly exist. The project, "Throw & Catch (Words)," was displayed, and performed at the Tukksom Han River public park in Seoul, Korea on the 21st of August, 2011 as a part of a group exhibition titled, "Media Circu(it)s." There were about twelve "Body Graffiti" discs laid out on the grass near

Han River and the public was invited to participate in throwing words around in the evening. The different texts in Korean meaning such as 'I'm better than you', 'I don't want to', 'I envy you' were POV displayed for participants to experience communicating in physical action of throwing and catching the briefly existing textual words that are commonly uneasy to speak out within Korean society, where this art project was exhibited. This new version is to be developed further in different languages in close future.

Conclusion

'As a wearable communication platform, an electronic textile functions as a dynamic surface around the body that interconnects people and places.' [10] Often, wearable artists take great deals in displaying since the surface of the garment easily becomes visual interface to communicate. Lights are common form of visual expression in wearable technologies since it's easy to control their patterns and movements with micro-controllers.

In some sense, "Body Graffiti" performance with the b-boy crew, "Last For One" was a true form of hybrid art and collaborative creation among dancers and wearable art technology researchers. Like other performing wearable musical interfaces and/or real-time moving images that interact with wearable on performers, it reflects how performing art can be an ideal platform for the wearable media as it provides creative expression for both wearable artist and performers.

The fact that messages for the "Body Graffiti" projects can be reprogrammed easily through the software developed in Processing and Arduino makes "Body Graffiti" a wearable platform. The project wasn't originally created with a functionality of a wearable in mind. Rather, this new wearable display platform was created in the process of exploring context of words and graphic messages displayed through bodily movements of the wearer. Very often, new media artists have to create or reinvent a new technological platform in order to express in new ways and this was the case for the project, "Body Graffiti." Additionally, very expressive ability of the platform opened up new opportunities of creating many different variations of the "Body Graffiti" projects as a result.

"Body Graffiti" isn't just a new wearable platform. It is a statement the wearable creates through performer's bodily movement and the artist's conscious messages combined. Its fast movement and transformation leaves a brief story while blurring its surroundings for its audiences.

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RETHINKING THE BASELINE: EXPLORATIONS IN NONLINEAR TYPOGRAPHY

Travis Kirton

Rethinking The Baseline is an ongoing investigation into the possibility of non-linear typesetting through the production of original artistic software and exhibited artworks, which challenge fundamental concepts in the field of typography. Two digital canvases are presented, called TextDraw and TypeIs, where the artist can draw with text using nonlinear and gestural interaction to control and create new kinds of typographic aesthetic.

Fig 1. The Don's Imagination, 2009, Travis Kirton, Handmade Typographic Artwork / Print made with TypeIs, 1.80m x 1.0m containing 450,000 letters.

Fig 2. Drawing with Type. Putting pressure on the pen changes the size of each letter as it is being drawn, tilting the pen changes opacity, and drawing direction affects rotation.

Fig 3. Baselines (in red). Traditional baseline (above) is an invisible staff which appears after letters have been typeset. Weighted baseline (below) is an object made of points which determine the characteristics of the letters on the line.

Aspects of modern typography that were defined around the time Gutenberg's press was presented to the world have come to be deeply rooted in daily perception. We take for granted the way words should be read, how text should be prepared and presented, to such a degree that "good" typography should often become transparent. This level of achievement has come through centuries of development, and many theories for working with text have stood the test of time. The work presented herein does not challenge the beauty of a letter, the aesthetic qualities of an optical kern value, nor the gestalt effects and theories which were studied and concretized throughout the better part of the 20th century.

What this work suggests, however, is that the digitization of the typesetter's workshop brought with it strict and rigid principles that belong within the realm of materials. For instance, principle of "leading" refers directly to the use of lead as a medium for creating space between lines of text. Beyond this, however, the remediation of typesetting also brought with it a methodological and linear process of working with words. A process whereby the act of placing one letter after another, of moving one block of text, changing characteristics of letters, and so on, happens in a step-by-step fashion. Furthermore, the abstraction from metal type and typecases to the mouse, screen and keyboard, effectively abolished the physical nature of typography. No more do the typesetters hands get dirty during the creation of a new work.

The direct translation of typesetting techniques to the computer was a necessary first step. Now as new forms of technology are arising, computational devices are becoming faster, and physical interfaces are moving away from the keyboard and mouse, it is the right time to start thinking about the next stage of typesetting. This work attempts to do just that. The confluence of digital typesetting, computation as a medium for artistic expression, and the advent of graspable and tangible interfaces creates an incredibly interesting and open space for the field of typography.

MOTIVATION

My goal is to develop new mechanisms that help us *rethink* our relationship to things we take for granted, and which can provide a foundation for the development of innovative approaches and new space for creative expression. At the moment, my work looks at a limitation in modern typesetting environments which shapes the practice of typesetting into a linear one. Through my research I have come to see this limitation as a by-product of design for keyboard and mouse interaction.

I share in the belief that this linearity occurs as many elements of digital typesetting environments have been developed as general remediations of printing press techniques. [1] In response to this, I have created a new kind of canvas for working with type using non-linear techniques, where many aspects of a letter, word or phrase can be controlled and manipulated simultaneously.

My technical approach finds its roots in two places: the use of computation as a medium for creativity, and the development of physical interfaces for high-fidelity interaction with software environments. The former can be seen in the work of contemporary computational artists who develop their own programming languages, writing software through which they are able to express their unique visions. [1,2,3,4] The latter can be seen in the development of Tangible and Graspable Interfaces which provide more natural affordances for control and interaction than the keyboard and mouse.

Such kinds of interaction have been successfully applied to gaming, music, storytelling, and other computationally enhanced environments, but remain largely unexplored in the field of typography. [5,6,7,8] I am interested in developing new kinds of software / hardware interfaces as opportunities for returning to the field of typography, a physical quality that was lost when print moved to the screen.

GESTURAL & NONLINEAR TYPOGRAPHY

Over the course of the last two years I have been engaged in a media-art research project centered around the idea that smart interactive surfaces can help us rediscover and rethink paradigms that we take for granted in our everyday lives. Throughout this period I developed two applications, called TextDraw and TypeIs, which exemplify the possibility for non-linear typesetting through original artistic software. As well, I used these applications to produce and exhibit artworks that support a challenge to fundamental concepts in the field of typography. Furthermore, both of these applications utilize elements that separate them from modern commercial typesetting software.

The act of creating, or even simply attempting to create, new mechanisms for production opens up an opportunity to deeply investigate the nature of a field such as Typography. In order to build something new one must first understand the elements needed for its construction. In the past, such elements were almost entirely material, or physical objects and processes – before being able to punch-cut moulds for casting type, an understanding of physical properties of metal alloys was essential. In today's digital world such elements can fall entirely within the realm of the intangible – creating new applications for typesetting requires a working knowledge of available underlying software frameworks. Both cases necessitate a thorough understanding of the qualities of the materials with which one can create.

The production of TextDraw and TypeIs has helped validate two fundamental assumptions about the field of typography. Despite the potential for digitization to untether typesetting practices from their

historical precedents, the act of typesetting remains inherently linear. This linearity is strongly influenced by the tools and materials with which typographers are able to accomplish their practice. Additionally, since the introduction of new forms of media and techniques in the mid-60s, of which software plays an important role, the physical nature of the practice of typesetting has been largely lost.

The first application, TextDraw, addressed the linearity and lack of physicality present in modern typography. It did so by considering the impact of new technologies on the ability to provide a paradigmatic shift towards non-linear control over typesetting environments. TextDraw is designed to be used with a stylus that can capture such things as pressure, location, tilt and rotation. These aspects provide the basis for capturing a variety of movements and hand positions which can be used as gestural input for typesetting. In doing so, TextDraw attempts to do so by bringing back elements of lost physicality, through the creation of gestural interfaces which provide higher degrees of expressivity than the traditional keyboard and mouse. [9]

GESTURAL TYPESETTING IN TEXTDRAW

In typography, the baseline is an implicit element used for measuring the vertical placement of text, which Bringhurst describes as an invisible line "on which [most] letters rest."[10] The baseline is an implicit element because it only appears as a result of typesetting, and is not a real object in the sense that it can be changed. In software, however, the baseline is an explicit object that contains letters.

Creating baseline itself as an explicit object, which provides the basis for defining text attributes, is a different approach than the one taken by modern typesetting softwares. Essentially, in abstracting attributes away from individual letters I am attempting to shift the idea of the baseline from an imaginary entity to one that is also responsible for creating the look, position and feel of text itself. Rather than the baseline arising from the visual composition of text, it is the visual composition of text that arises from the creation of the baseline.

In TextDraw, gestural interaction is captured and stored in a set of weighted points which contain position, rotation, pressure and tilt information. When a path is created, by drawing a line into the application's canvas, it takes a section of text and attributes each letter based on its position along the line. As each letter's attributes are determined, those attributes help determine the position and attributes of the following letter. Specifically, the attributes for every letter in a line are dependent on that letter's distance from the beginning of the line, with its distance being dependent on all the letters which precede it along the line.

Modern typesetting software breaks bodies of text down into lines, and then into runs of characters. These runs are essentially sets of sequential letters which have the same attributes (e.g. point size, font, italic). In TextDraw, it is uncommon for individual characters to be lumped into the structure of a run because the fluid and intuitive nature of gestural typesetting often provides subtle variations in attributes from one character to the next. Because of this, it is the attributes of each individual letter are determined by its distance from the beginning of the line on which it is being drawn. Furthermore, because each letter's distance determines its attributes the concept of a run of letters having common characteristics becomes obsolete. In general, the reason for this obsolescence comes not from the technique of gestural typesetting but from something more fundamental.

The principle behind the idea that text can be broken down into lines, and then into runs of characters, which all fit within shapes and areas in a typographic composition presupposes something crucial. The metaphor behind the construction of a basic run of characters supposes that all characters will be consecutively laid out on a line. This is an important point, and fundamental to this work because this approach assumes that the traditional concept of an implicit baseline as a horizontal or vertical element is the most appropriate form for typesetting in a digital context.

Having created TextDraw, I took a 6 month hiatus from developing to focus solely on working *with* the application, rather than *on* it. I was able to "draw" with type, but wasn't really sure what that implied. So, I started exploring the differences between inked lines and lines of text. Working solely in black and white for this period, I produced a series of works whose aesthetics were largely based on versions of various woodcut prints by Gustave Doré. I was able to trace lines using my pen's pressure sensitivity to smoothly adjust the size of each letter as I was drawing.

Afterwards, I experimented with shading and the qualitative aspect of using text as texture, subtle adjustments to the tilt of my pen changed the opacity of each letter. The product of these experiments were the Alice in Avenir series, where I combined chapters of Alice in Wonderland with images from its original publication. Through this period of creative work I learned much about the artistic experience of gestural typesetting. However, I felt that the process of creating works with TextDraw remained inherently linear because the application only moved through a text one letter at a time. To move beyond this I needed to develop a system which would handle moving through a text in non-linear fashion.

NON-LINEARITY IN TYPEIS

Naturally, the technique of gestural typesetting is a non-linear one and requires more than a straightforward, linear access to the text which is being drawn. In order to accommodate this, a novel line management and text storage system was designed into the new application. Among many advantages, including efficient storage and access, TypeIs provides non-linear access to various components of a body of text. When a body of text is loaded into the application, it is broken up into a set of component strings, each of which can be accessed individually. Even though the current implementation uses a pen-based interface and draws a single line at a time, it is possible to access multiple components of a text simultaneously. In a simple experiment, a bit of modification to the user interface resulted in a multitouch version of TypeIs where each finger is drawing words from different parts of a text.

Just as I stopped developing and started working creatively with TextDraw, I picked up my stylus and spent again a period of months experimenting with TypeIs. Throughout this period I moved beyond black and white experiments to a range of works in colour. With the sophistication of new system, I was also able to create interactive installations and 3D-printed type sculptures. During this period I also collaborated with the choreographer Joan Karlen to produce dynamic poetic aesthetics for the ballet Trace.

RETHINKING THE BASELINE

Represented in these two applications is a fundamentally new way of constructing typographic works. This new way can be seen as the result of using a new kind of mechanism, a weighted baseline, a software object which attributes characteristics to letterforms. This mechanism provides the ability for

recording multiple forms of input which provides the opportunity for non-linear control over the aesthetics of a piece. The non-linearity which is possible through the use of this baseline is supported by another mechanism which provides non-linear access to all the elements of a given text. The weighted baseline shifts the typesetter's traditional practice of editing characters and words to manipulating the elements of a typographic environment.

TypeIs attempts a first, though small, step towards bringing physicality back to the practice of typography through the use of gestural interaction. An overall vision, and motivation for the work, sees the development of tangible interfaces for typography where the typographer can once again actually touch and control the tools needed for typesetting.

Rethinking The Baseline implies that its purpose is to investigate modern typesetting and to propose new inventions where old mechanisms may have reached their potential. It suggests, too, that new technologies provide the starting point for reconsidering paradigms that are taken for granted in our daily lives. Finally, and most practically, it elucidates the fact that the creation of gestural and non-linear typesetting environments require the invention of a new kind of baseline.

In traditional typesetting the baseline is an abstract idea, an ephemeral line which appears only after letters have been aligned to one another. In TextDraw and TypeIs, the baseline has become an object that the typographer can mould and create through gestural and non-linear interaction. A new object, which becomes central to the creation of artistic works, provides the starting point for rethinking established ideas and paradigms of thought. In a synthetic media-art-research practice, new mechanisms provide the opportunity for the creation of new aesthetics, and new kinds of expressive activity create the space for the development of practical innovation.

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CROSSWORLDS

OLGA KISSELEVA

Products of the theory of error correcting codes, electronic tags correct transmission errors, exploit informational redundancy, flirt with order, disorder, and the entropy of information: in *CrossWorlds*, the artistic proposal integrates the concepts of a scientific corpus born post-war under the impetus of Claude Shannon. A true dialogue between art and science is presented here.

Fig 1. Olga Kisseleva decoding a 'CrossWorld' with a mobile phone, 2010

Fig 2. "Olga Kisseleva 'Have you enrolled as a volunteer?' from the CrossWorlds series, 2008
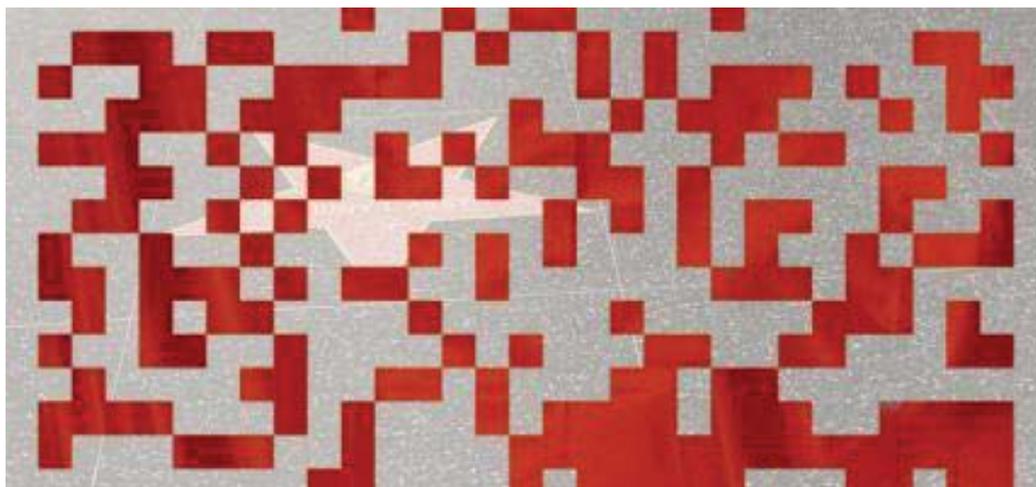
Fig 3. Olga Kisseleva 'Towards the collective' from the CrossWorlds series, 2008

The advent of the digital communication systems at the end of the '90s generated a major change in society. It is undeniable that this technological revolution profoundly modified the structuring of relationships between individuals on the one hand, and between the individual and the collective (e.g., governments, large companies,…) on the other. Using this fact as a kind of anchorage point, I have implemented an original collaboration between art and science, proposing an innovative development as regards a collaboration between artists and scientific laboratory.

My way of working follows an experimental approach: a discrepancy, detected during a process or in the operation of a structure, leads her to formulate a hypothesis, explaining the observation in question, and as far as possible, to propose a solution to the problem. To do so, she identifies the skills required to carry out the studies and pilots the research. I call upon the exact sciences, on genetic biology, geophysics, or political and social science. I carry out the experiments, calculations and analyses, strictly respecting the methods of the scientific discipline concerned. My artistic hypothesis is thus checked and approved with a strictly scientific method.

CROSSWORLDS: CONCEPT AND OPERATION

CrossWorlds is presented in the form of a series of electronic tags printed on formica.

This artwork was produced in the context of Transmediale, the theme of which for 2008 was "Conspire": hidden intentions, hidden messages, hidden things… The piece was created in situ at HKW, Berlin (Das Haus der Kulturen der Welt - the House World Cultures).

When entering this place for the first time, one can feel an atmosphere similar to that of the Soviet culture palaces of the Seventies (time when I, then a schoolgirl and member of the Communist youth, had piano and ballet lessons in this type of institution). However, the HKW is not a product of East Berlin. This famous building was offered by the Americans to the town of Berlin as a sign of friendship in the

Fifties, "to mark", to some extent, their territory. As such, slogans of American propaganda were engraved on the walls of the building - in the figurative sense - as testimony of United States supremacy. What is surprising is that this building is similar to those which the Soviets were simultaneously building on the other side of the Berlin Wall.

I was particularly interested in this point, which led me to explore questions related to the similarity between the cultures of the Eastern and Western Blocs at that time.

ELECTRONIC TAGS: FROM FUNDAMENTAL PHYSICS TO THE TECHNOLOGICAL OBJECT

The electronic tags I use are semacodes, the two-dimensional modern version of the barcodes of the Eighties. Barcodes are omnipresent in the labeling of products or objects (hypermarkets, libraries,...), and are primarily used to ensure the traceability of goods. They are made up of a succession of black bars, the variable thickness of which represents respectively an 0 or a 1. They are, however, more than just a simple technique for the storage of digital information. Barcodes (like the majority of visual codes) are robust in relation to error: they contain informational redundancy, i.e., they contain more information than necessary in order to be able to correct possible misreadings thanks to this additional information (for example, if a bar is not easily readable, with weak contrast, and its thickness is consequently difficult to estimate). Each code has its own performance, which makes it possible to recover original information more or less effectively according to the level of error present.

A datamatrix is a two-dimensional version of a barcode. It's a square of a few square centimetres, made up of juxtaposed black or white pixels (or squares), respectively coding a 0 and a 1. They first appeared in Japan in the Nineties, and were rapidly adopted by the Japanese industry due to their high storage capacity on a very small surface (in particular their capacity to code the kanji of the Japanese language). They are also error correctors: if a zone of the square is blurred, or the level of contrast is weak, and the reading of certain pixels is therefore difficult, the informational redundancy is sufficient to recover the original information as long as the blurred zone is not too large.

The choice of the semacodes (a variant of the datamatrix) for the fundamental base of the work is also an aesthetic choice. The pictogram, which can contain up to 4000 characters, offers a sybilian, cryptic aspect to the eye, which also intrigues one because it is omnipresent in contemporary society, and yet indecipherable without the help of an electronic machine.

In as much as they are error correctors, the barcodes are de facto products of an obsession with security (food or medical safety,...) which increased throughout the Eighties and Nineties and was nourished by our society's growing intolerance of error, and somewhat ambiguous conception of risk (rendered positive when it's associated to innovation and the entrepreneurial, and deplored when it flirts with death - aeroplane accidents, medical errors,...).

The principle of error correcting by redundancy was formalised by Claude Shannon at the end of the Forties in his article "A Mathematical Theory of Communication". Humans have their own mechanism of redundancy which enables them to communicate even under difficult conditions of transmission (ambient noise,...) for a long time: either quite simply by repeating the same sentence several times (collation mechanism), or by adding information another way (gestural), or finally by using contextualisation to decode the information (a word's missing in a sentence, but the context enables us to guess what it is).

In this last case, it's our culture, and our language, which enables us to recover information by contextualisation.

Semacodes are displayable as a two-dimensional matrix of black or white pixels. The visual analogy between semacodes and spins (models from quantum physics, like the Potts or Ising model, and intended in particular for magnetic materials) led me to explore the conceptual similarities between the physical model of spin networks (which has been studied for several decades, and which constitutes the paradigm of statistical physics) and the eminently contemporary technological object that is the semacode, further.

ELECTRONIC TAGS: THE ARTISTIC APPROACH AND THE TECHNOLOGICAL OBJECT

As an artist, I became interested in electronic tags for two reasons. The first approach was formal: she found this geometric form composed of small squares, enthralling from an aesthetic and a semiological point of view. The duality is present in each tag: black/white, dark/light, zero/one. Each time, the tag is like a path to be found in a maze, an enigma to be solved, a truth to be defined. I was seduced above all by the positive Cartesian side of these objects.

But, if the tags have a tempting appearance, from a social or political point of view they also have an alarming dimension. Often invisible, due to their small size, they are omnipresent in the urban landscape, public and private spaces, in the underground, on advertising posters, magazine covers… They differ from the barcodes that one finds on products for sale in supermarkets, in that semacodes are decipherable with a simple mobile phone equipped with a camera and necessary decoding programme (rather than a sweeping laser scanner). Once decoded, the message "enters" the telephone.

All kinds of messages can be adapted to tag technology: simple texts, or more complicated informational structures, such as an Internet address (URL), a hypermessage (sound, image or video), even an order which the telephone will carry out. In practice, when one goes past an advertising poster in the underground with one's telephone on and directed towards the poster, a message "jumps" automatically into one's telephone, inviting one to connect onto the site of the mark in question and buy the latest promotions or the latest models of the range. All one has to do is click on "OK".

We are, in fact, becoming increasingly manipulated by this technology. We have less and less choice: it's binary, between clicking on "OK", and not clicking. All the rest has already been prepared, the path has been paved.

I first came across electronic tags in 2006 during my exhibition at the Guggenheim museum in Bilbao. The project introduced the urban signalling used by people with a minor mental handicap to move around the city, into the museum territory. In several parts of the town of Bilbao where difficulties of displacement or orientation could arise (bus, street, crossing, etc…), electronic tags were present to help them by bringing them the necessary information. The handicapped were to some extent radio-controlled through the city by such tags. It was surprising to note how the handicapped people recovered the faculties of "normal" people thanks to this technology. And in fact, the non-handicapped people became almost handicapped by being inordinately assisted by this multi-media technology.

Obviously, it echoed Soviet propaganda technology used in the USSR, which hammered slogans from dawn to dusk, in nurseries, factories, and at home, that one should adhere to, such as: "do not stray

from the collective", "love your fatherland", "every day the lives of the Soviet people are increasingly happy." One realised in the USSR that another kind of propaganda was being hammered on the other side of the iron curtain, but with a different set of values. When one looks more closely at the slogans of American propaganda, one realises to what extent they are close to Soviet propaganda (in particular when translating Soviet slogans into English, one can see how the same words are used). For example the very Soviet "the dreams of the people come true" is astonishingly close to the American "what the people believe is true".

Each tag is composed of two images: one from Soviet propaganda, the other from American propaganda. Each time, one of the images plays on the black, the other on the white, and together they make up one of the slogans, Soviet or American. When looking at them, one can note a real similarity between the two images, for example between the faces of the Ukrainian dancers, and the faces of Hollywood actress, or more specifically, between Marilyn Monroe's face and that of Lubov Orlova (Russian actress who was the star in all Soviet films at the same time); one is under the impression that it's the same face. When one presents these two images to Western spectators, they think it's Marilyn Monroe's face shown twice. But it is not only a question of faces, but also of common symbols: in one of the tags one can see the red flag brush with a fragment of the floor in the Hall of Famed in Hollywood, with the same stars in the shape of a star personality.

INTERACTIVE INSTALLATION

An interactive CrossWorlds was produced in collaboration with quantum physics laboratory.

By inventing a computer programme which produces semacodes on the go when connected to the Internet, I wanted to divert the semacode from its primary technological function. The programme generates semacodes the original white and black electronic tag pixels of which change colour at regular intervals to ones which remind one of the "flashy" look related to the disco music period at the start of the '80s. This aesthetic choice is not random. The period also symbolizes the advent of perestroika and the East-West detente, and when the Berlin Wall were omnipresent in the political and artistic discourse in the West.

A true semacode does not fluctuate, the pixels do not change colour, the black/white opposition is thus disturbed here by an absurd colour setting, which doesn't contribute anything to the informational level, and even blurs the tag by reducing its contrast. The colour setting, in addition, is random; the choice of colour is produced randomly from a pallet of sixteen colours chosen for their saturated aspect. It is, in fact, a perfectly reproducible chance process, created by a computer program called "pseudo-random generator" which produces in a deterministic way, i.e., predictable and reproducible, a succession of numbers between 1 and 16 which have no apparent correlation between them. This absence of correlation is what makes the succession of numbers seemingly unpredictable, and therefore fittingly random. Following the example of radio operators used by the intelligence services of the former Eastern Bloc to jam and prevent the reception of television programmes produced by Western tv channels, these semacodes jam and thus access to the political message contained in the tag is more difficult. The exhibition visitor, provided with his or her mobile phone and an ad hoc decoding software, is therefore sometimes surprised that he or she cannot decode the message if chance happens to contribute to the situation by significantly modifying a majority of pixels.

CONCLUSION: ART&SCIENCE BASED WORK AS A NEW PERSPECTIVE OF CONTEMPORARY ART

The last two centuries have shown how much researchers, engineers, and scientists have had the capacity to change in the society in which they live, and which they've exerted via a process generally consisting of creating a filament (a new theory, technological invention), or suspending themselves from an existing filament and creating more or less rebellious ramifications of it. The researcher cannot not be responsible. The desire to address such a responsibility becomes more and more pressing over the process of his or her process of maturity.

Art&Science approach concentrates on destabilizing, and taking a certain amount of distance from, the daily practice of research, while taking a fresh look at past work; at the sensitive, laughable or provocative dimensions of the work, which are also fundamental, in that they can constitute a catharsis.

By analysing scientific theories since the second world war, it appeared to me that the theory of information was probably the most disturbing, stimulating, shocking and destabilising to have appeared in the 20th century. In the ultradigitalised information and knowledge-based society, in which the desire for hypercommunication is the rule, it seemed essential to us to propose that one reflect on the significance of this communication and on the structuring of the information implied within it. For the researcher, there is, naturally, a quest for meaning related to the societal implications of his or her work.

Art&Science research upheld by CrossWorlds, and the firmly interdisciplinary character of this approach, has enabled me to provide a resonance to this work that is scientific, aesthetic and political. Cross-Worlds has quite naturally given rise to the concept of informational resilience: resistance to censure, propaganda or truncated information, the fundamental role played by the redundancy in this resistance, multiplicity of channels of access to the information, intransigence to error or to jamming. Such key points will be refined, disclaimed, and put to the test, in future work.

INFRA|VERGENCE

Brad Kligerman, Jamil Mehdaoui & Sinan Mansuroglu

Immersive visualization reveal the dynamic form of communication and transportation infrastructures as it facilitates the simultaneous occupation of digital and physical worlds across, online server, virtual worlds, and physical space. A visualization of the metaverse's sustaining infrastructure emerge by mapping its form, structure, scale and extents based on usage data flowing through it, focusing on their divergent/convergent qualities.
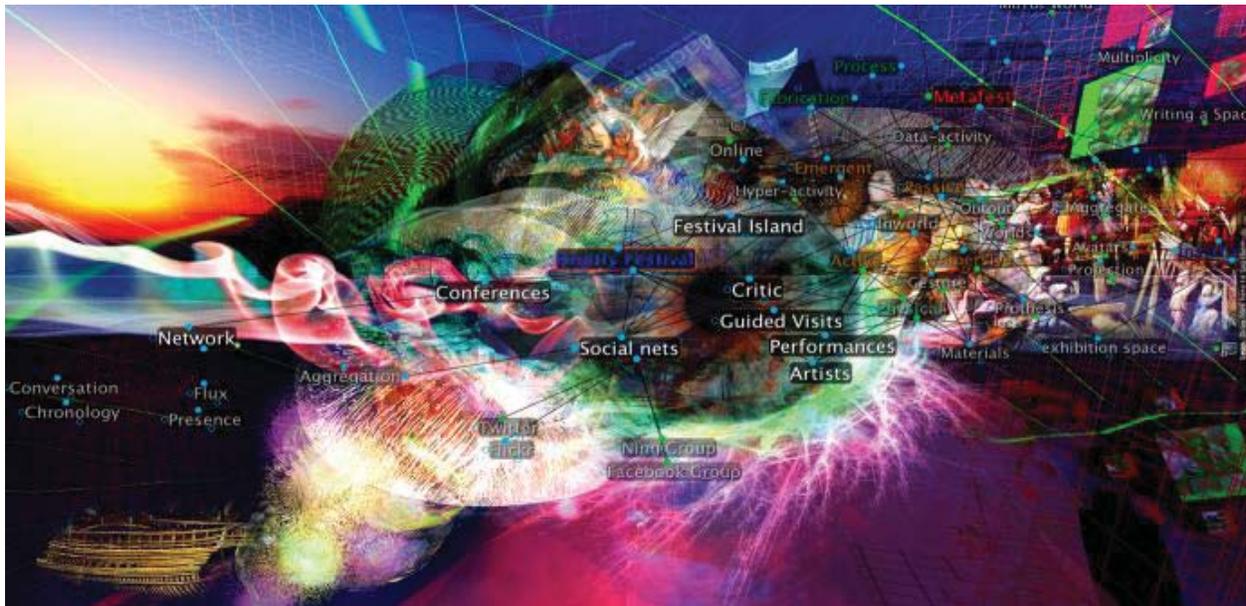
(E)Space, immersive visualisation by Bradley Kligerman and Jamil Mehdaoui (Building W/Immaterials

The project's objective is to employ immersive visualizations to map the dynamic form of the Metaverse. This will be achieved by creating a representation of its network infrastructures, the multitude of communication and transportation networks that span between its digital & physical states, from : online social spaces, 3-D immersive worlds, geospatial worlds and the physical world.

infra|vergence is a research/project into how to map the scale & extents of the metaverse based on passively capturing network data flowing through this complex infrastructural nexus.

infra|vergence is also a project/research. By focusing on the divergent/convergent qualities of the metaverse, a visualization will emerge showing not only a quantitative representation of this network, but also an expression of its qualities.

This presentation will be illustrated by referring to other projects that have been created for the metaverse.

Key Concepts

We will begin by establishing a common definition of the METAVERSE to help avoid ambiguity and to determine the scope of this project.

metaverse : We define METAVERSE as the collective, consensual space created from the convergence of digitally enhanced physical reality and physically persistent virtual and online worlds. The METAVERSE is composed of the sum of all virtual worlds, augmented realities and network enabled services for communication, collaboration and location.

components of the metaverse

1. Virtual worlds : A virtual world is synchronous, persistent network of people (represented as avatars) interacting in a physically coherent spatial environment that is rendered by networked computers.
2. A user is considered INWORLD when he/she is active in a specific virtual world.
3. Metaverse Roadmap (Smart, Cascio & Jerry Paffendorf, 2007) : "the convergence of virtually enhanced physical reality and physically persistent virtual space." In fact, it is a fusion of both, while allowing users to experience it as either.
4. This last point is essential. "allowing users to experience it as either" implies that, whether INWORLD or not, one can be constantly engaged or co-present, with the metaverse, constantly in contact with it through social media or geospatial worlds. This hypothesis is essential to how we collect our data.
5. mirror worlds : informationally -enhanced "reflections" of the physical world, creating a service used for real world orientation and navigation, for example Google earth
6. augmented reality : exists through the use of technical interfaces, such as mobile computing devices, to enhance the external physical world by superposing location-aware information on top of our everyday perception of the world
7. all of these components of the metaverse overlap and converge to fabricate an immersive, albeit fragmented, experience for consensual users.

FRAMEWORK

The essential support structure of this project (its framework) is the technical infrastructure, the persistent data networks, and the social constructs emerging from them.

Due to the complexity of these divergent and convergent infrastructures, their simple classification transcends of any one of them. For example : information infrastructures (making possible global communication) are augmented by transportation infrastructures (enabling mobility) to compose dynamic urban environments; financial infrastructure are magnified by legal systems to define market economies; supply chains are brought into focus by energy infrastructures to determine the patterns of territorial occupation...

An infrastructure can be represented as a function of the quantity and quality of the data that circulates through it.

ACCELERATOR

In addition to infra|vergence's stated objective to Map the Metaverse, we are committed to carrying out research concerning metaverse ecosystems. These include addressing innovation in the design and building of immersive 3D environments and the unique media-forms it enables. But also, engaging a program of design research that specifically addresses the metaverse and its relationship to the discipline of ARCHITECTURE.

We call this program of Design Research SPATIAL INQUIRY, the independent research for the invention of new spatial/structural typologies. Our active participation with "vehicles of cumulative innovation" will help assure that architects meet "the challenges posed by contemporary society, thus translating those challenges into viable briefs and design tasks to serve to upgrade architectures' capacity to fulfill its societal function" within our "Networked Society".

The following project will describe how our control group, a participating community of metaverse residents, are organized.

Project : (REZ)ident

Infra|Vergence will focus on co-presence as one of the metaverse's singular qualities. The project's incipient stage is the development of its propriatary database. During metaREZmalaquais workshop (École Nationale Supérieure d'Architecture Paris-Malaquais, February 2011), an Inworld residence on the ARCHI21-World Island (in the virtual world of Second Life), residents generated this database. A multiplicity of projects concerning the spatial organization and sustainable development of the ARCHI21 project's collaborative, networked environments were developed passively, recording of their inworld activity (movement, collaboration, building...). This database will enable workshop participants to follow-up the experience with a project of cartography.

MAPPING

Generating the actual visualization of the metaverse, takes place via a process called MAPPING. infra|vergence proposes to map not only the scale & extents, but also the form&structure of the metaverse based on data intensive usages of this complex nexus of infrastructures. To achieve this, we rely on the HYPOTHESIS that a network infrastructure can be shown as a function of the data that circulates through it. Thus, by measuring network activity concerning specific metaverse related tasks, we can make this network and its infrastructure visible. Data will be captured from the network activity of a diverse community of metaverse users, the project's CONTROL GROUP. Information will be captured by observing simple, pre-defined activities (or gestures) that are inherent to each world.

The Data types are qualitative data, which asks, "What is the activity?" (building, logging in, holding meetings, chatting, shopping...); quantitative data, which inquires as to the intensity of any one activity (its duration, how many (people, objects, things...), how much...); and locational data, which asks, "Where is the activity taking place?" (physical world, virtual world, social network...).

Although the activities are not necessarily the same in each world, they are compatible and comparable. : For example, bodies are mobile in both physical and virtual worlds, and, while not entailing the same

act (ie, taking an airplane vs. teleportation) the results can produce comparable quantitative and qualitative data (distance, location, velocity...) attesting to the specific activity. The compilation of this data will serve to describe the services (protocols, debit, units of exchange, location...), physical, locational and technical qualities (connective matrix, location, technology...) and the geographical territory in which infrastructures' are deployed.

Project : (VIZ)ualisation

During the metaREZmalaquais workshop where residents were generating a multiplicity of projects, metaCARTOgraphy challenge to trace residents path and activity. Its goals were to capture these informations, a bracelet was distributed to each resident, containing a script to record residents' inworld activity and transmit the data to an online database. All the residents wearing scripted prothesis were passively recording and transmitting data about their presence, their location and their proximity to each other. The collected data is agregated in a databse hosted by Pachube, a web-based service built to manage the world's real-time data. The visualization of simple tasks or events through recorded data was developed using grasshopper, which is a graphical algorithm editor.

These visualizations were developped both with historical and live data streams. Based on historical data-sets recorded during the workshop to manipulate these data in an offline mode. Otherwise, using real-time data-streams to feed and stimulate pre-established visualization frameworks. The process mentioned above allowed us to build a bridge between three environments: the workshop's ARCHI21 island, the pachube's online database and grasshopper's algorithm editor. The output was generated in Rhinoceros's 3D modeling environment in which Grasshopper is tightly integrated.

VERGENCE

Although data is objective project parameter, a numerical value, its subsequent representation is subject to interpretation. We developed spatially immersive visualizations as our interpretive, representational tool. These visualizations will evolve from 2-dimensional graphic abstraction to interactive, tactile spatial immersion, by accruing informational, material and spatial dimensionality. These representations will be built into an immersive virtual environment whose physics, spatial coherence and topography will be designed to SIMULATE scale, distance, interactivity and modularity... Embedding visualizations into immersive environments is compatible to the process of data mapping (which is the creation of functions between distinct data models, for data integration).

Thus we strive to effectuate a direct correlation between the content (or data) and its representation (or mapping) : for example, when expressing the SCALE of the metaverse, an immersive visualization permits us to develop a 3D space whose size and navigation are a direct (not metaphoric) expression of its scale. This is due to the fact that immersive visualizations take place in a virtual environment with physical characteristics (physics, movement, temporality) similar to the physical world we inhabit.

It is not a question of mapping the totality of this infrastructure, but of determining their extents. : The physical, virtual and online worlds of the metaverse each possess an inherent logic that is divergent and convergent with one another. Therefore, the actual extents and limits of any one world of the metaverse are nebulous; the lines separating them are blurred by their dynamic co-dependence. Interpreting

this data will be accomplished by isolating specific states within each world and representing their points of vergence, revealing the tension between :

comparable states (or activities) in different worlds (ie, distance and velocity for comparing mobility in virtual and physical worlds); different states (or activities) in the same world; and,

simultaneous activities in more than one world (ie, interactively representing the same data-set in a virtual world and in an online visualization).

Project SCOPE

To avoid analogy, metaphor or abstraction when attempting to represent the scale, location, rhythms or textures of a complex, global network such as the metaverse infrastructure, we will be striving to create an expression of the metaverse that goes beyond merely mapping its quantitative data --striving to combine representation and sensation. in the context of the infra|vergence project, this is a process entitled : DESCRIPTION/ENCRYPTION

This expression is, in fact, a means of FRAMING the world in order to better see the metaverse. Framing is "a system of entities, postulates and rules that enables society to identify, perceive and label an emergent phenomenon from the seemingly infinite number of occurrences". The Immersive Visualizations to be developed by infra|vergence allows us to frame the extents of the metaverse.

DESCRIPTION/ENCRYPTION as an creative tool We strive to development representations that express the sensation of inhabiting a data saturated metaverse. What are some of the omnipresent realities that are deeply embedded in our quotidian experience, beyond our perceptive capacities? If daily interaction with volumes of data and numerous messages is part of our new "data-subjectivity," how can we represent this experience in new ways? How can immersive visualization express the ambiguity, the otherness, the multi- dimensionality of our experience, going beyond already familiar and "normalized" modernist techniques of montage, surrealism, abstraction, by formalizing the fundamentally new dimension of being "immersed in data?"

This expression will take the form of not only visualization graphics, but especially of IMMERSIVE VISUALIZATION They will permit the revelation of the dynamic, evolving form of communication and transportation infrastructures as they facilitate the simultaneous occupation of digital and physical worlds across three networked spaces.

Framing

Data visualization in 3D environments becomes a question of inventing legible objects and spaces that are capable of revealing the situations, places or things that compose the metaverse. 404-Window is an installation presented at the 404 Festival in Trieste, Italy in 2009. Its goal was to "open a window between virtual and physical worlds; it accomplished this throught the fabricataiton of "real images from virtual worlds and virtual images from real worlds."

Through the use of real-time montage from within a virtual world, the superposition of a real virtual landscape (Sizigia, Second Life) is framed by a Heads-up Display (HUD) that is also connected to a database embedded in that virtual world, and accessable at geographically located beacons.

404Window is both a machine fabricating a dynamic spatial composition from the convergence of image and movement, information and form, meaning and emergence, space and force; a device for reading and writing the essential organization of a world (physical and virtual); and, a dynamic representation capable of revealing these conditions through the fabrication of an Image-Space. In this context, data visualization in immersive spaces becomes a genuinely new cultural paradigm.

Dataflow

The framework of computation and network connectivity is organized according to a Dataflow graph containing nodes that produce data streams (inputs), nodes that transform data streams (programs, algorithms, APIs, libraries) and nodes that consume data streams (output). Dataflow as a model of information processing is based conceptually if not physically, on a graph of data flowing between operations. Dataflow promotes the data in the system as its main component. Systems conceived using the dataflow prototype start with an input and succeed by illustrating how that data is used and modified.

This enables real-time message handling, a procedure necessary for this project

The following related project description fills in some of the details of the dataflow machine employed by the infra|vergence project.

Work Process

For creating an immersive representation of the metaverse, infravergence will be harvesting historical and live data streams from networked sources, using them as raw material in a collaborative design environment. By measureing and comparing simple usage patterns inherent to each spatial typology, we can employ quantifiable and qualifiable data types. Data will be scraped from open source resources, open API's or publicly avaible sources to extract and interpret network semantics and I/0 data. Generative algorithms will be used to aggregate data-sets for the creation of meaningful spatially immersive 3-dimensional visualizations.

We will use visualization techniques to model the metaverse infrastructure based on data exchanges resulting from a simple network activities by the infravergence community.

By capturing simple actions through the passive observation of the infravergence community, measuring its movement and location, online and inworld activity, we can qualify, quantify and localize activities in each world. By organizing the data according to forms, textures, scales, proportions and many other characteristics based on keyframes consisting of coincidential events capable of placing the metaverse's three worlds in tension. Visualizing these points of vergence in a spatially immersive visualization, composed of 2 and 3-dimensional, stable and unstable, passive and interactive representations, will allow us to represent and reveal the supporting infrastructure of the metaverse, thus mapping the scale, texture, intensity and context of this infrastructure. By accruing informational and spatial dimensionality, the

project will push its visualizations to evolve from objective abstraction towards spatial immersion. Visualizations will be created using interactive representations built into an immersive virtual environment whose physics, spatial coherence and topography will be designed to simulate the scale, interactivity and modularity of the hybrid infrastructure's form, location and intensity.

1. Create a representation of the metaverse, a map or visualization of its scale, limits and size that is both graphic and immersive, interactive and tactile.
2. A program of design research

- - Research into visualization design : Develop knowledge concerning the coherence between the semantic and formal aspects of data visualization. How is the content or meaning of the data related to the formal qualities of its representation? (i.e. : using virtual worlds to represent information about the metaverse).
- - Open Source Architecture : projects whose "production and critical, public, client (and) peer-related (reception) form part of the project itself, creating a feedback loop that can ground—or unmoor—a project's intention and ultimately becomes part of it..." These projects "supersede architectures of static geometrical form with the introduction of dynamic and participatory processes, networks, and systems... distinguished by code over mass, relationships over compositions, networks over structures, adaptation over stasis."

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CURIOSITY AS AN ARTIST'S BRIEF

Rudi Knoops

In this paper I will discuss some techniques that I use as an artist to instill curiosity. The criteria for my 'discourse' are set out by Stephen Bann in his book "Ways around Modernism" wherein he formulates an "ambitious brief for the present-day artist in respect to curiosity".

I will elaborate on this brief with references to my own work, and show how a media-archeological mindset can be a source of inspiration for an artist.

Fig 1. recording session with Psallentes @ AMUZ, Antwerp, Belgium. © Rudi Knoops

Fig 2. DIORAMATIZED #02, installation view @ M - Museum Leuven, Belgium. © Rudi Knoops

Fig 3. DIORAMATIZED #02, Psallentes? performing Hildegard von Bingen. © Rudi Knoops

The criteria for my 'discourse' are set out by Stephen Bann in his book "Ways around Modernism" wherein he formulates "a specific and ambitious brief for the present-day artist in respect to curiosity." [1]

I will here discuss some techniques that I use as an artist to instill curiosity, and elaborate on the three elements of Bann's brief:

1. that the practice in question should combine the process of experiment with the irreducible appeal of the singular object;
2. that the artist should seek to adopt, and of course to revise, historical precedents reminiscent of earlier conjunctures between art and science;
3. that our attention should be drawn to particular, appropriate types of locale for the work. [1]

The Brief - part 1

In a confrontation of present-day art practices with this brief, Bann refers to curiosity as a historical ricorso: the recurrent practice of retracing some of the older pathways with their ambiguous connection with art, science and technology.

For audiovisual media, this return to curiosity is advocated by different scholars in the field of media-archeology:

This anarchaeology of media is a collection of curiosities. [...] By curiosities, I mean finds from the rich history of seeing, hearing, and combining using technical means: things in which something sparks or glitters – their bioluminiscence – and also points beyond the meaning or function of their immediate context of origin. It is in this sense that I refer to attractions, sensations, events, or phenomena that create a stir and draw our attention. [2]

Harking back to this 'deep time of the media' and uncovering undeveloped possibilities can be an important source of inspiration for contemporary art forms. A media-archeological mindset becomes a fertile context for serendipitous insights, a trigger for "fortuitous finds instead of searching in vain." [2]

The link between curiosity and research methodologies used is obvious: as the fortuitous finds that shock you into the awareness of new possibilities are unquestionably also the most interesting finds, curiosity – in its general meaning of an inquisitive interest – is always part of any research approach. My own practice, characterized by a research through design approach, could thus easily be rephrased as research through curiosity, or research guided by curiosity. And "it is the by-products of experiment that will often prove to be the most important dividend, at least for the artist." [3]

The Brief – part 2

Adopting media-archeology as a methodology has already partly answered the second part of the brief. But I still have to elaborate here on the media-archeology based techniques I employ in my work as a media artist, namely re-injecting analogue elements into the highly digital apparatus that video has become. The technique of anamorphosis is one such form of mediation that I use in my work.

It is however not a pure analogue form of mediation, as I first use algorithms to 'anamorph' digital video materials, and secondly I implement, on the viewer's side, mirrors that function as hardware mediators between the projected visuals and the viewer.

In fact it is a hybrid combination of exploiting the possibilities of the existing digital apparatus, and adding an analogue/hardware form of mediation using mirrors that questions the traditional audience-screen relationship.

ANAMORPHOSIS

Definition of Anamorphosis:

1. A distorted projection or drawing of anything, so made that when viewed from a particular point, or by reflection from a suitable mirror, it appears regular and properly proportioned ; a deformation. [4]

Anamorphosis is an optical curiosity that has a long history of being positioned on the intersection of the fields of science – architecture, optics – the magical and art. As an optical subterfuge anamorphosis is especially interesting because of its interfering with the laws of perspective: while asking the observer to view the distorted shapes from a determined point – thus enforcing a certain perspective upon the observer – anamorphosis at the same time shows the illusion of that perspective.

Exploiting this core characteristic of anamorphosis – the inherent possibility to impose perspectival limitations – touches the core of my PhD research wherein I explore how interventions on a number of parameters of the video apparatus can generate a sense of wonder and curiosity with the observer, in search of a contemporary iteration of the concept 'cinema of attractions.' [5] 'Cinema of attractions', not in its meaning of historical time indication in early cinema theory, but in its meaning of being an ever present undercurrent surging to the surface whenever the fascination for and the explicitation of the medium takes the lead.

Anamorphosis perfectly fits this picture of what a cinema of attractions can be, firstly by exposing the laws of perpective and thus focussing on the medium itself, but in second instance also by its many references to the realms of the phantasmagoria, the uncanny, the magical and the taboo.

Daniel Collins' description of the observation of a single anamorphosis is of interest in this context

To observe anamorphic images, one must be an "eccentric observer", that is, an observer who is not only a bit "eccentric" in the usual sense of the term (i.e. "strange") but an observer who is willing to sacrifice a "centric" vantage point for the possibility of catching a glimpse of the "uncanny" from a position off-axis. [...] An eccentric observer is exactly the observer of the anamorphosis, an observer who literally "stands apart" and is self-aware of the process of seeing. [6]

In contrast to the traditional Albertian one-point perspective representation, that solicits an immobile stance from the spectator, an anamorphosis demands a dynamic act from the observer, an exploration of the 3D space wherein the anamorphosis is projected or displayed, in search of a favorable vantage point from where the warped 2D image coalesces into a coherent form.

One main type of anamorphosis is the group of catoptrical anamorphoses where special mirrors – cylinders, cones, pyramids, prisms – are used to reconstruct the distorted image. [7] In cylindrical anamorphoses a mirror in the form of a cylinder has to be used in order to view a reconstruction of the distorted image from a specific vantage point.

It is exactly the possibilities of cylindrical anamorphosis that I explored for the visual part of the media-installation DIORAMATIZED #02.

DIORAMATIZED #02

DIORAMATIZED #02 is an experimental design exploration in the framework my PhD research. I coined the word DIORAMATIZED because it refers on the one hand to the 19th century phenomenon of dioramas of which it transposes a few parameters into a contemporary interactive media formula: the modulation of light, the use of sound effects, the application of perspective, [8] the use of multiple moving images, or sometimes moving observers. On the other hand the word DIORAMATIZED carries some of the meaning of the word 'dramatized' as the multiple auditive and visual elements are presented in a very theatrical setting.

DECONSTRUCTION AND OPPOSING FORCES

The musical content of DIORAMATIZED #02 is the performance of Gregorian chants from four antiphonaries. For each of the antiphonaria the singers are filmed individually from top to toe against a black background. The video footage is being warped and displayed as separate visual elements. In the centre of each warped image is a cylindrical mirror. Only by looking at the mirror from a specific vantage point you will see the original recording dewarped correctly, the viewing angle being the key to 'decoding' the distorted image.

For the audio part of the installation, also each voice was recorded isolated. Each of the five visual layers has a corresponding sound layer, and the listening 'angle' coincides exactly with the angle of perception for the visual anamorphosis. But there is a difference built in that introduces friction between sound and vision.

From a distance, it is the sound emanating from the cylindrical construction that lures the observer to approach the installation. Upon discovery that next to sound, there are also images on display inside the contraption, the exploration of the manipulated layers of sound and vision can start.

The best position for perception of the sound layers is exactly in the centre of the installation, where the different sound layers merge into a 'surround' sound. The visual part of the installation works slightly different. Focusing on just one of the anamorphoses, it is perfectly possible to find a correct vantage point. Through the use of multiple anamorphoses however, and the specific circular setup, there is no ideal position to get a combined visual overview, and the search for good visual perspectives drives you away from the centre of the installation.

There is, in addition, the discrepancy between the size of the warped projections and the size of the dewarped reflections in the cylindrical mirrors. The warped projections function as points of attraction because of their sheer size and luminosity. When exploring the installation however, the dewarped cylindrical reflections may take over as main points of interest. As observer – an active viewer/listener – you make your own choice between these opposing forces of sound and vision.

The Brief – Part 3

The media-installation DIORAMATIZED #02 is an integral part of the exhibition 'Divine Sounds – Seven Centuries of Gregorian Chant Manuscripts in Flanders' at M – Museum Leuven from september 8 till november 27, 2011.

The centre of the exhibition is not only these manuscripts, but the audible music itself. Visitors can hear the music they are looking at, and listen to diffences in style, form and performance practice in the installation DIORAMATIZED #02 by multimedia artist Rudi Knoops. Three top ensembles – Cappella Pratensis, Psallentes and Psallentes♀ – breathe new life into four antiphonaries from the eleventh, twelfth, seventeenth [...] and eighteenth centuries. The integration of an installation with historical heritage raises that heritage to a new level: that of contemporary art. It refreshes our collective memory and brings it up to date; the ancient traditional chants not only get a fresh coat of paint, but become an essential element of a new artwork. [9]

As visual concept for integrating the installation into the white exhibition space, I covered the top part of the installation in a mirroring sheet, and the reflecting light of spots draws a full circle around the installation, in balance with the light level allowed for the precious manuscripts on display. At the same time keeping the centre of the installation as dark as possible to guarantee the best visual quality of the images projected inside the contraption.

Second element of this lighting concept is an inverse application of anamorphosis, now utilizing pure light. On the inside of DIORAMATIZED #02 I use warped video projections and from specific vantage points you can see the video images reconstructed in the mirrored reflections. On the outside of DIORAMATIZED #02 however, I use lights that are reflected by the mirroring hull, throwing warped reflections on the floor that merge into one shimmering nimbus of light.

Third and final function of having this aura of light around the installation, is a reference to light being filtered through the stained-glass windows in a Gothic cathedral – which still is the ideal location for performing Gregorian chant.

Thus recreating part of the atmosphere of an "appropriate type [...] of locale for the work" comes close to an answer to the 3rd part of the brief of Stephen Bann.

Challenging the traditional audience-screen configuration

Through the use of anamorphosis, and especially through the multiple use of anamorphosis, I challenge the traditional audience-screen configuration. Instead of a viewer immobilized in an Albertian tradition of static one-point perspective representation, the observer becomes an active participant, who's full sensorium of vision, hearing, feeling, walking ... is called upon.

In this dynamic act of exploring the multiple images and sounds on offer in the audiovisual installation, the peripathetic observer becomes an active participant in the articulation of the projected – or (re-)presented – objects, and constructs his own perspective on the music performed.

This concept of the construction of vision through the dynamic act of the observer, comes close to an embodied phenomenological concept of perception. Mark Hansen positions the 'affective body' right in the centre of the perceptive act. In his neo-Bergsonian phenomenological concept of perception as an act of subtraction 'affectivity' is the sum of the "bodily modalities of tactility, proprioception, memory and duration." [10]

In DIORAMATIZED #02 it is the friction between sound and image that stimulates curiosity. Curiosity as the driving force, the trigger for bodily activity, the formative power in a dynamic and personal sensory experience.

As observer you engage with the installation, aware that what you see and hear is the result of a specific media configuration, but at the same time you are at risk to lose yourself in a fascination for the mirrored world created in this Wunderkammer of sorts.

In contrast to Collins' description of the 'eccentric observer' of one single anamorphosis, the viewer/listener explores the innards of DIORAMATIZED #02 – with its display of multiple anamorphoses – from within the installation. Instead of being an 'eccentric observer' in the literal sense, the viewer/listener immerses himself in a multi-perspective experience that challenges his curiosity and invites to explore these multiple perspectives.

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CROSSING OVER: ART, DIGITAL PERFORMANCE AND PRACTICE-BASED PEDAGOGY

Rachelle Viader Knowles, Wade Sakundiak & Kathleen Irwin

Crossing Over Web interface, designed by Wade Sakundiak

What we do, how we choose to act and interact and 'spect-act', perform and play and replay, will differ for each of us, at each moment, and for many political and personal reasons. One thing only is certain; we will be faced with such choices in 'real life' and in any number of digital or virtual performative spaces as well – even in our own imagination and dreams; in the spaces of our own desires (Goodman 294).

 Crossing Over (http://www2.uregina.ca/crossingover) is an ongoing project devised by Kathleen Irwin and Rachelle Viader Knowles, connecting students from the Faculty of Fine Arts at the University of Regina with other students around the world. The workshop is a pedagogical art / performance / video project that investigates and engages the terms of cosmopolitanism as a way to constitute meaningful social networks by exchanging virtual performances -- and suitcases -- over the internet. The question that the project asks, about our responsibilities to strangers, is critical in light of global mobility, the blurring of borders and the instantaneous exchange of information that crossing over points, both real and virtual, represent. During the workshop, these ideas are explored using readings from Kwame Anthony Appiah's Cosmopolitanism: Ethics in a World of Strangers (2006).

A visit to the website shows how the exercise unfolded. Student players in both locations were required to fill in an online immigration form in order to construct a real or imaginary identity. Each packed a "digital suitcase" with personal belongings (images, sound fragments, text, etc.) to equip them in their new life and to transport across a virtual border (or in this case, to upload to a baggage conveyor belt on the website). With the click of a mouse, students in the arrival country claimed suitcases from the conveyor belt and opened them, thereby making the contents available for public scrutiny. Following this

point of entry, emigrants were no longer in control of their destinies, as the recipient of the luggage was left to sort out its contents and plot a putative future based on knowledge of the current socio-political contingencies in the arrival country. The process attempted to replicate the crossing of international borders for immigration, emigration, or asylum seeking and suggested the tensions that occur when the fragments or "facts" of one's existence are publicly displayed and possibly misinterpreted. Through the process, students were asked to consider their own country's migration and refugee policies, their own response when confronted with "otherness," and the problems associated with communicating the signifiers of one's identity in a public forum in ways that may deleteriously affect outcomes.

The Crossing Over workshop offered during the 2011 ISEA conference is the second iteration of the project, connecting students from the Visual Communications Design program at Sabanci University in Istanbul with students from Visual Arts, Film and Theatre Design at the University of Regina in central Canada. The larger context is the city of Istanbul, itself a gateway or crossing over point between east and west, a cultural and creative nexus between diverse people and practices in art, philosophy, science and technology. The first iteration of the project/workshop was carried out in 2008 between students in Fine Arts in Regina and students at the School of Art in Utrecht in the Netherlands. The project was conceived during Knowles and Irwin's tenure as University of Regina Teaching and Learning Scholars, a program designed to challenge university faculty to move beyond traditional divisions between research, teaching and service and towards more multilayered, interconnected, and interactive conceptualizations of faculty work. This project develops out of a teaching methodology, shared by Knowles and Irwin. It combines studio practice and theoretical investigation and understands that such interconnectivities encourage students to think broadly, deeply and creatively and to explore the possibilities that exist where one or more disciplines and cultures intersect or collide. Crossing Over concentrates on processes, theories and paradigms for innovative practice-based research that traverses distance, time, language and disciplines. It provides a framework for collaboration that engages students in a creative exchange of "identities" within a post-colonial context. This second iteration of the Crossing Over website was designed and build by Wade Sakundiak from the University of Regina Centre for Teaching and Learning, utilizing several technologies to realize the project goals. The site is built using ExpressionEngine, a CMS (Content Management System) used to facilitate user interaction with the database which holds each participants responses to the questions asked during the 'immigration' process. Building upon this base, Javascript and HTML 5 provide the frontend functionality and animation throughout the site, lending an element of authenticity as visitors explore participant profiles.

In the absence of avatars and mythic scenarios, as an interactive web-based activity, Crossing Over operates more as an international parlor game, played out in real time and at street level. The rules of engagement ask players to perform identities and respond in kind to their international teammates. In so doing, participants blur the distinction between performance and social networking. Players are asked to question the representational armature of narrative and character that conventional performance operates within and to see digital performance as a fluid, and evolving field - an intertextually coordinated, multiply located discursive field of operation.

The project is part of Knowles and Irwin's ongoing research investigating changing modalities of performance that asks whether the Internet has any distinct, useful or unique characteristics that offers performance anything other than merely another means of distribution. In 1991, Brenda Laurel wrote that media opens new possibilities for experience and speculated that virtual reality would, in due course, contain more functions than databases, games and networks (Laurel 194-95). Less than two decades later, much has changed and such a statement is reductively self-evident. Indeed, while the internet today provides a multitude of opportunities for rich social interaction and 'stealth' learning outcomes,

the opposite is also undeniably true. It offers countless portals and opportunities for considering options and confronting difference, not all of which are congruent with the ethics of cosmopolitanism. Yet the consideration of these ideas, framed within practice-based research, offers a productive, albeit playful, exercise in implementing ethical strategies and rehearsing life skills necessary to function in an interconnected global community. The students who participate in Crossing Over are quick to recognize the limits of the paradigm we propose but are prepared to struggle with the ethical question Appiah posits – "how and to what degree are we responsible for others and how far do we extend kindnesses to strangers?" – as well as the related questions we proposed: "how do these questions relate to art making and new modes of dissemination and performance?"

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HYPERPRESENCE: TELEPRESENCE VIA QUANTUM CINEMA

Osman Koc

Today's technology enables us to impact and observe places by different teleprescence methods. Teleprescence methods have been implicated into various applications such as robotics, communication and art. The paper aims to introduce a new teleprescence application for cinema, which creates a customized narrative by using the user's bio data.

HyperPresence, Osman Koç and Fethi Can Tüzel, 2010

As technology enables not only processing data but also transmitting them, we started hearing and using "tele" as a prefix in our daily lives. It has been attached to many different words such as telecommunication, television, teletext etc. After these reinterpretations of actions occurred with the advancements in technology and industry, another 'tele' prefixed word has been created, namely teleprescence. Scott Fisher, one of the pioneers of the concept, explains "a technology which would allow remotely situated operators to receive enough sensory feedback to feel like they are really at a remote location and are able to do different kinds of tasks."

Teleprescence encapsulates several subsections in industry like tele-robotics, video conferencing and so on. Each of these subsections approach to the aspect of stimulation of the remote location and sensory feedback from different angles. In tele-robotics the sensory feedback is mechanical, but the remote location can be virtual (haptics) or a robotic system (bilateral teleoperation). In both approaches the tactile sensation is crucial. The main purpose for tele-robotic applications is the remote location being haz-

ardous or inaccessible. Telepresence robots are also becoming popular, as they allow visual and auditory transparency, as well as controlling the motion of the robot in physical space. In video conferencing the immersion is enhanced by eye-contact and having the same interior design for the physical spaces at both sides.

There has been different ways of telepresence techniques experimented for artistic purposes. Kirk Woolford's work approaches to this concept by using the flow of air as a medium of telepresence. Two people wearing belts made of fans are present in two separate rooms. The cameras installed to the ceilings enable the users to be in the same room virtually. The way to sense each other occurs through the wind one creates as it passes by the other, which is created artificially by the fans.

In order to extend the boundaries of the telepresence concept, it might be illuminating to think about different media in which the user is immersed consciously or unconsciously, but does not have an active role. Edward Packard's "Choose your own adventure" book series offer an example to this argument. In the books, the user is immersed by the scenario of the books, while having the opportunity to initiate on some choices. For example the reader can decide whether to go out by the door, or escape from the window, by jumping to the corresponding page, which gives the reader the liberty to customize the narrative of the scenario. As the narration is customized, the reader gains an active role, therefore, even though it does not accommodate any technological infrastructure, Edward Packard's concept can be considered as telepresence also.

This article aims to introduce a new way of telepresence, through an interactive art installation called "HyperPrescence" implemented in collaboration with Fethi Can Tüzel in 2010. In order to delve into the subtext of the project, the teleprescence concept is fragmented as remote location and stimuli, which will be expounded in detail in the following sections.

REMOTE LOCATION

Remote location is the part of the system which is observed and manipulated. Depending on the system, the observing medium can be visual, audial or mechanical. In order to sustain immersion, it is compulsory for the remote location to provide transparent sensation to the user. In systems where the remote location is a physical space, immersion becomes dependent on the quality of the data, which is provided by the sensors. For example, if the user is supplied with the visual data from the location, and the quality of the image is inadequate, the user becomes aware that the image is not real, but merely a representation of the reality. Apart from the quality of the data, in systems with multiple sensory feedback mechanisms, the delay and synchronization also becomes pivotal in order to provide transparency. Immersion with virtual spaces is more complicated to achieve. Human cognition distinguishes real and virtual depending on the experience based reality perception. The virtual reality environments fail to mimic physical spaces, thus the immersion wanes. As the action-reaction relation continues, the conscious immersion starts to build. Virtual environments are built on mathematical models. We can consider reality as an n-dimensional entity (n being a positive infinite number), but the performance of the affordable technologies allow realizing the reality to some extend in order to sustain the real-time specifications of the system. Until the model based realizations reach, maybe not to the n-dimensional reality, but up to the human perception limit, virtual environments will always be distinguishable regardless if they are visual, aural or mechanical.

Cinema can be considered as a midway between physical reality and virtual reality, as it seems real, but the context and the time may not be. Thus, it represents a reality which does not originate from any particular bit of the real world, or as Jean Baudrillard names it "hyperreal". In a cinematic experience, the audience attests the juxtaposed images which might construct a reality effect, albeit the fact that neither the context nor the time of the film are necessarily derived from reality. But the perception of quasi-real images is sufficient for the audience to be submerged in the experience unconsciously; hence constituting a counter-example to the physical and virtual remote locations, where the user's consciousness tries to disrupt the immersion. This immersion into cinema is called as "the suspension of disbelief." Thus, this concept can be exploited for the sake of telepresence, as the audience already evolves an immersion unconsciously. To close the sensing-acting loop, this unconscious state can be exploited as well, which will be elaborated deeper in the stimulation part.

In order to sustain and enhance the suspension of disbelief or the illusion of reality, the perception of the audience should be considered. Cinematic experience is subjective. Thus, the usage of some filming techniques causes different effects on the audience. First person point of view anthropomorphizes the observance, hence enhancing the immersion, as the user is not just an observer in the represented hyperreal space, but it observers as a passive character inside the actor. The technique can also be augmented by adding some eye-blinking mask to the video.

Other than visual technique preferences, the soundscape of the film also affects the immersion. As explained by Denis Pegge, the audial elements are ingrained depending on the audience's experiences. The sound of an object in the video may be different than what the audience would have expected, which cracks the illusion. Another audial element of the video would be speech. Speech would diminish the effect of the video by attracting some attention to the context of the speech, which is even worse for non-native audiences, as a result of the subtitle texts.

Lev Manovich denotes, emergence of the new media caused paradigm shifts, the constants are changing into variables in operational relationships. With these new perspectives in media, it is inevitable for any medium to stay untouched, which is also the case for cinema. Interactive cinema enables the audience to participate in the film by different ways. "Kinoautomat" is considered to be one of the first examples of interactive cinema by Raduz Cincera screened first at 1967, where at nine instants the movie stops, and an operator asks the audience to choose between two different possible scenes for the movie to continue onwards, by virtue of which the audience is authorized for deciding upon the progression of the narrative.

Apart from the motion capture based cinema, video games are also considered as interactive video, as they use computer as an interface to act between the series of video sequences. As the interaction with the medium closes the action-reaction loop, and users' perception adapts to the visual medium, the immersion is cultivated, which leads to the feeling of telepresence. As aforementioned, cinema is hyperreal; ergo the telepresence with a hyperreal medium creates the "hyperpresence" concept, which also originates the name of the installation.

In examples of interactive cinema, where user is augmented with the ability to manipulate the narrative, multiple user based interaction might reduce the quality of personal experience by diminishing the feeling of participation as the outcomes of the interaction differs from personal responses. Considering that telepresence is a singular entity, the presentation of the work has been chosen to be a one-person experience.

The concept of interactive cinema conceived several different related concepts like quantum cinema which is originated by Peter Wiebel. The concept of quantum cinema, as the name implies, arises from quantum theory. Heisenberg's uncertainty principle denotes the trade-off between the measurement accuracy of position and momentum of an electron at an instant, which means the observance, manipulates the subject of the experiment, therefore the real data is uncertain. Another quantum theorist, Richard Feynman, has focused more on to the initial value problem of a system, where the system should not be considered as a whole, but as transitions between several different states, which all have different initial values. In a cinematic context, these concepts can be interpreted as the manipulation of the film as a result of its observance, and the film having different possible paths which evolve from different initial states.

The HyperPrescence project exemplifies the aforementioned "quantum cinema" concept. The film used in the project is montaged in a non-linear way time-wise, which is linearized by the software depending on the responses of the user and the diachronical state of the film. The film starts from a single part which evolves to different narratives and endings as it is observed, and each inversion creates different possible films customized by the user. The decision points of the film are predefined; therefore finite numbers of possible films are present.

Without elaborating deeper about the technology fetish in interactive art in order to maintain the focus of the paper, it should be pointed out that the subject matter should also not be neglected. The theme of the film is based on an incubus dream that most people could have experienced or at least familiar with in their lives. As it has been explained before, the film is shot from the first person point of view, with eye-blink masks in order to enhance immersion. The method for harvesting the users' responses will be discussed in detail in the next part.

STIMULATION

Interaction is more than the machine obeying to the user; it is also the experience that the user lives. User interaction can be both conscious and unconscious depending on the type of interface and briefing about the experience. The interface can be a physical controller with some sort of form factor, or transparent like a camera based interface; but in both cases if the user is informed about the interaction, it will restrict the interaction as it leads the user to investigate the mapping between the actions and the responses, and eventually loses its playfulness and become just a tool. One stance against this may be creating a system with more organic responses in which the interacted medium does not always give the same responses, when given the same set of inputs. This would probably create a similar experience without satisfying the user's curiosity as a result of the stochastic responses of the system. On the other hand, what if the user is not aware of the interaction? The interaction interface and the obligation to interact consume some of the user's attention, which diminishes the effect of the experience. As a result unconscious interaction enables the user to get immersed in the experience without feeling obligated to interact. Unconscious interaction is like improvisation, where the line between user's cognition and intuition fade. In order to enhance the instinctiveness of the responses, biosensors should be considered as a medium of interface. The beauty of the usage of bio data for interaction is that, it anthropomorphizes the overall synthesized being, consisting of the body and the machine. Therefore bio data can be used to sustain and observe the effectiveness of the designed experience.

The roots of using bio data for non-medical purposes go back to lie-detectors, where it is assumed that the body doesn't lie. Bio data is specific to the source, which results in having a unique experience for

each user. Even as a result of inadequacies of the platform, the outputted bio data is the same, the re-sulting effect on the user is always unique, as Leibniz's identity of indiscernibles principle.

Cognitive sciences have developed thorough interpretations of bio data, which resolves to the user's emotions. Therefore, bio data is highly intimate and should be handled with delicacy by the designer. As the bio data is not fully governed by the user, unpermitted public exposition of this data would be con-sidered unethical. As bio data represents the true self, it has been used for several different non-medical purposes. The fingerprint or retina scanners and camera based face recognition software provide ad-vanced security systems which prevent the possibility of hacked or forgotten passwords. Marcel Van Der Drift exemplifies the misuse of bio data in "A Future Love Story", where the interpretation of bio data creates a positive feedback in the formation of user's moods, as the user becomes more depressed by gadgets interpreting the state of the user as depressed and the user finds salvation in technological homicide.

More artistic usages of bio data have been present in several media due to the new meanings they rep-resent. DNA portraits offer an unusual way of representing the uniqueness of an individual. Christian Nold's experiment used skin responses of the user's in order to create an emotional map of a city. One of my previous artworks "Living Istanbul" examines the relationship between the sounds of a city and the heart rates, or the rhythm, of the dwellers. The installation uses the heart rates of the audience in order to recreate the different soundscapes of Istanbul.

The downside of biosensors is that, the user can be affected from any previous situation, which creates the user's initial state. Furthermore, during the experience the user can be haunted by unprecedented concerns which also lower the quality of the experience. In order to overcome this problem, the norm of the user is calculated before the first decision point of the film, and had been used as a reference to measure the deviation of the users' responses.

The HyperPrescence project uses an electroencephalogram (EEG), for measuring the brainwaves to in-teract with the aforementioned quantum cinema setup, as it offers a fast representation of the arousal state of the user. It measures the amount of activity of the brain by the alpha and beta waves, the data is interpreted as the user's state being relaxed, tranquil or alert and excited, which is used to alter the narrative of the film.

CONCLUSION

In order to present an overview of the HyperPrescence project, remote location and stimulation parts have been discussed separately. Different media and concepts have been investigated regarding the im-mersion of the user. Motion capture film has been chosen as a remote location medium, in order to benefit the predisposition of the users' suspension of disbelief.

As it has been stated before, the conscious interaction creates an obligation which diminishes the qual-ity of the designed experience. The non-initiative state that the user enters as a cinema audience in-spires the usage of biosensors as the stimulation interface. Bio data is not fully governed by the user, with the state of the user in mind, the true responses of the user have been tried to obtain in order to differ the experience from a game and anthropomorphize the overall structure which results in a more organic relation.

The user experiences a film that revolves around the theme of incubus, shot in first person point of view, wearing an EEG sensor without any further information about the forthcoming experience. Furthermore, the whole interaction process is explained at the end of the film as a classic grand finale in order to keep the user unaffected about the technological infrastructure of the setup. It is expected from the user to realize the transformation from an individual audience to the protagonist of the film, which fulfills the teleprescence concept.

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PERFORMER VS ELECTRONICS: PERFORMING MUSIC FOR INSTRUMENT AND ELECTRONICS

PANAYIOTIS KOKORAS

This paper investigates the challenges which face a performer when he/she has to practise a composition for instrument and electronics at home alone and then perform it in a concert hall. Analysis of a survey of performers identified an incapability of playing a work with electronics. In the second part of the paper, I propose a paradigm for performance material that could provide the necessary information for the performer.

1. Introduction

More and more performers today are asked to perform compositions for instrument plus electronics. Are they ready to do so? What should a performer know in order to be able to accomplish such a project, and what help should the composer provide? How far can a performer go and how much can a composer ask? A great deal of knowledge is required, and the problem looks initially to be very far from what a performer usually knows. [1]

2. The Survey

At the beginning of this research study, professional performers of new music who were under forty years of age were contacted by email and asked to complete a simple questionnaire. The questionnaire described a scenario in which a performer receives performance material in order to practise a piece for solo instrument and electronics at home alone, and then perform it in public. Questions were asked:

1. about their level in music technology and sound engineering (novice, intermediate or expert),
2. about the equipment they owned (laptop computer, external sound card, speakers, and microphone),
3. about their interest and their desire to programme a work with electronics and finally,
4. whether they had any experience of playing such a work and, if so, what their most recent experience was.

Analysis of the survey revealed a mixture of high scores on the practical questions and at the same time a lack of ability to play a work with electronics. Question four was intended for those respondents who answered 'yes.' In brief, starting with the responses to question three, the selected participants were positive about studying and programming a piece including electronics. Also, 100% of the respondents answered question two by saying that they owned three of the four listed items of equipment. The most disappointing result came from question one: 86% of the participants described their level in music technology and sound engineering as 'novice' and the rest described themselves as 'intermediate'. These findings result in two conclusions. On the one hand, their education had not offered them modules on music technology and sound engineering. On the other hand, the performance material which they received from composers had not helped them sufficiently to enable them to go through with a piece. These two major issues raised from the survey will be discussed in the following paragraphs.

3. Performance notes as a protocol

First, I shall take as a case study four works of my own for one instrument and electronics. These works are *Slide* for guitar and electronics, *Shatter Cone* for violin and electronics, *West Pole* for piano and electronics, and *Jet* for recorder and electronics. [4] I shall propose a paradigm for the performance material that will provide sufficient information to enable a performer to practise and play a piece alone. This could work as a reference for a composer and as a guide for the performer to know what to expect and how to prepare a work for performance.

The four works listed above were written for one amplified instrument and electronics. The electronic part combines fixed electronics in the form of pre-recorded electroacoustic sounds and live electronics that come to life as a response to the performed part. The performance material includes:

- the score,
- the performance notes,
- a stereo track of the fixed electronics,
- a mono click track audio file,
- a folder with the extra plugins, and
- a folder with the preset settings of the plugins.

Finally, it is useful to provide a full version of the piece as a reference. The performance notes, apart from the instrument's performance and notational instructions, should provide information about the four elements explained in the following paragraphs.

3.1 LIVE ELECTRONICS

The Live Electronics section should provide instructions on the main application needed and how to use its session for the piece, which are the hot keys, and what are their functions. Moreover, there should be displayed screenshots of the plugins to make sure that the settings of the vst effects are loaded properly in the first instance. This section should also explain the way that the live electronics is going to be notated on the score. It is of vital importance that the composer should provide a sort of notation for the live processing. The performer should, by reading the score, be able to anticipate the when, what and how of the way in which the live electronics contributes to the piece. Finally, to make sure that the real time processing produces the expected result, some sound samples should be provided with each of the effects applied separately. Thus, it would be easy to compare the example sound with the performer's sound and to figure out possible incompatibilities. [2]

3.2 HARDWARE SET UP

To study such a piece, the performer should be equipped with some hardware, primarily consisting of: 1) a laptop, 2) a sound card (at least three outputs, one input), 3) a microphone, and 4) a pair of speakers. A signal diagram is useful to show the way the signal is traveling through the devices and the software. The stage layout should clearly show the position of the speakers, the performer and the microphone, as well as the way to connect the devices. In addition, information should be provided about the Audio Preferences menu of the software used and how to make sure that it has the right setting.

3.3 AMPLIFICATION

Once the software and the hardware are up and running, it is time to give some emphasis to the amplification of the instrument. The microphone should be placed close to the instrument. According to the composition's needs, it is recommended to have the microphone placed on an adjustable stand so as to be able to control which part of the instrument will be closest to the microphone. In addition, it should be made clear that the idea of the amplification many times is not just to make the sound louder but to create a supernatural sound which results in the loss of the neutrality of the classic known instrumental sound.

3.4 FIXED ELECTRONICS

The notation of the fixed electronics (or taped part of the composition) is important because the musician should always be able to follow it and be in sync with it. It should be placed in a form of sonogram staff below the live electronics staff line. The sonogram works as a visual representation of the tape part to help the performer to follow it accurately. The sonogram can be enhanced by the composer or the performer with extra shapes, words and rhythmic motives. At the left top corner of every staff, the time of the pre-recorded material is displayed. In the fixed electronics sections, there is also the click track which is useful not only during the practice but also for the concert performance. It should be appropriately arranged according to the tempo and time signature changes of the piece. Another issue which should be clarified in the performance material is the distinction between the rehearsal and concert situation. In the concert, the click track should be routed to the headphones only. In the rehearsal, the session should be flexible enough to start at any point. [5]

4. Conclusion

All the above described information will considerably increase the possibilities of a performer playing a piece with electronics successfully and repeatedly. It remains in the hands of the educational institutions to include it in their courses or improve their curriculums with opportunities to enable students to acquire the necessary knowledge to be able to carry out such projects. Music conservatory performance students should be able to follow classes with the focus on the performance of electronic music, and should have close collaboration opportunities with fellow composers, and the inclusion of compositions for instrument and electronics should be encouraged by teachers and included in the examinations concert programmes. [3]

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IDENTIFYING PLACE AND PLACING IDENTITY IN TRANSNATIONAL TRANSMEDIA: A CASE STUDY OF TWO CONVERGENT MEDIA PROJECTS

Julian Konczak

Two case studies currently in development will be examined from a producers point of view while focusing on targeting new audiences, The two projects – TELENESIA and ANTIGONE INTERACTIVE both employ different toolsets that relate to the location and preferences of the target audiences.
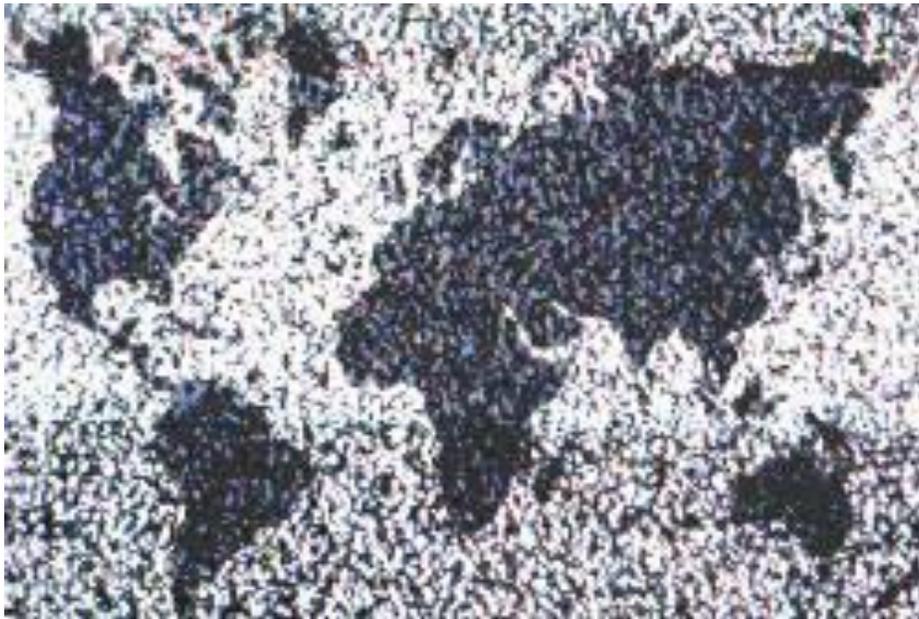
"Telenesia/Antigone Interactive"

"A Transmedia production will develop storytelling across multiple forms of media in order to have different entry points into the story." [1]

The key point within this terminology being the idea of working *across* platforms as distinct from other models of digital storytelling such as "remediation" and "crossmedia" where content is replicated across platforms.

TELENESIA is a fictional place and alludes to a distant and inaccessible "no place" and resting on the idea of a place that exists beyond and outside of the increasingly throttling networked communication. Conceiving a physical location that is post- network and by inference suggesting a post- apocalyptic time zone developed out of a research edition of hidrazone.com and was used as a overarching terminology to describe the process of increasing fracture of audience experience as the communication networks get more pervasive. Hence, a range of digital media tools and working practices were brought together under an umbrella term – computational video, VJ sampling, glitch to name a few.

TELENESIA evolved into art based project in that the principle outlet for the work is an installation within an art gallery, however, in engaging with the key concerns of the work – fragmentation and atomization of post network communication – there were clearly opportunities within a multi-platform setting.

The core of the work draws on two key influences. Firstly, the occult power of the moving image is fictionalised in Theodore Roszak's Flicker, a pacey novel that follows protagonist Jonathan Gates. The narrative revolves around an academic researcher who penetrates a shadowy religious order responsible for embedding subliminal images into Hollywood - later to be forcibly marooned on a Pacific island with a decaying film archive. In many ways the background of the novel reflects an enduring 20th fascination linking occultism and media developed by figures such as Wiilliam Burrough's Cut-ups, Bryon Gysin's Dreamachine, Kenneth Angers Magick Lantern Cycle and work by the English filmmaker Derek Jarman.

The other strand being explored in the work is the hardware hacking and glitch cultures that in turn are driven by what is often described as a post-modern deregulation of narrative, scratch video and VJ culture. The aesthetic intention is to attempt move on from post-modern nihilism where the destruction of image is an end in itself and to use these atoms of destruction in a novel fictional edifice.

Beyond the gallery, TELENESIA expands across ephemeral networks allowing the exhibition slot to use platforms as both publicity and marketing opportunity as well as providing a legacy in the form of documentation and video. The installation itself is built on "physical computing" sculptures – boxes that allow the visitor to the gallery to access and play with a database of short video clips using analog controls i.e. dials and knobs and while there was no intention to replicate this experience on-line, elements of the narrative have been extended into the internet.

The initial building block of the project was the 1-minute video that would emulate and draw in some of key tropes and practitioners of experimental moving image. These short films have been posted into a video blog and exhibited at international film festivals prior to venue and funding confirmation of the show tour. The project has been in development over a number of years and initially the look and feel of the video pieces was developed as a VJ set that used digital tools according to an "analog rule set" i.e. using image effects in line with film optical printing. An underlying impulse before devising this set (which featured with a vocal sampling group) was to move away from the hegemony of hard edge graphics and explosive eye candy of mainstream VJ culture – the VJ community appears to be hungry for material so the source clips have been released under a CC license and distributed via torrents thus creating an on-line participatory mode to compliment the installation.

ANTIGONE INTERACTIVE explores the relationships between physical location and narrative in a parallel and complimentary manner. The focus of this project is to tell personal stories of migration and political conflict – accommodating films created by experienced filmmakers exploring the hidden side of personal family history. By focusing on the personal over the political it entails challenging of the inherent artificial nature of political boundaries and the de-humanizing effect of the nation-state.

The genesis of the project grew from previous projects by the producers that had used a global interface to allow the audience to access video content reflecting stories and places from around the planet.

In developing the work within the confines of transmedia the producers use the borderless map as a starting point, borders become apparent as users drill down into content. This reflects the restrictions of movement across the surface of the planet that is the starting point for the narrative threads. To this

end the Google maps API with its extensive capabilities for overlaying geopolitical information and location markers was chosen as the key interface device.

Common to much of material created for internet consumption, work tends to be molded into short form productions such as the website, in designing the narrative structure of the project it, the challenge was to tell rich and complex stories while maintaining an offering that could be consumed in bite sized chunks. The work uses an episodic structure that enables a longer form story to be communicated while only experiencing a 4-minute section at any one time.

The interface enables the audience to access the video segments using a variety of menu options: a tagged map using Googlemaps API, a gallery of thumbnails and a video player that allows the clips to be watched as a long form video more akin to watching television, thus the user can calibrate their own experience in terms of levels of interactivity.

In terms of the viewing experience the tablet/ipad was the optimal distribution device that was chosen for a number of reasons – that the viewing environment could to some extent be predicted and the strength of the quality of video playback. At early stages of development, the creation of an app was considered has the potential to provide consistent rich media experiences, however, the limitations over distribution, extensibility issues and the fact that user base would be necessarily limited precludes this option.

Drawing together the two projects it can be noted that they exist in almost opposition to one another TELENESIA is a fiction that attempts to move audience in space and time, while ANTIGONE INTERACTIVE is underscored by accurate sense of personal experience. Whilst elements of their transmedia existence may bear some resemblance in that they use short video within a web based interface and such like, they are operating at different ends of the spectrum TELENESIA challenges the audience to immerse themselves into an escapist fiction while ANTIGONE INTERACTIVE intends to awake a political dimension within the user.

telenesia.com

antigoneinteractive.com

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MICRO-MOCAP

SUSAN KOZEL

Motion capture performances used to be equipment heavy, fraught with calibration problems, and only for a privileged few. How have things changed? Developments in tracing, capturing, archiving, and sharing motion (including the Kinect) suggest mocap might play a different role in our daily lives. Further, there may be scope for synaesthetic translations or transmedia applications.

Micro-Mocap

Literature at the turn of the 19th century was described by Jacques Rancière as: "the new writing made up of sensory micro-events, that new privilege of the minute, of the instantaneous and the discontinuous." [1] Developments in tracing, capturing, archiving, and sharing motion at the turn of the recent century suggest that tiny, motion captured gestures might be another way of writing the minute, the instantaneous, and the discontinuous. Further, there may be scope for synaesthetic translations or transmedia applications. This short paper briefly describes a journey through experiments with motion capture, ending with speculations regarding new developments and the role for captured motion in our mediated lives.

THEN (DISSOLVING INTO PARTICLES)

Looking back at much of the motion capture experimentation I have done since the 1990s I see fragments of bodies: points, lines, particle systems. Movement billowing outwards, then being condensed to a single point. Dancers walking through each other's data points as though wandering through constellations, or using their feet to create strokes like calligraphy. Creating basic data bodies out of Bezier curves, that twitched, bent back on themselves, or lost their proprioceptive maps only to reform with a leap and a stretch. [2] Endless fun, if you ignored the nightmare of calibrating these heavy optical or magnetic systems. We left small dark studios at the end of the day, blinking in the light, feeling imaginary markers on our bodies.

Experimenting as a dancer for many years, using whatever system I could get my hands on, my philosophical and aesthetic questions returned repeatedly to the sense of the data as an "other." Not a mirror of my and others' movements, but the sense of dancing with an other that challenged my own corporeal and ethical boundaries. It is possible to say that these experiments always somehow dissolved the body without losing its materiality: true to Deleuze's understanding of Spinoza, bodies were composed of speeds and slownesses, combined with the ability to affect other bodies and be affected by them. [3]

NOW (TURNING THE PRACTICE INSIDE OUT)

Now the mundane beckons: less spectacle, less calibration, less performing in theatre spaces or secluded labs, and more the idea of capturing affect and motion in daily life. A question arises: can mocap,

that digital system most able to capture external form and virtuosity, be used to capture liminal or ambiguous internal states? This is part of a larger project aiming to explore Immanent Aesthetics in order to understand how our new technological devices may be able to foster internality, quietude, intuition, and depth – and social choreographies. [4]

Micro-Mocap is an experiment in accumulating a personal vocabulary of nothing movements, or little kinaesthetic snippets. Perhaps it is like a DIY Motion Bank without performative aspirations. [5] But can motion, once it is captured, really be non-performative?

The micro-movements of performing life are those moments where dance intervenes, where gestures become slightly more than pragmatic but may express very little. Jean Luc Nancy's reflections on sleep as the "formation of an interiority" where we cannot distinguish ourselves from what is not ourselves are strangely relevant. [6] I am my tiny gesture. And I am my grand gestures. I reflect the gestures of those around me to the extent that capturing motion is not about my movement at all, but movement as patterns of circulation and exchange.

So when I play with the ubiquitous XBox Kinect, improvising a daily narrative of nothing movements, or micro movements, am I closer or farther from understanding how I move or inhabit the world? For now the gestures are not recorded: and in itself this reminds me of the ephemeral quality of live performance, back before we had to become documentation obsessed and a dance took place and disappeared. If I decide to save these motions (to capture and preserve, rather than capture and release) giving these to others will be like the strange intimacy of sharing of a blank text message. Its blankness is often thought of as a stroke: so intimate that nothing needs to be said in it.

AND (VENTURING INTO THE DOMAINS OF SYNAESTHESIA AND TRANSMEDIA)

As the liminal states of corporeality are explored through motion capture with the Kinect it is clear that the question of what is sensed (the input) is relevant, but it is more necessary to question what form the output takes because the Kinect is not designed to hold on to data. We have to decide what becomes of our motions, what happens to them and who receives them, in what form.

Marcus Ghaly, animator and interaction designer based at Malmö University in Sweden, recently created a poetic transmediation of Kinect motion capture data into a tactile output. His intent was to explore devices to assist in the translation of visualised motion into haptics: pragmatically, this is a prototype of a device that might assist people with visual impairment; poetically, Ghaly enacted a synaesthetic transition from the kinaesthetic realm into visual data and then to tactility. According to an aesthetics of immanence it is possible to ask what disappears through this sliding across sensory registers, and what is gained when something of oneself is externalized, possibly shared, and then returned to oneself: like falling asleep and then waking up, the same but different.

There is, of course, a along tradition of dancers considering tiny, repetitive, or pedestrian motions, or recently of dancers simply refusing to dance. This has been done with a sense of defiance but for some reason I am reminded of Efva Lilja's choreographic experiments on arctic ice. She set up a video camera on a tripod near the Nordic research ice-breaker where she voyaged with other scientists and, in her bright red foul weather suit, she repeatedly stood and fell, with the wind and snow whirling around her. These simple acts of falling and getting back up revealed much about motion and corporeality, captured

and archived by digital video. 'Micro Mocap' intends to be spectacularly underwhelming, but revealing of the minutiae of dance in everyday life.

In a discussion with an interaction designer recently, he asked why he should consider performance and performativity in conjunction with his work. This sort of question, so basic but at the same time encompassing, stopped me in my tracks for a moment, making me question my own assumptions and put deeply held convictions into words. "Consider performance," I said making some disciplinary translations in my head as I spoke, "if you want to reflect upon your design work in terms of dynamic patterns of actions, and if by creating interventions you hope to disrupt social structures or codes, or hold a mirror up to yourself or your culture." In this sense, from the cosmological to the mundane, motion capture performance experiments can be used to reveal what we are as intercorporeal beings and how we dynamically inhabit in the world.

Or could they could become very personal movement vocabularies, immanent motion, a part of one's life to save as an archive or edit together into a choreography and send to someone. Like a gift.

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THE BIRTH OF MEMORY FROM THE SPIRIT OF THE MACHINE

ANDREAS KRATKY

The computer is a machine of the future – not only do we still attach to it the connotation of technological sophistication and future orientation, also in its function as an information processing machine it only deals with the present, calculating towards to future. In the project "Bleeding Through" we use a database structure and signifying chains to explore the past and the subconscious processes of meaning creation described by Lacan.

Bleeding Through – Layers of Los Angeles 1920-1986, 2002, Rosemary Comella, Norman Klein, Andreas Kratky, computer-based interactive installation, Copyright by the authors.

INTRODUCTION

The computer is an amnesic machine; and it is a machine of the future. It appears in most of the science fiction imaginations of the future – shaped different ways, sometimes giant, sometimes minuscule, sometimes steam-driven as in the steampunk imaginations – it always belongs to the future. The computer still has an association of "high-tech" joined to it. How can a machine that is so inherently linked to visions of the future be used as a conduit for a reflection of the past? And how can a machine that purges everything from memory when the power is off be used for a reflection on memory? In the interactive database novel "Bleeding through – Layers of Los Angeles 1920–1986" we are developing an interaction method embodying the process of memory and the interplay between personal and collective memory. "Bleeding Through" is conceived as an interactive DVD-Rom by Rosemary Comella, Norman M. Klein, and Andreas Kratky. [1] It is produced as a joint research project by USC's Labyrinth Project and the ZKM | Center for Art and Media.

The inspiration for the piece came from Norman M. Klein's book "The History of Forgetting", where he digs into the urban restructuring of Los Angeles and how traces of the old are remembered and forgotten. Klein uses the notion of 'simultaneous distraction' as a concept to describe how memory is constituted by a continuous and self-corrupting process of inscription and re-inscription – a "distracted imaginary, essentially a filing system where information disappears or reforms itself whenever you touch it." [2] This notion of a 'distracted' filing system is somewhat close to one of the central metaphors of the computer, which, besides its capacity to compute numbers, is in many applications a large storage unit or filing system. But what actually is the relationship of the computer and memory? This is one of the central questions motivating our research into how to represent the process of remembering and misremembering algorithmically. We explored this question with an excavation of the complex layering of past and present in one central area in Downtown Los Angeles. Guided by the story of Klein's fictitious character Molly, we built a comprehensive archive of photos from different time periods, re-photography, film, newspaper clippings, maps, interviews etc. that is assembled in a digital database, which can be explored by the viewer through a narrative interface. This paper discusses the process of conceiving the interface and traces the conceptual decisions behind its design.

COMPUTERS AND MEMORY

The person who coined the term "cyber", which has become the prefix to many of the computer-related concepts and contraptions, Norbert Wiener, describes the relationship of the computer to the past and memory as a function of two extremes: First, a very fast short term memory that is necessary in order to keep the values that are necessary for the ongoing calculation at hand. These intermediate results are of no use anymore once the process is completed and at this moment the memory used to store these values should immediately be emptied and made available for new calculations. And second, the opposite of this fast memory is the long term storage, the "memory which is intended to be part of the files, the permanent record." [3] Disregarding the long term storage, Wiener's view is focused solely on the processing unit that gets entirely emptied after a completed run of its process to make room for the next process to run on the machine uninhibited by previous results. The human, in contrast, never completely clears what is stored in memory and thus should be situated somewhere between the two extremes that Wiener describes, as "the analogue of a single run of such a machine." [4]

The engineering effort of Wiener concentrates on making the machine memory as precise as possible and keeping the information, once stored, intact and repeatable until it is intentionally erased. In this sense one of the predominant concerns of the cybernetics researchers was to identify a method of distinguishing discernible information from distorted information that disappears in noise and becomes unreadable. Noise in these information transmission systems is the influence of the environment: "It is unfortunate that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound or static, or distortions in shape or shading of picture, or errors in transmission." [5] The technological aspect of layering uncontrolled signals from the environment with the intended information can be seen as a parallel to the notion of memory "distraction" that Klein alludes to. Since the days of Wiener and Shannon the information processing machines have made great progress, the computer is a perfect amnesic machine that can forget everything on command and that got rather good at isolating the wanted bits of information from the unwanted. The machine has only two states: Either full recall or complete forgetting. For the human being it is not possible to simply forget everything. Most human beings are indeed somewhere between the two extremes: unable to recall everything and equally unable to forget everything. Klein also alludes to Borges' story of "Funes, His Memory", a man who has perfect recall. After an accident Funes has the

ability to remember everything, even the slightest detail, and in view of this immense amount of data he became unable to go through his recollection again, as it takes more time to go through everything that is remembered than it takes to live the event. Thus he only two or three times reconstructed an entire day. Funes came to the resolution that he should restrict his past days to a recollection of some seventy thousand moments ordered by numbers – but he realized that he would probably by his death be done with classifying his childhood memories and dropped this endeavor. [6] Voluntary forgetting and selective memory are hard to achieve. The human brain seems to be constructed to fulfill this filtering function completely by itself, without conscious intervention. This is a characteristic that would call for an 'imperfect machine' in the sense of Wiener and Shannon and the opposite of the 'pure machine' that Edgar Allan Poe develops in his analysis of the "Turk", a chess playing automaton made by the inventor von Kempelen. The chess automaton was a supposed mechanical machine that was able to play chess and that won most of the games it played, in very few occasions it lost. Poe states that a 'pure machine', would show no irregularities, and it would always win – therefore the chess automaton could not be a 'pure machine.' [7] As we know it was not a mechanism, but a human operating the "Turk" in reality, and it was the human brain that was able to establish this middle ground between absolute perfection and imperfection.

In his essay "A Note on the Mystic Writing Pad" Sigmund Freud describes a mechanical device that embodies the characteristic of this middle ground, a memory support that is able to harmonize the opposition between a lasting storage of information and the erasure in order to make room for new inscriptions. What he describes is a children's toy, a writing pad with a wax layer onto which a sheet of paper can be pressed by writing on it. The areas where the paper sticks to the wax will show the trace of writing, while the others wont. By lifting off the paper from the underlying layer of wax the writing becomes invisible on the surface, but it stays as an engraving in the wax underneath the paper. This combination of an always fresh writing surface, ready to take new inscriptions and a remaining trace, that gets altered each time new inscriptions are made but still preserves traces of the prior impressions is for Freud an allegory for the human capacity of memory. [8] What seems to be possible with the mechanical device is a serious challenge for the digital machine. As the computer is made to be precise and all its elements are designed with the goal of the 'perfect machine' in mind, this kind of unreliable inscription is hard to achieve – what would be an algorithm for selective forgetting, or what should be the heuristic to select what should be forgotten versus what should remain? What are the alterations that are produced through new inscriptions? Not only it seems that it is hard to design algorithms that are made to produce irregularities – as we know, even real randomness is almost impossible to achieve with the computer [9] – it also seems to be in the human psyche to not want to intentionally loose anything. All our tools are made to preserve and keep, from the stone inscription and the note pad, to the museum and the database.

CALCULATING THE UNCONSCIOUS

There is a different way of conceptualizing the relationship of the computer to the past: Another story of Borges, the "The Library of Babel" describes the idea of a complete library, a library that contains all books, all that have ever been written and those that will ever be written. In this library it is sufficient for a book to exist that it be possible [10] – the library is the hypothetical construction of the space of all possible recombinations of the set of the alphabet. The books are thus not seen as meaningful entities but as instances of a possibility space – where meaningful combinations might be the exceptions. This perspective of a library is without any past, as "it has existed ab aeternitate" [11] and will exist eternally – it is the tireless activity of a probably very simple recombinatory algorithm, which does not need to

keep any information about the past. Based on the transformation rules of the algorithm it is possible for every possible state to calculate the next state. The implication here is that every seemingly meaningful experience can be seen as a simple combinatory instance of such an algorithm.

The Russian mathematician Andrej A. Markov has investigated this idea and in a parallel to Borges' later story he used a book for his experiment. The inventor of the Markov chain, which, named after its inventor, later became an important mathematical device, determined in a detailed analysis of the pages of a book in long matrix calculations the probability for character sequences to follow each other. As his study object he used Alexander Pushkin's novel Eugene Onjegin, which for him became the abundant source of combinatory instances of character sequences. The probability chain that he identified represented a pattern that is sufficient to predict the continuation of the sequence without regard to the content of the surrounding text.

Markov's theory of signifying chains inspired later Jacques Lacan to formulate his theory of the unconscious as a chain of signifiers that determine the subject. A specific symbolic sequence akin to the Markov chain governs like a formal language such psychological effects as remembering and repression. [12] Lacan saw this chain also as the explaining principle for what Freud called the "Wiederholungszwang", the compulsion to repeat. He writes "we can find in the ordered chains of a formal language the entire appearance of remembering, and quite especially of the kind required by Freud's discovery." [13] Lacan sees the ordering principles inherent to this kind of formal language, expressed as a chain of probabilities for a specific sequence, as determinant for the acts and subconscious affinities. Rather than explaining these acts and associations as stemming from past experience, they are the results of a probability structure that is almost like a 'personal formula': "This could illustrate a rudimentary subjective trajectory, by showing that it is grounded in the actuality which had the future anterior in its present." [14] The intuition behind this formula relates directly to a computational approach and Lacan suggests that it would be possible to conceive of a modern calculating machine, a "thinking machine", to operate according to the specific formula that modulates a subject's choices. [15]

INTERFACE ALLEGORIES

For our design of the interface for the piece "Bleeding Through – Layers of Los Angeles 1920–1986" we were looking for an approach that could on both the functional level as well as the aesthetic level embody aspects of the "distracted imaginary" process of remembering between personal and collective memory, and fiction. Our goal was to conceive what I called an "allegorical interface," [16] an interface that constitutes a figurative or symbolic representation of the core aspects of the media text that is experienced through this interface. As in an interactive medium the functional dynamic aspects are an integral part of the experience, they are in extension of the visual, textual, and auditive elements conceived of as a procedural allegory that embodies aspects of the processes described in the media text.

The idea of a signifying chain formulated like an unfolding syntactic structure that develops based on an interplay between transition probabilities from one state to the next and the subjective acts of choice of the viewer is the central idea for the functioning principle of our interface. We conceived of this chain as a sequence of presences and absences that formulates a "scansion," [17] as Lacan calls it, a rhythm of 'slots' that are filled as the viewer navigates through the piece with elements from the database. The elements from the database take the role of associative presences that enable the viewer to fill in the absences, the gaps between the loosely composed elements, with his imagination. The act of imagining is thus initiated and guided by the succession of database elements and, framed by the story that Klein

invented, the imaginative activity of the viewer fills in the reading of these elements as possible characters of the story, possible places where the story may have taken place, or possible events that could have influenced the story. All the elements oscillate between their role as a document that shows places, people, and events in the real history of the city of Los Angeles, and the role they assume in the progression of the fictional story. In this way the imagination of the viewer is invited to interpret them in both ways, as historic traces as well as fictional elements, and contribute their background and experience to the multi-layered experience. As the viewer navigates through the materials, they line up in an endlessly cycling chain in which the succession of elements is determined by the choices of the viewer and a probability ranking based on a keyword system that we extracted from the story.

Visually this chain is implemented as an allegory for the act of strolling through a city where the viewer is exposed to a continuous succession of impressions that unfolds as he goes forward. A central panel shows one element from our database that can be explored in depth to reveal its historic context, such as a cross fade of historic images with their contemporary rephotographed view, further explorations of a specific location etc. Left and right from this central panel are images that are only partially visible, cut off by the borders of the screen, which stand for the elements in the peripheral field of view attracting the viewer to divert left or right. As he chooses one of them, this element swings into the middle position revealing another element on its side. In this way the elements succeed each other in an endless chain, which may show repetitions but repeated elements always appear in a different context so that the recombinant principle incites new readings and contextualizations even though elements appear familiar. We see this process as a re-encounter of a familiar object or image, which is always altered by the past experience and thus never the same as it was when it was first encountered, thus implementing an allegory for the simultaneous distraction of memory through the ongoing process of inscription and re-inscription.

The visual form of this interface is a long panoramic strip akin to the perspective of going through the city. On the other hand it evokes associations of a film strip or an editing machine underscoring the role of media and their representations in our memory process. In particular in a city like Los Angeles this latter association underscores the influence that media representations have on collective memory and individual perception.

CONCLUSION

The Markov chain implementation as the algorithmic principle behind the experience of "Bleeding Through" is compelling from a theoretical point of view and in practice delivered the anticipated results. We realized, though, during our production that a careful fine-tuning of the process was necessary to achieve the "middle ground" between mechanical perfection and 'subjective distraction'. Finding the right keywords, the right amount of keywords, and the correct probability weightings was a process of trial and error, which was not only restricted to the fine-tuning of the engine but also required us to make adjustments to the database. We also found that in order to make the process of memory inscription and erasure noticeable and develop the right narrative tension, we had to limit the amount of presented elements at a single viewing to a subset of the available database. Further it was necessary to implement several kinds of layering systems that introduce an additional superposition of images and meanings to add more depth to the recombination engine.

Through several user studies we found that the process of eliciting associations and stimulating the imaginative engagement of the viewer with the experience worked well. And even though the principles

that are at the basis of the combinatorial process of the work remain hidden to most viewers, it still is effective on the perceptual level and presents a compelling heuristic for design principles.

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THE MUSEUM MACHINE - OR - A DATABASE APPROACH TO THE REPRESENTATION OF SPACE

Andreas Kratky & Juri Hwang

We generally think of space as a coherent and continuous extent and the representation of it is dominated by the linear perspective. In the project "Venture to the Interior" we are formulating a database approach to the representation of space. We are creating a hybrid mixed-reality environment that integrates multiple points of view and allows to explore a layered structure of parallel spaces.

Venture to the Interior / Vorstoss ins Innere, 2010, Juri Hwang and Andreas Kratky, computer-based interactive installation, Copyright by the authors.

In this paper we will discuss the methods and design considerations that we developed for the creation of the Cine-Interactive "Venture to the Interior / Vorstoss ins Innere." The project is a real-time 3-d environment that investigates the nature of the museum as an apparatus of collecting and cumulative knowledge construction. We used the collections of the Natural History Museum in Berlin, Germany, as an example case for the act of collecting as a way of understanding the world. With the project we are looking at a tradition of collecting objects as part of an emerging scientific practice and worldview that originated during the Renaissance period, when the first private collections were formed in the 15th century, [1] and that had its high time as a public institution during the age of enlightenment and the 19th century. Collecting material objects was regarded as a prime way to gain knowledge since then and only lost its primacy in the recent years around the end of the twentieth and the beginning twenty-first centuries, when the material object got replaced more and more by its coded representation in form of DNA sequences, scans, and measures, and when the museum as a spatial construct started to fade behind the ubiquitous databases. [2] With our project we are reflecting on the status of the object and its representation, and the museum as an architecture of knowledge – a spatial construct that embodies a particular worldview. In creating a virtual representation of the museum and its objects, we are on one hand contributing to the virtualization of the material culture of the museum while at the same time raising awareness and questioning this very process. The question of representation of objects and space is therefore a key element of the project.

THE IDEA OF THE MUSEUM

What gets lost in the reduction of objects to their data representations is the material existence of tangible objects and their binding to a location in a spatial continuum. It is a turn away from the material culture of knowledge that was established in the Renaissance period and dominated the natural sciences for a long time.

Among the Renaissance savants the possession of objects was equal to the possession of knowledge. In the acquisition of such objects – preferably exotic objects, such as birds of paradise or fossils – one could physically acquire knowledge and display the possession of it to gain the reputation of a learned person. [3] Building private collections was a popular activity among the upper class along with the creation of spaces to display these objects as a way of showing economic wealth as well as knowledge. It was an important part of learning about nature and it was the foundation of a particular material culture as part of the sciences that moved away from studying the antique texts as the source of knowledge and towards an experiential contact and engagement with nature. [4] The museums of the early Renaissance – more cabinets of curiosities than museums akin to our modern concept of museum – were architectural structures representing the order of the world according to the "book of nature", and displaying the secret relationships between the objects was a way of deciphering this book and the divine order of the world. [5] The spatial arrangement and the act of "taming" the wild beasts on a shelf in a collection was also a way of maintaining some control over the exploding natural world that was constantly growing in complexity as travel and increasing knowledge revealed more of it. [6] These early collections were conceived around their owners as the central figures. Representing the world from their point of view, the collections were at the same time reflections of nature and of the individual self. This importance of a spatial ordering system persisted when the majority of the private collections became public institutions and as museums became a display case of national importance and pride.

The other aspect that gets lost by the replacement of the object with its data representation, is the aspect of reality. Even though the real object needs to be preserved in order to survive over time and become the eternalized reference for a species, and the wild animals need to be killed and transformed into a taxidermy in order to be stored in a cabinet, they still preserve a reminiscence of their individuality and the reference that they once were living beings. And even though the taxidermy is in some sense also a representation, as one single dead instance stands as pars pro toto for entire species of living creatures, the data object in contrast does not have this reference at all and thus lost its direct connection to the world.

THINKING ABOUT PERSPECTIVE

With these considerations in mind we developed a spatial concept for our project that allowed us to address these questions and make them tangible. As a central element of the project we decided to create a virtual representation of the museum space itself as we found that the actual built space is the core element in the function of the museum as a collecting, ordering, and display system, and it is the stage of the play of representation versus the object. This virtual representation is conceived as a real-time 3d environment that users can explore at will using a common game-engine. The way most software represent space as a virtual entity on the screen follows the principles of linear perspective as it was devised by the Italian Renaissance architect and artist Filippo Brunelleschi and that had its first description in the "construzione legittima" by Leon Battista Alberti in 1435. A good description of this perspective approach can be found in Erwin Panofsky's seminal essay "Perspective as Symbolic Form:" The way we see

a perspectival representation of a space is as a "planar cross-section through the so-called visual pyra-mid; the apex of this pyramid is the eye, which is then connected with individual points within the space to be represented. Because the relative position of these 'visual rays' determines the apparent position of the corresponding points in the visual image, I need only draw the entire system in plan and elevation in order to determine the figure appearing on the intersecting surface. The plan yields the width, the el-evation yields the height; and if I combine these values into a third drawing, I will obtain the desired per-spectival projection." [7] This construction renders a continuous and homogeneous space, but in order to realize this impression and to absorb all content into one single "quantum continuum", as states Panofsky, it has to be assumed that there is a single viewer who sees the scene only with one eye and that the planar projection of the space can be seen as a valid representation of our spatial perception. [8] This notion of linear perspective corresponds rather closely to the way the collections of that time were conceived – a perspective of the world of which all lines converge in the one person, the collector, at its center. This way of representing the world was shattered by the development towards modern science.

The computer generated real-time rendering is not per se constrained to the assumption that the viewer stays immobile as is the case in static linear perspective constructions, since the viewpoint is continu-ously updated to the current position of the viewer. But nevertheless, most computer-based perspective constructions adopt the postulate of the continuous and homogeneous space. There is still only one sin-gle point of view from which the entire world falls into place and is displayed correctly. These are ab-stractions to which we are so accustomed that we almost accept them as natural. We have seen them throughout centuries of painting, in almost all of the photography, and finally we see them taken over in most of the computer graphics imagery. It is for this inherent feeling of natural perception that com-puter graphics go generally with linear perspective, even though the machine would be perfectly able to generate all kinds of other representations of space that follow different mathematical models, such as Michael Noll's four-dimensional hypercubes, [9] or fractal geometry.

BAROQUE PERSPECTIVE

While linear perspective and the Renaissance collection correspond strongly in their way to represent the world, the modern museum stands for a different perspective. Even though it is equally conceived as a location within which all things in the world fall into place and in this way constitutes one big sys-tem of order and knowledge, it realizes this notion based on other abstractions. In order to represent entire species, single individuals are collected; likewise single objects stand as representations for entire regions. The museum space in fact presents itself as a system of references reaching out into the world – like a space that is folded over and over to encompass and absorb all the distant locations into its own volume. This notion comes close to some of the central elements of the thinking of Gottfried Wilhelm Leibniz, a Baroque scholar who was instrumental in the founding of the museum in Berlin and in the de-velopment of the idea of scientific collection and display as a generator for knowledge and further re-search. Leibniz is well known for the invention of the infinitesimal calculus and his solution for the "quadrature of the circle". The intuition for his approach to determine the surface of the circle stems from linear perspective eventually dissolving it into a system of floating points of view. The quadrature of the circle was one of the paradigmatic problems raised by the ancient geometers and became a metaphor for an intractable problem. Taking inspiration with perspective construction, Leibniz divided the circle from a single point of view into an infinite series of triangles. The area of each of these trian-gles can be calculated and therefore the area of the circle can be calculated as the sum of a series of tri-angles, which can be infinitely smaller and thus the calculation can be infinitely more precise. [10] From

this notion he developed a general approach to calculate any shape or curve by subdividing it into a series of small triangles in order to make it tractable. While this quadrature of the circle solution is still close to the idea of one central viewpoint from which the entire shape falls into place and becomes calculable, the way this concept enters into the philosophy of Leibniz is as a duality of inflection points and points of view of which Gilles Deleuze gives a succinct description in his book "The Fold – Leibniz and the Baroque". The point of view in this model is the point at the interior of a curved shape where all the perpendiculars to the tangents of this curve converge. The inflection point on the other hand is the point where a curve changes its direction. As the Baroque curve is marked by an irregular and changing curvature, it is described by an infinitesimal series of directional changes. We can see it as the complement to the vectors on the interior of the curve converging in the point of view, as a series of divergent vectors reaching into infinity. [11] This concept of an endless variability implies that the resulting space circumscribed by this curve is characterized by multiple points of view that change their positions from the interior to the exterior as the curvature shifts from concave to convex and back. This Baroque extension of the perspective view as it was formulated in the Renaissance, introduces a relativism that perceives space as the sum of a multitude of points of view. It constitutes space as endlessly folding between local discontinuities within a large continuum. This is what Deleuze calls the "very idea of Baroque perspective." [12]

A DATABASE APPROACH TO PERSPECTIVE

This inspiration about the representation of space and the idea to extend the linear perspective as it is implemented in most computer graphics applications led us to the development of a hybrid approach that we call "database perspective". It integrates the familiar linear perspective construction with a series of defined relative points of view and allows us to address the composite nature of a collection that draws a comprehensive picture of nature from an almost endless amount of collected individual objects. It uses the idea of a folding principle connecting the museum building to the various locations out in the world and, by referencing the idea of a continuous shifting of viewpoints and the successive "falling into place" of the perspectives, gives a metaphor to the procedural nature of the ongoing and by definition never finished project of collecting. The concept of cumulative knowledge construction as it stands behind the idea of the museum is an endless process of generation and revision of knowledge.

The layout of spatial elements in our project uses the museum as a central hub that is explored by the user. The museum is represented as an abstract space consisting of the floor-plans and elevations of the original building as it is described in the quote from Panofsky above. Using the line drawings of the plans gives us the opportunity to evoke the notion of the building of knowledge as an imagination and points the viewer to the fact that the museum itself is an abstraction and idealization made regarding the human understanding of nature. It appears as a line drawing delivering associations on one hand to the architectural plans of imagined buildings yet to be completed, and on the other hand, it is akin to the wireframe images evoking the imaginary worlds of virtual reality as they have been established as classic notions of computer-culture by media pieces such as the Gibson novel "Neuromancer," [13] the film "Tron," [14] or the game "Rez." [15] From this central hub the viewer can access multiple "context spaces", which display certain topics and explore other locations and times, such as the submarine fauna or objects from the 'Wunderkammer'. The viewer can access these spaces by passing through objects located in the virtual museum that serve as representations of and portals to the "context spaces." The geography of these spaces and their relationships to each other are organized in a recombinant database structure symbolizing the references and vectors reaching out from the museum into the world

and that follow the intuition of a folded space with various extensions, which are only possible as virtual spaces in a virtual architecture.

The central museum space is filled with photographic images of the actual museum building, arranged in the virtual space according to the perspectives from the various points of view as they were taken in reality. The resulting impression of the space is a composite akin to a spatial collage of images that fade in and out as the viewer passes through the space and approaches the various points of view. We have adopted a similar concept for the representations of the objects in the museum that serve as portals to the context spaces. Each object is represented by a series of photographic images of the real object showing the different sides of it, which are displayed as the viewer moves around the object. All sides of the object are shown in ten degree steps and imply the notion of continuity and three-dimensionality while at the same time communicating the gap between the individual representations, much like the idea of an infinitesimal series – coming close to the original but never reaching it. Our decision to use photography in combination with a computer generated space was motivated by the desire to evoke the reality reference of the objects and contrast it to the abstraction of pure data representation. As Roland Barthes describes, photography has the power to evoke an idea of direct reference to the object that was photographed, much as the reality reference of the taxidermy in the museum: "The photograph is literally an emanation of the referent. From a real body, which was there, proceed radiations which ultimately touch me […] like the delayed rays of a star." [16]

As a way of overcoming the abstraction made by most of the linear perspective constructions, the restriction of the view to one single eye, we decided to present the project as a stereoscopic three dimensional projection. This significantly heightens the immersive quality of the experience and makes the complex spatial system more readable for the viewer as it uses stereoscopic vision to support his perception and resolve the spatial relationships within the space.

THE MUSEUM AS EXPERIENCE

The reflection about perspective and the representation of space is an important aspect of the the project "Venture to the Interior / Vorstoss ins Innere." During our research and production of the project we have realized that the specific quality of the space and the distinct feeling of historic presence that spans many centuries are essential aspects to communicate. We have used the representation of space as a symbolic way of communicating these feelings and allowing the viewer to enter a space that is normally inaccessible, as, in contrast to the show-collection, the scientific-collection, which is the largest part of the museum, is not publicly accessible. These decisions are important aspects of the communication process and warrant careful consideration, they should not be left as contingent on the tool that is being used, as there is no neutral or, as James Elkins writes, "meaningless perspective." [17] With the reference to Leibniz we are alluding to the notion of the museum as an educative and entertaining experience that he formulated in 1675 in his text "Drôle de Pensée" and where he described the use of exhibitions, machines, and all kinds of media spectacles as a way of fostering scientific engagement and as a generator for new insights into nature. [18]

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PROGRAMMABLE SPACE

Sam Kronick

This paper draws an analogy between the development of the programmable computer and conceptually related projects to develop programmable architectural *spaces*. I propose that the computational power of mobile devices and augmented reality technology can be used as a method of revisiting these utopian dreams. In this spirit, I lay out the plan for a software toolkit for such mobile applications titled *Urban Space Program.*
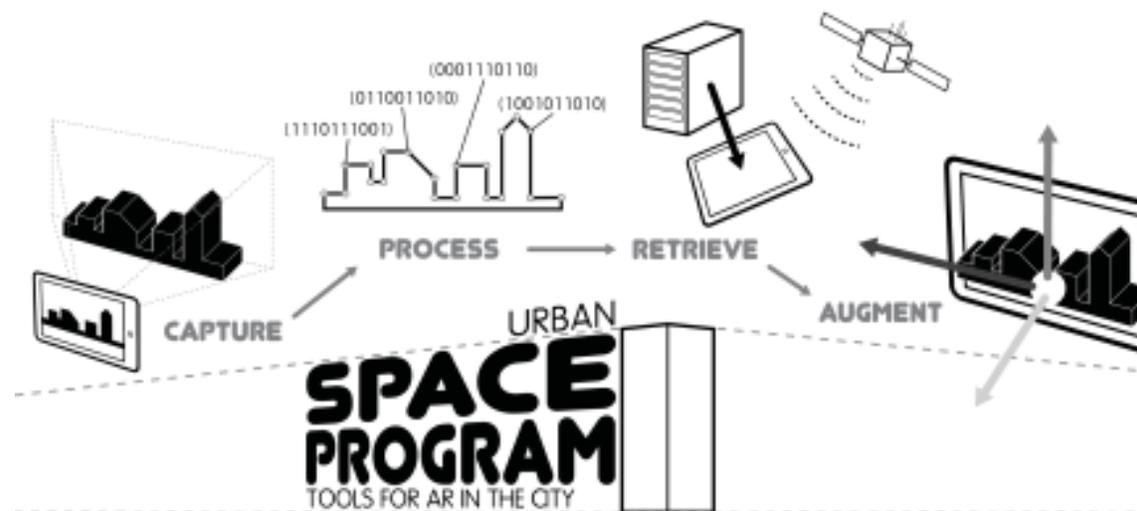
System overview for the Urban Space Program augmented reality toolkit, currently under development by the author.

The Program Metaphor

In the field of architecture, the term "program" refers to the types of spaces to be included in the building or set of buildings– a university's program would call for classrooms, auditoria, dormitories, food service, etc. The architect's job is, in part, to shuffle around the building masses necessary to house these functions into an effective form. Whereas most architecture renders the program static, a distinct movement of mid-20th century avant-garde architects focused on the design of frameworks or superstructures into which various programatic elements could be inserted, removed, and replaced with relative ease. Such dynamic architecture is exemplified by Cedric Price's *Fun Palace* (1961-1964), Archigram's *Plug-In City* (1964), Yona Friedman's *Spatial City* (1959-1960) and Constant Nieuwenhuys' *New Babylon* (1959-1974). [1] In all these projects, the users of each structure are given agency to reconfigure their environment by moving about walls, staircases, or even entire rooms within a grid of possible locations. In this way, these spaces move from being programmed to become (*re)programmable*. An analogous shift occurred at about the same time as single-function computers (such as World War II-era

ballistics trajectory computers, or desktop calculators) transitioned to the von Neumann architecture of contemporary microprocessors– an architecture that supports interchangeable programs.

Suggesting that space itself can become programmable is not an unprecedented metaphor; software architects have been borrowing language and concepts from their brick-and-mortar counterparts for decades. Examples include Eric S. Raymond's seminal paper *The Cathedral and the Bazaar*, [2] Mac OSX's "Core Foundation" API, Ruby on Rails' "scaffolding," and the general focus on "software patterns" (including the "factory method" pattern) which implement the style of thinking suggested in Christopher Alexander's *A Pattern Language* [3] far more extensively than the architects for whom it was originally written. Curiously, this conceptual crossover has been largely one-directional. Contemporary architectural discourse is rife with discussion of how best to use software tools like CAD/CAM and Building Information Modeling systems, but, except perhaps for a few loose interpretations of the term "Open Source," [4] the philosophy of software design has not had a great impact on the art of making space.

Challenges of Programming Space

A possible explanation for this asymmetry is that making physical space programmable isn't as easy or effective as it looks on paper. Take, for example, Japanese Metabolist Kisho Kurokawa's *Nakagin Capsule Tower*(1972)– a rare example of built architecture that embodies principles of modular, interchangeable components. Its 140 micro-dwellings are designed to be removed from its two central towers and replaced every 25 years. Thirty-nine years later, the capsules are hopelessly outdated (with their built-in reel-to-reel tape decks and corded telephones) but replacing them with new modules has proven difficult to organize and finance, so the building as a whole is at risk of demolition. [5] It is likely a similar fate would have met the other avant-garde designs would they have been built, too.

Nakagin's capsules seem to be more inspired by the industrial revolution's notion of interchangeable parts than the computational revolution's interchangeable programs. Thus, Nakagin and other blueprint-based speculative architecture can be read as analogous to the mechanical analytical engine of Charles Babbage, an early computer that aspired to do with gears and levers that which was ultimately only made efficient through the transmission of electrons. [6] In an era of cheap digital computing, these architectural visions from the past century deserve a fresh look. Not only are computational tools unthinkably more powerful than they were when Archigram and the rest were designing, they also embody the notions of portability, ubiquity, and pop-culture integration that fueled these designers' visions. With a mobile phone in the pocket of an ever-expanding percentage of the world's population, the low costs of experimenting with software provide a viable alternative to periodically retooling factories as a means of reprogramming space.

Of course, the challenges of making a physical space programmable are not just technical or economical in nature; there are social barriers to achieving a critical mass of spatial dynamism as well. Architects like to think that everyone is as interested as they are in contemplating the buildings around them as a part of everyday life. The mid-century avant-garde was no exception; Price's *Fun Palace* was pitched as a viable business model for a citizenry that would crave spatial reconfiguration as a weekend leisure activity, and the imaginary species *Homo ludens* set to inhabit Constant's *New Babylon* would not only be allowed but expected to build diverse spaces inside a maze of homogeneous, standardized parts as an act of play. That people would jump at the chance to engage with such systems seems a misguided assump-

tion in hindsight. In revisiting these visions, it might be best to look at a growing contemporary subculture that already has practice in the sort of spatial literacy needed to take advantage of reprogrammable space to its fullest. Here, the popular model of video gaming can provide guidance.

Virtual Games to Augmented Realities

Some of the most successful video games explicitly use space as a core gameplay mechanism. Maxis' *SimCity* outright casts the player as an urban planner with no other reward than those that come from implementing a satisfying plan, while newer games like Valve's *Portal* series require a player to keenly read the walls, voids, and walkways, of the surrounding space and precisely alter its topology in order to reach the next level. There are plenty more examples of interesting game spaces, but perhaps the most relevant to the mid-century avant-garde is Mojang's *Minecraft*. [7] This low-budget indie hit takes place in a world made entirely of one-meter cubes that bears a striking resemblance to the sprawling overhead grid of Friedman's *Spatial City*. The gameplay stems from the fact that this cubic world is entirely mutable. Every cube can be "mined," carving out voids into the terrain, and subsequently replaced to build up structures with the radical variety of LEGO bricks. Its two-button interface (left click destroys cubes, right click places a new one into the grid) perfectly captures the duality of literacy that is an ability to both read as well as to write within the grammar of a given system. A careful balance of gameplay combined with this novel building mechanic creates a highly addictive experience. The result is a user base of millions; Minecraft's multiplayer worlds are teeming with activity that would make any participation-hungry architect jealous. Minecraft demonstrates that gaming is a format full of deep incentives for participation, capable of training actors to effectively transform their world. What Minecraft lacks (along with myriad other "virtual worlds"), however, is the connection to the physical cities that interested the avant-garde as spaces ripe for critical intervention– spaces that might be the foundation for widespread social reform or political revolution. This is where we must depart from purely synthetic spaces and move into the hybridized space that augmented reality can provide.

Augmented Reality (AR) is a general term that suggests a perceptual blending of the physical with the virtual. At this point in time, it primarily refers to the computer-aided superimposition of textual/graphical annotations or 3D geometry over a live video feed. The format most relevant to the discussion at hand sites these functions inside a mobile phone or tablet computer– computational machinery that contains a critical combination of portability, ubiquity, processing power, location-awareness, and wireless networking which could facilitate urban-scale exploration by a multitude of users. Not only does AR hold potential for its ability to fuse engaging synthetic game spaces with socially meaningful physical places, it works on the level of vision, augmenting the image of the city and thus connecting to a primal sense of how we perceive ourselves as inhabitants of the surrounding environment.

As masters of visual presentation, architects have long been working with a sort of proto-AR to communicate their ideas. Yona Friedman's sketches for Spatial City were often drawn over real photographs of the existing city, using what currently is as a starting point to show what could be. The overhead maps of Constant's New Babylon were made from cut up pieces of other maps, pasted as an overlay onto the intended site. Archigram was famous for their use of collage to illustrate how their radical visions might look in the context of a familiar space. While these images were static and captured only a moment in time, they represented plans for vibrant, active spaces. The real-time, on-site nature of AR has potential to extend these composited, active urban plans of the 20th century with the socially-networked, interactive technology of the 21st.

Form Follows Framework

Bringing all this together seems too great a task to be accomplished by a single piece of software. One great AR app will not change the world, just as one Metabolist capsule tower could not transform millennia of architectural wisdom about the importance of permanence. Fortunately, an alternative path can be discerned by hybridizing the historical precedents with the practices of contemporary software design. The mid-20th century avant-garde did not aspire to design singular monuments; instead they focused on the production of systems which would facilitate a certain kind of desired activity. Form followed framework– the latter manifest as structural steel beams, service hookups, communications equipment, and machinery to manipulate modular substructures. Even after years of development, the physical design for the *Fun Palace* consisted of little more than a set of towers and gantry cranes that would move along suspended rails to construct the interior under the command of the structure's spatial programmers. Likewise, the notion of a framework in software design consists of a set of algorithms and data structures which are targeted to approach a certain body of problems without solving any one in particular (frameworks exist for robotics, graphics programming, user interfaces, etc). The constraints and structure of the framework define the configuration space of derivative works– the space of all possible programs that could be built on top of what is put forth as merely a starting point. Therefore the framework creates not a single application, but embedded seeds which self-replicate as they aid and influence how others approach the design process. In this way, a multitude of programs may arise that carry on in the spirit of the original framework but also, as products of various programmers' desires, mitigate the shortcomings or authoritarian impositions of the original structure.

Design Considerations for an Urban Space Program

Existing augmented reality frameworks neither usefully constrain the problem space by targeting a clear set of applications nor do they provide relevant algorithmic tools that are specific to the task of reprogramming the city. What is needed is an AR framework for spatial programming, targeted at the creative coders who use software as a primary means of aesthetic and conceptual communication. Such a framework is currently under development under the working title *Urban Space Program*. In developing this framework, several design choices became clear.

First and most importantly, the framework needs to be able to recognize where in the city a user is located and what they are looking at. This can be accomplished by combining location-aware sensors such as GPS, compass, accelerometers, and gyroscopes with computer vision data gathered through a mobile device's camera. All existing AR frameworks at this point in time use one of these methods or the other but do not fuse data from both sources. Frameworks that are location-aware without using vision (such as Layar [8] and Wikitude [9]) tend to augment with textual annotations rather than alternative geometries because of the limited accuracy of GPS; pixel-perfect image alignment is only possible through the use of computer vision. [10] In Urban Space Program, building facades become fiducial markers; the distinct face of a storefront or tower replaces the blocky black-and-white barcode as a machine-readable identifier. The other on-board sensors help limit the search space of which facades might possibly be in view and, using a set of algorithms called "sensor fusion," fill in the gaps when no known facades are visible.

Second, the framework needs to be built with a client-server architecture to enable simultaneous augmentation of a scene by multiple users. If all data were stored on each user's mobile device, changes

made by one user would not immediately be available to another user in the same area– this would create a fundamentally single-player experience that runs contrary both to the social act of building promoted by the historical avant-garde and the multiplayer nature of successful contemporary video games. Thus, storage and processing of augmented data and recognizable facades happens on a server and is streamed to the users' devices as they enter a new area and reprogram the space. Rather than centralizing this on one server, the software tools are openly available for installation on any number of servers from which the mobile device can choose to connect to, allowing parallel systems to operate in the same locale.

Third, the database of facades should be built in part with user content. This is suggested as a critique of the historical architectural projects; while designed *for* radical user participation, they were not designed *with* users. In each case the architects unilaterally chose the sites and situations in which activity would take place. In the case of AR, it is easy to imagine that if only the system designer can define which buildings are recognized (and thus which can be easily augmented), this encourages applications of the framework which perpetuate traditional power structures. Recognition of a fixed set of popular landmarks, buildings concentrated in hip districts, or storefronts of sponsoring companies correspond with notions of exploration-as-tourism, advertising, and brand recognition rather than opportunities to truly re-imagine and re-program how a city could be. The Urban Space Program framework includes user interface elements that simplify the process of capturing imagery from a mobile device, processing it for later recognition, and integrating user-captured facades into the database for later retrieval. Of course, the system designer could always choose to exclude these interfaces from their application, but their presence in the framework and presentation as end-user tools rather than developers' utilities suggests that they be included as a sort of meta-game that expands the frontiers of where a particular program can be used.

Finally, if this framework is to connect with a relevant audience of developers, it should tie into existing tools that creative coders are familiar with. Urban Space Program fulfills the role of figuring out where to draw an augmented overlay, but not how or what to draw on top of the live video feed. This latter task is handled by a rendering engine. Conveniently, the creative code community is in many ways defined by the rendering engines it collectively tends to use. Community websites like CreativeApplications.net tag projects according to the rendering framework they use, similar to the way traditional artwork is categorized by material. Tools like Processing, [11] OpenFrameworks, [12] and Cinder [13] are common choices for a growing number of artists and designers. Whereas many rendering engines are set up to produce mainstream video game graphics, the tools for creative coders encourage interactive generative design and abstract visualization of data. Very different results are obtained when images are programmed rather than modeled. Integrating Urban Space Program with these other frameworks will hopefully lead to fresh perspectives on how our cities might function and change beyond the well established modes of representing spaces in photorealistic 3D.

Future Spaces

The Urban Space Program framework represents just one possible way to explore the programmability of space. Augmented reality clearly captures the notion that the image of a place could be altered, though it does little to immediately effect the tangible components of a place. Questions of materiality require other means of investigation. As a software-based media, AR inherently engages with processes and algorithms as a method of producing images, though actually reprogramming the dynamics of an urban environment may call for other interventions. An application that is at its core algorithmic could

hide nonlinear processes and data behind a linear presentation method, playing back fixed narratives rather than the branching paths of participation proposed by the mid-century avant-garde. Gaming is a broad category covering numerous ludic activities and discerning exactly which mechanics can best transform contemporary urban spaces is another field of inquiry in itself. Urban Space Program does not attempt to resolve all these issues. Rather it is an attempt to reconcile present technologies with past philosophies of space to not only speculate, but actively create possibilities for the near future.

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METAFACTION AND THE RHETORIC OF ERROR – AN APPROACH TO ADAPTIVE PERSUASIVE CONFLICT GENERATION

Daniela Kuka

With 'metaFACTION' we invent an experimental semantic tool for critical discourse representation and nonfictional storytelling. Based on our Persuasive Conflict Generation Model, we establish an adaptive documentary style to help people gain alternative access to the structure and mutations of public discourse. Paradoxically, metaFACTION makes use of an error-friendly rhetoric – on a meta-level – as a means of shaping democratic communication.
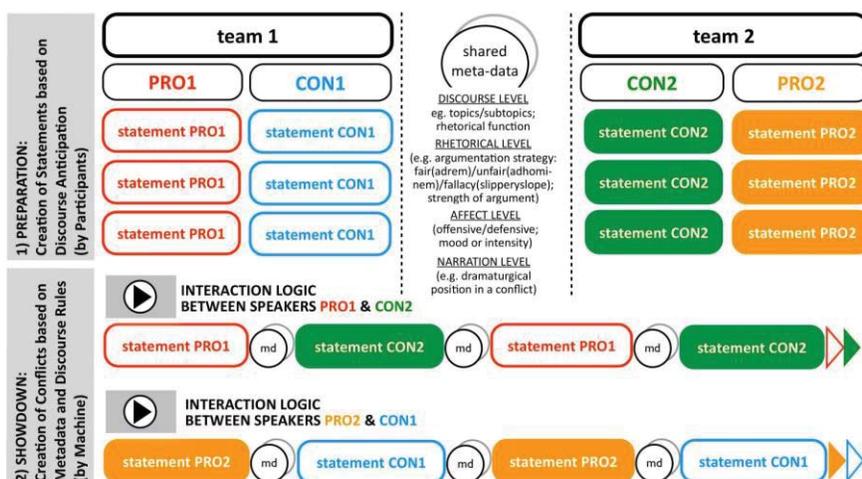
Fig. 1. Exemplary workflow of the formalisation of dialogues with conflicting viewpoints, Meta-Dating II Persuasion, 2010, Klaus Gasteier & Daniela Kuka, Schematic representation, Copyright by the authors.
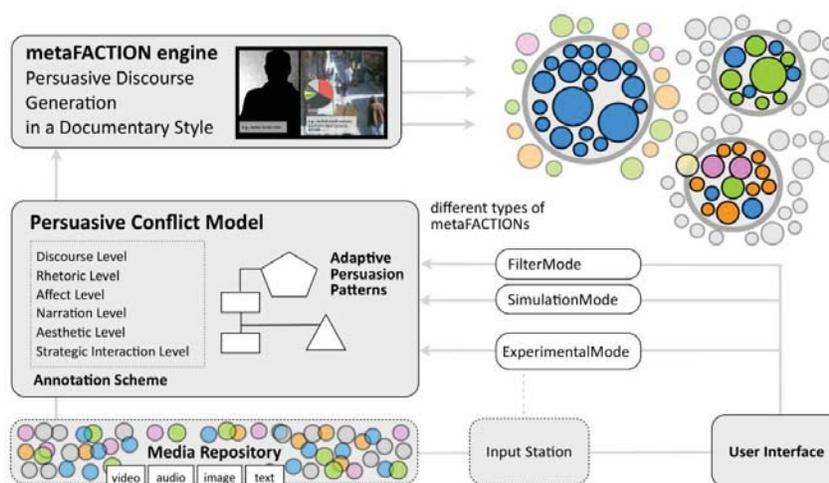
Fig. 2. metaFACTION, 2011, Daniela Kuka, System draft design (representation of filtered versions of mF-documentary following the style of 'filter bubbles'[2]), Copyright by the author.

Imagine we could generate informative and entertaining conflicts from digital resources of discourse such as online magazines, wikis, news portals, blogs, etc. Imagine we could receive them as personalised documentaries instead of lists of articles, references, links and comments – e.g., as simulated panel discussions, TV debates or just everday conflicts. Imagine fragments of discourse were attracting other fragments of discourse in a dialectical manner, and they would automatically arrange as we are participating in a never-ending global conference ...

Semantic Media shape the way we produce, spread and receive public discourse. Given that discourses in digital archives and the World Wide Web are organised in a nonlinear fashion, we need to conceive of new methods and design approaches to create adaptive representations of topics of societal relevance. With 'metaFACTION' we invent an experimental semantic tool to capture, structure, and reorganise discourse fragments in such a way that informative and entertaining media products with different communicative goals for heterogeneous publics emerge. Combining structural knowledge from Automatic Video Generation, Discourse Analysis and Argument Processing as well as Story Generation with empirically validated patterns to describe natural situations of human dispute or conflict, we suggest the Persuasive Conflict Generation Model. metaFACTION, based on this model, is a conflict machine to create and present divergent and even contradictory discursive formations from a pool of annotated media fragments. The resulting conflicts are contextualised in a documentary-like genre model (documentary films as they are assumed to be persuasive) so that naturally unstructured discourse can be transformed into a semantically enhanced media experience. What is paradoxical about metaFACTION is not so much its capability to contradict itself in a plausible manner, but the targeted use of errors as a means of shaping communication.

The first two sections of the paper discuss current effects from the semantic web as they influence the vision and concept of metaFACTION. The third and fourth section describe metaFACTION with regards to its specific documentary generation approach.

A New Kind of Democratic Communication?

metaFACTION adresses a new wave of internet criticism associated with authors like Cass R. Sunstein, Jaron Lanier, Dean Eckles, and others. In 2010, Eli Pariser introduced the metaphorical term "online filter bubble" to describe how personalised search algorithms start to control how information is presented "increasingly biased to share our own views:"

With Google personalized for everyone, the query 'stem cells' might produce diametrically opposed results for scientists who support stem cell research and activits who oppose it. 'Proof of climate change' might turn up different results for an environmentals activist and an oil company executive. [...] More and more, your computer monitor is a kind of one-way-mirror, reflecting your own interests while algorithmic observers watch what you click. [1]

What seems to establish from that is a "friendly world syndrome" with "false consensus effects," [2] a hegemonial discourse frame that is immune against critique, irritation, provocation, or alienation, but whose plausibility is always assured in advance owing to the comfortable avoidance of cognitive dissonance. Following Pariser, personalised discourse filters create an intransparent You-Loop around us, a landscape of automated cencorship which, paradoxically, is both a black box and generated by our own online activities. Aggregation services and filter algorithms are challenged to cope effectively with an

existing deluge of data that has reached a level of complexity unmanageable by human capacities (cognitive, economic). But can such algorithms be neutral and democratic? They are not simply there to create order and meaning; they are always a step ahead of our decision-making faculty by autonomously selecting, weighting, and evaluating data. They simulate coherence, completeness, and context based on familiar paradigms of reception such as hierarchical, topographical, or chronological order. Behind that simulated order, a new kind of order is emerging: According to "The Order of Things" described by Michel Foucault in 1966, [3] we call it "The Order of Media" which means that there are now semantic concepts and algorithms that govern the production of knowledge and, as a result, people's understanding of the world, their attitudes and behavior.

Digistemes & Unfair Machines

Consequently, in such an "Order of Media" the authors of ontologies and algorithms become the new designers of, again in Foucault's sense, "epistemes", the rules to produce and spread legitimate truths. While semantic concepts determine if and how an object can be described to become part of an order, and if and how it can be related to other objects, algorithms determine how we can access these objects both on general and on personalised paths. This interplay builds a new set of rules to deal with scientific knowledge, cultural artifacts, news, and so on. To adequately describe this phenomenon we invent the term "digistemes". Digistemes are the self-logic of the semantic media dispositif, [4] a highly complex and intransparent set of rules that, on the one hand, allows to produce, distribute and access knowledge. On the other hand, they cause the spread of parallel universes full of zombie discourse, a hidden landscape of disordered unaccessable media fragments. An auto-persuasive human machine network is emerging, a system in which everyone is free to publish anything, but where they cannot or may not see and read everything. Which mutations of a discourse are transformed into zombie data is determined by their capability to provide relevant meta-data to sever the tentacles of semantic search. Otherwise, they remain unable to appear as part of any public discourse.

Thus, digistemes make it appear conceivable that a machine may be capable of automatically generating discourse representations on an arbitrarily chosen topic, using certain pieces of meta-information and coded discourse rules. But should the machine support every user's mindset by adjusting its discourse position to his/her profile? If we intend to use the power of semantic media technology democratically, we have to learn how to use its tools against their own logic (the creation of filtered worldviews). We have to learn how to strategically cooperate with what my be unfair machines (without even knowing if they are). metaFACTION is an attempt: By thinking errors on the meta-(information-)level.

Machine Generated Conflicts

Relevant insights for the research and development process were made possible by a pre-project "Meta-Dating". Meta-Dating is a conception and design project initiated in 2009 by Klaus Gasteier, Professor of New Media at the Berlin University of the Arts. The original idea was to generate plausible conversations about everyday topics from a pool of annotated video clips, based on a collaboratively generated meta-data scheme. Since then this evolved, now as a cooperation, into an experimental environment for non-linear persuasive communication, and a coming series of new approaches. In a team effort, students produce several hundred video clips dealing with anticipatable aspects of a controversial topic of their choice. Having agreed on meta-data that describe argumentative contents, strategies and discourse rules (later transformed to machine-readable algorithms by a programming professional), each team

splits into two subgroups which then develop content for the conflicting viewpoints (taking up both positions in the argument) in complete autonomy, cf. Fig. 1. The project moves a step beyond traditional debating contests: Each subgroup has to anticipate arguments and argumentation strategies for both the pro and con positions as well as patterns of strategic and tactical interaction between the two parties in an ongoing conflict (reaction/action). The computer programm then generates the automatic debate (one version of many possible ones). While preparing the needed material the aim is not to anticipate and plan for all possible dialogue constellations, but to find a formalisation model that also supports unforeseeable turns in the final stages. The plausibility and authenticity of the course the conflict takes shows whether or not the model is working.

Persuasive Conflict Generation

To date, Meta-Dating experiments have been focusing above all on a free definition of description parameters and patterns for each project. A theory-driven modelling of argumentation or discourse structures or narration was deliberately avoided in order to simulate seemingly natural dialogues with high flexibility to test different solutions. metaFACTION builds on these experiences and introduces, in contrast to existing approaches in automatic documentary creation [5, 6, 7] and dialectical argument modelling, [8] an approach to model adaptive persuasive communication on natural conflict analysis in human communicaton. The following paragraphs give a short overview on the main features, cf. Fig. 2.

USER MODELS FOR NONLINEAR PERSUASION

Existing argumentation and persuasion machines do hardly consider that statements have different relevance to different users and that different ways to present a statement affect their persuasive power. metaFACTION follows a "mind opener" approach to documentary [9] combined with user models to generate persuasive mutations of discourse. On this level, we need two different types of meta-data with strategic relevance: a) Meta-data used to direct the dialectical process of two or more parties in order to create a plausible dramaturgy of conflict, e.g., institutional (expert-to-expert/expert-to-layman/layman-to-layman) and social (activist-nihilist/optimist-pessimist) relationships, modes of reaction (offensive/defensive/reflexive), strength of arguments, level of affective involvement (neutral/angry/unsettled); b) Meta-information relevant to personalisation based on user models, e.g., speakers' credibility in different contexts and milieus, speakers' similarity (optimistic/pessimistic, economist/ecologist, manager/mother), values addressed, and so forth.

NATURAL PERSUASIVE CONFLICTS

Related approaches that encode rhetorical patterns are based on formal argument and argumentation scheme modelling. [7, 8] Their insights are integrated in the Persuasive Conflict Generation Model, but we need further approaches to compensate that they create unnatural discourse structures which (1) are hard to capture from organically growing discourse, (2) cannot be used as model for the creation of a whole documentary experience, which consists of a wide range of verbal discourse and visual representations in a dramaturgically relevant order, and (3) are ignorant to the fact that human opinion-making processes do not exclusively rely on logical argumentation. In everyday life, we are affected by personal experience and emotionally intense stories, different hierarchies of values, more or less powerful opinion leaders in our community, misunderstandings, unfair rhetoric, etc. For this part, metaFACTION creates an approach to model human discourse on patterns of natural conflicts as they dominate, e.g.,

panel discussions, TV debates, or spontaneous conflicts in social contexts. Formal Models describing discourse and story structures add parameters and concepts in order to realise a documentary style that is driven by dramaturgical courses of conflict.

OPEN-ENDED PRODUCTION

The related project Terminal Time [6] encodes ideological patterns instead of formal argumentation, but it operates as closed systems. Based on transparent annotation schemes and scalable conflict rules, metaFACTION supports unmoderated peer production on topics of societal relevance. It has to be determined whether sets of meta-data can function as a universal language for micro-storyboards and/or as global stage directions so that anonymous and heterogeneous groups of authors add and annotate found footage or their own statements to create unwritten, typically contradictory, and evolving conflicts.

RHETORIC OF ERROR

Existing approaches try to avoid or minimize errors, e.g., argumentation tools that support decision-making and opinion-making processes. metaFACTION tries to generate a more experimental form of discourse representation. Human beings do not communicate in the mode of formal argumentation. Instead, social communication is context-sensitive and realised in dialectical loops which are rarely free from misunderstandings, coherence gaps, evasion and rapid shifts from topic to topic. More or less unconsciously, we bridge gaps and accept media disruptions, we oversee unfair rhetoric and fallacies, we familiarise with ruptures and lacunae as they are popularised by postmodern film aesthetics and fragmented internet communication. How could our habitual readiness to allow for errors and imprecisions of communication be utilised in a way that enables the manipulation of discourse? We suggest a sense-making false-connections approach allowing metaFACTION to repeatedly generate new arrangements of available media fragments and, therefore, also new statements without paying attention to the primary material's context or intention. Different manipulative principles of montage (known from documentary film theory) are used to build statements and clusters of statements that serve the user. The annotation schemes allow to index media fragments in such a way that they may appear in different, even completely foreign contexts (e.g., by multiple annotations on the discourse level such as science, media, politics, economy, education, ethics, medicine, aesthetics, and everyday life), and also lead to different statements when combined with other media fragments (e.g., by using bipolar fragments that change their polarity depending on their context of use (Kuleschow effect), or by omissions, by polysemy, by framed de- and recontextualisation such as quotation or parody, and by augmenting different context information). As persuasive patterns, we build on psychological and social effects in conflicts such as, e.g., "create fear," "evoke sympathy," "demonstrate authority," or "provoke moral concerns." They can be fullfilled by employing rhetorical tactics such as "quote an expert," "build a positive/negative analogy," "show great/terrible consequences," "tell a story of success/failure," "broaden the topic," "show pleasant/dissuasive example," "attack trustworthiness of counterpart," and so forth.

METAFACTION MODES

The stimulation of the user can occur in three modes. The FilterMode creates a coherent documentary that serves the user's (anticipated) mindset. The SimulationMode allows users to deliberately manipulate the persuasive logic of the engine via an interface. Users can thus playfully experience in this way

how discursive formations and resulting statements are controlled without interfering with existing content. The ExperimentalMode generates documentaries that deliberately infringe discourse and genre rules and thereby open up improbable formations for simulation (e.g., counter-discourses suppressed by mass media, untypical speaker constellations).

Outcome & Future Prospects

metaFACTION allows to simulate different kinds of persuasive conflicts. Resulting media products can be manipulative, entertaining, provoking, or just irritating. Thanks to an error-friendly rhetoric on a meta-level, metaFACTION can serve as a powerful tool for critical discourse representation and nonfictional storytelling. We suggest using the Persuasive Conflict Generation model to establish a new documentary style to help people gain alterative access to the structure and mutations of public discourse in the third generation of the Internet. We are currently working with a prototype version that is to be developed further as an online application.

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CORPOREAL EXPERIENCE IN VIRTUAL REALITY

Merve Kurt

This paper will discuss the status of body and corporeal experience in the context of new media art, especially through the virtual works of art that involve digital interactivity and immersion. I will argue that an alternative understanding of aesthetics is needed in art historical and theoretical studies because the experience of virtual reality through new media art reappraise our ways of thinking about pictures and images.

This paper outlines a few ideas about the nature of a new kind of interaction with the art works: an interaction in a bodily way with digital works. This experience is made possible via real-time interactive 3D computer graphics and the resulting enveloping space is called virtual reality. I will argue that an alternative understanding of aesthetics is needed in art historical and theoretical studies because the experience of virtual reality through new media art reappraise our ways of thinking about pictures and images.

To get a clear picture of the notion of virtual reality one should begin with its possible definitions. During my researches, I have realized that there are three different use of the term, corresponding to three different disciplines: science (more specifically optics), philosophy and arts of computer generated imagery. Used in optics, the virtual reality signifies a mirror image. In this context, this term could be substituted with optical illusion. In philosophy, it is defined either as a potentiality in the Aristotelian sense or a hidden, a non-obvious presence in the actual reality. Though in the first context the virtuality is the contrary of actuality and in the second it is already in the actual, both of these definitions accept that the virtual is in the order of reality and it is not its contrary. It is necessary to underline this attribute of the virtual because mostly in the commonsensical thinking we tend to say that if something has a quality of virtuality then it is not real. Yet, it is important to appreciate that virtuality is a part of reality since there is really a virtual reality. And today, when we talk about virtual reality, it has a specific meaning: interactive simulation systems created through computer based three-dimensional imagery. In this paper, we'll use the term in its third sense when referring to virtual reality in digital art.

When we move to the definition of virtual body, we find two different categories. In the field of literary fiction and its declension in films, it is a question of cyber bodies or bodies set free from all material limits. And in the universe of computers, it is a question of a body modelled or moulded by three-dimensional computer graphics, a body immersed in a computer-generated world where a perceptually encompassing environment is created. This experience is promoted either through use of an interactive screen or with head mounted displays combined with haptic and vestibular displays. This device enables the user to complete, extend and reproduce the reality. I'll treat the question of virtual body as it is defined in the second category, meaning as an immersion in an enveloping space created by digital art works.

I disregard if it is an disembodied experience like in the works of Jeffrey Shaw, namely *Place :Ruhr*, or an embodied one like the *Osmose* of Charlotte Davies because in both cases, the body incorporates into images, live them from an intrinsic point of view which could break out the rules of Euclidean space and

the Cartesian understanding of spaciotemporality. Hence this new way of experiencing images arises new phenomenological and aesthetical questions.

In Jeffrey Shaw's *Place: Rurh* (2000), which is an example for the disembodied experience, a rotating platform allows the viewer to interactively rotate a projected image within a large circular projection screen and explore a three dimensional virtual environment. A device on the platform designed as an interactive user interface, with its buttons and handling, allows the viewer to control his movement through the virtual scene. It enables the rotation of the platform and of the image around the circular screen. The field of exploration is open to other sensory organs than the eye: the spectator uses the virtuosity of his/her fingers, gestures and synchronizes his/her movements with the speed of moving images. The hand wins a control function and the eye interacts with it in order to enter the virtual world. Movement of the body from the physical environment to the space of virtual images is accompanied by a sense of continuity that partially masks the difference between physical and virtual space. The ability to move in the space of images doubles the movements of images on the circular screen. Anne-Marie Duguet mentions that in Jeffrey Shaw's works;

The user enters in spaces without any point of reference, in times without direction and in adjustable speeds. He is both on the stage and out of it. He conceives here and there at the same time. [1]

 So the aesthetic experience does not remain only as contemplation, but gains a sensitive and cognitive aspect. We can literally say that the audience becomes one with the work and s/he touches the image. Thus, the interactive device allows participation to an unprecedented and multisensorial experience.

To have an idea about the embodied experience within the virtual universe, *Osmose* , the three dimensional installation of Charlotte Davise, is a good one. Davies, a Canadian artist and the director of Visual Research at SoftImage creates *Osmose* in 1995. She builds twelve natural worlds with the themes like landscape, earth or interior view of a body where it is possible to be immersed and to move with the help of a head mounted display and sensors that capture the respiration and the movements of the user. Immersants are placed in *Osmose* for fifteen-minute sessions. In her paper « Techne as Poiesis : Seeking Virtual Ground » Davies speaks of *Osmose* as being a poesies or bringing forth, revealing our being in the world. The prime navigation tool is the breath. Stephen Jones, when describing his experience in *Osmose*, writes:

On breathing in, one rises through the virtual worlds ; on breathing out, one sinks slowly into deeper realms until one gets down to the core machine-code world. The participant gains a sense of being removed from the everyday world and immersed in some environment that does not necessarily behave according to the rules of the known. [2] Davies explains the audience impact of her immersive virtual artwork:

… judging from the participant response, immersion in *Osmose* appears to temporarily suspend some people's capacity for rational thought and conversation. For many, it is an emotional, even euphoric, experience. People feel free of their bodies and yet, paradoxically, grounded in them at the same time. Some feel an intense sense of loss when the immersive session is ending, and even cry afterwards. [3]

With *Osmose*, one have a better understanding of the virtual space and time which operate under laws other than those belonging to the real world. In addition to these characteristics, the digital images in

contrast to traditional ones do not have a fixed or mobile medium as they are immaterial in their electronic form.

Following these examples, we may say that virtual worlds are non-spaces, which do not exist, in our everyday reality. Yet our bodies in these non-spaces can never be non-bodies. This confrontation between non-spaces and real bodies is the core of the question of the corporeal experience in the virtual. At this point I'd like to analyze its conceptual and sensorial consequences of this confrontation from two perspectives, not so sharply distinct from each other : phenomenological and aesthetical.

What is at issue here, from a phenomenological framework is, as art historian Suzanne Ackers suggests, « Renaissance perspective is displaced, and we are learning new ways of seeing, navigating in new kinds of conceptual space. Our perception of time and space becomes a virtual knowledge, no longer fixed to the Cartesian frame.» [4] So we are placed in an original situation where we can perceive physically a theoretical model and in practice act on its intelligible structure but in a reciprocal way this mediation allows us to think, in other words to understand abstractly and categorically physical sensations and configurations of stimulus sensorial. Henceforth, they offer the possibility to cut ourselves off from the world, not in order to retire but to understand it better, to grab its essence. So, the virtual body is not, as it is commonly thought, a body without corporeal envelope, without weakness, just a body of pleasure. But it is rather a body, which would have the chance to ask itself the question of the man, his status and also his own limits. The virtual reality permits to witness the boundaries of reality through an other form. In a phenomenological context, if we refer to Merleau-Ponty, the body grasps its own immediate knowledge by jutting into the fabric of experimental space and time. And since the experience of space and time changes within virtual environments, we can not speak of body image as a stable entity in virtual installations, therefore we should reconsider it: Is it possible to conceive a phenomenological experience of a new order ? If so, to what extent these new sensations and perceptions would change the phenomenological studies ? These questions could be considered as a basis for a phenomenological theory that remains to be founded.

To experience the visual, aural and interactive aesthetics of the work, we don't really leave our physical bodies but we leave it in an imaginative way. Philippe Quéau, a contemporary French scholar and Fred Forest both artist and art theorist who made a great contribution to the literature of the virtual, announce that the virtual is the vertigo of the abyss. Quéau explains that in German, the abyss is Abgrund, which is the contrary of Grund, the base but also the reason, as Heidegger reminds us. If the virtual worlds excite us it is because they create a sense of vertigo, an emotion of abyss, we are leaving the reason. [5] Virtual installations, by enabling people to experience the unusual sensations of seeing and floating through things, changing them, living them from inside, make them get free of their usual, habitual ways of being in the world. So, as our physical appropriation to the art work, our emotional, sensitive and intellectual relation are deeply modified, we should bring forth a new theory of aesthetics. It would be an ignorant mistake to place new media art in the historical continuity of artistic movements related to contemporary art. We should face the question of digital arts as we do in the scientific domains when confronted with a genuine epistemological breakdown. New media creates an exciting occasion to raise broader questions in art theory, philosophy of art, phenomenology and even in epistemology.

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ORIGINS OF JAPANESE MEDIA ART – ARTISTS EMBRACING TECHNOLOGY FROM 1950S TO EARLY 1970S

Machiko Kusahara

INTRODUCTION

This paper excavates and analyzes works of Japanese artists from 1950s to early 1970s that anticipated media art to come, with original ideas and innovative use of technology.

It is never clear when and where "media art" started. However, it is important to trace back its history and examine what may be called "pre media art" in order to better understand media art today. By exploring postwar Japanese art history retrospectively from today's media art point of view, elements that have been neglected or put aside can be rediscovered with different meanings.

HISTORICAL AND CULTURAL BACKGROUNDS

In order to analyze their relationship to technology it is important to understand the historical and cultural background. Japanese postwar avant-garde artists emerged from a specific situation when the value system went through a drastic change in a short period. Nationalistic ideology that the government had successfully established since Meiji Restoration in 1868 collapsed with two atomic bombs and the occupation that followed. The defeat meant liberation from the exclusionist doctrine that practically banned anything Western or international and praised "Japanese spirit" (yamato-damashii) as the winning force. The American occupation forces overwhelmed the Japanese with their material and technical superiority. To many Japanese it became clear that spiritualism alone could not compete against the power of technology. Interestingly similar to what happened less than a century earlier, Japan was determined to catch up by focusing at science and technology, transforming itself into an industrial country.

However, ultranationalism was not a Japanese tradition. Before the war, especially in the 1910s and 20s, lively urban culture prospered with real-time influence from Europe and America. New trends and movements were introduced in real time. Dadaist movement was introduced in 1920 and had a strong impact especially on poets. A group of artists founded MAVO in 1923 with publication and activities that encompassed a wider field including art, design, theatre, architecture, among others. Surrealism was introduced in late 1920s by poets, theorists and artists including Shuzo Takiguchi, who later led Jikken Kobo (Experimental Workshop) in the postwar period. In music jazz, French chanson and European classic music were popular numbers for gramophone and radio. In less than half a century since Japan opened its border to the world with Meiji Restoration and launched an accelerated modernization, Western culture was already integrated in urban life.

However, the occupation of Manchuria in 1931 and invasion to China that followed put an end to the liberal and international atmosphere. By 1940 cultural figures who were active abroad including the painter Taro Okamoto were forced back to Japan. In 1941 Takiguchi and a Surrealist painter Ichiro

Fukuda were arrested for a groundless suspect that avant-garde artists were involved in the international communist movement. Any cultural activities that looked "western" would be considered suspicious. In the daily life use of English was banned, as well as listening to British, French or American music. Painters -- both in Western style (yo-ga) and Japanese style (nihon-ga) – willingly or reluctantly painted war propaganda. As war situation got worse metal objects – anything from statues and temple bells to "unnecessary" machines, toys, kitchen utensils, etc. - were collected to be recycled for army use. Women and children were trained to fight using bamboo spears. To compensate the lack of arms and daily commodities the authority promoted the idea of superiority of spiritual strength over material power.

When the war ended in 1945 with two atomic bombs that exploded over the cities of Hiroshima and Nagasaki, it was natural that awe for the power of science and technology came back, with a hope to catch up the world standard. New companies emerged right after the war founded by engineers who had fresh ideas that could not have been realized during the war. Sony, for example, was established in 1946 and its products played an important role in avant-garde art. Japanese love for technology is a widely known cliché, but in fact curiosity for new things among Japanese had been reported by foreign visitors over centuries.

JIKKEN KOBO (EXPERIMENTAL WORKSHOP, 1951-1957)

Without doubt Jikken Kobo was the most experimental and technologically advanced group of artists in the 1950s Japan. Aforementioned Shuzo Takiguchi played a leading role both as a theorist and a poet in re-launching contemporary art, attracting young artists, poets and composers around him. Consequently Jikken Kobo was formed in 1951 with a multimedia ballet performance titled "Picasso, le Joie de Vivre". Inspired by a painting by Picasso, the stage set was designed by Shozo Kitadai and Katsuhiro Yamaguchi, costume designed by Hideko Fukushia, music composed by Hiroyoshi Suzuki and Toru Takemitsu, lighting designed by Naotsugu Imai - - as a collaboration of major members of the group. The choice of ballet as a form of collaboration was an homage to Dada's and surrealist's experimental ballet, from Francis Picabia, Erik Satie and others in 1920a to Jean Cocteau and Diaghilev, and further to American avant-garde scene with John Cage and Merce Cunningham. Helped by Takiguchi's career and his worldwide network experiments by Jikken Kobo paced up with international movements in art.

For a self-taught composer Takemitsu who was severely rejected from the academic world at a competition the year before, Jikken Kobo was a place for unlimited experiments and multidimensional activities. Takemitsu became one of the main composers of the group and collaborated with other members such as Katsuhiro Yamaguchi for experimental theatres and performances.

Musique Concrète, which was originally developed by Pierre Schaeffer around 1950, was brought to Japan in 1953 by Toshiro Mayuzumi. Mayuzumi had graduated from Tokyo University of the Arts and studied at Conservatoire de Paris the year before. The new form of music based on magnetic tape recording technology was brought to the next level immediately by Takemitsu and his collaborators at Jikken Kobo. They expanded the concept of Musique Concrèt to an audiovisual form that integrated latest electronic audiovisual technology of the time, rather than purely musical experiment. Sony's Automatic Slide Projector system was just introduced as an educational device to synchronize a slide projector and a tape recorder. Combining Musique Concrèt with slides created by artists and photographers, Jikken Kobo produced several "Auto Slide" works in 1953 with surrealistic imagery such as "Adventures

of the Eyes of Mr. Y.S., a Test Pilot" (composition by Katsuhiro Yamaguchi, music by Hiroyoshi Suzuki). The system was offered by Sony and the artists worked at Sony's studio.

The incredible quickness with which Jikken Kobo artists grasped the possibilities brought by these new reproduction technologies and developed a new form of creation must be understood within the social context. An interest element in their activity is the combination of European and American influences. While Takiguchi In addition to aforementioned atmosphere of the era and a longer tradition of appreciating technology and new things in Japanese culture, the academism in art had not recovered yet. The fact that the major part of Jikken Kobo members did not have academic background probably helped them to think more freely.

Jikken Kobo members continued to be involved in experimenting new ideas and technology after the group diminished in 1957 after Takiguchi's death and played major roles in the Osaka World Exposition in 1970, although it does not mean that they embraced technology without criticism. Ambivalence was felt widely among artists who had experimental approaches as in case of Osamu Tezuka who named his major robot character "Atom" (Astro Boy outside Japan) postwar Japan. Yet, as the title of the book "Robot Avant-garde" by Yamaguchi (1985) suggests, their curiosity toward technology and experimentalism shared by the Jikken Kobo members founded a basis for Japanese media art today.

PAINTING BY MACHINE

The Gutai artist Akira Kanayama is less known compared to his partner Atsuko Tanaka, the artist known for her "Electric Dress (1956), although the original use of technology and interest in materials that had not been traditionally used in art were shared among them. Kanayama helped Tanaka in realizing her ideas that involved technology such as her piece "Work (Bell)" (1955). Kanayama's "Work" series produced mostly around 1957 involved a remote-controlled car with paint tanks he built himself, modifying a toy car. Kanayama tested a variety of crayons, markers, black and color ink with which the car scribbled or dripped while moving on large pieces of paper and later on white vinyl sheets, which he found the most appropriate for his purpose. While the artist operated the car on a sheet laid on the floor, its trajectory and the resulting traces of ink were never under the perfect control of the artist. Instead of directly employing one's own body, as in case of other Gutai artists such as Kazuo Shiraga and Saburo Murakami, Kanayama used a mechanical medium and chance operation to drawn lines. His use of plastic inflatables and footsteps on vinyl sheets in other works also suggest his positive interest in new materials, and mediated representation of body. However, when Gutai was "discovered" by the French critic / art dealer Michel Tapié and internationally introduced, these features of Kanayama's works were disregarded. It is said that his "Work" series was interpreted as alike of Jackson Pollock's "all-over" style in the art world outside Japan, neglecting the interesting questions that arose about originality and the role of technology in art.

Eventually Gutai artists including Tanaka shifted to "paintings" rather than three-dimensional works involving unusual medium. By the time when Gutai was invited to participate the 1970 World Exposition in Osaka, Kanayama and Tanaka left the group.

DOMESTIC AND INTERNATIONAL, POLITICAL AND NON-POLITICAL

It has been considered that the isolation from the international art world during the first years after the war helped giving birth to original and often extreme approaches by Gutai artists and by those who submitted to the annual Yomiuri Independent exhibition[1949–1963] including Neo-Dada artists. While the role of isolation was more obvious in case of Kyushu-ha, which was notorious for their wild junk artworks that contributed in putting an end to Yomiuri Independent, there existed multiple channels of information on movements in art.

Taro Okamoto, who had lived in Paris before the war and achieved recognition among surrealists and abstract painters, was most influential among the young postwar Japanese avant-garde artists. Okamoto's knowledge and understanding on avant-garde art combined with his interest in Japanese prehistoric Jomon sculptures created a complex effects on young artists, together with his Polarism (taikyoku-shugi) that regards contradictory ideas as the source of creation. Jiro Yoshihara, who founded Gutai in 1954, had access to the international art world, and communicated with his friends from the prewar period. Aforementioned Takiguchi kept communication with surrealists including Andre Breton 、Marcel Duchamp, and László Moholy-Nagy. As Duchamp and Moholy-Nagy moved to the United States, Takiguchi's spectrum widened to the latest art movements in America. Another information source for some of the young artists including Yamaguchi was the library of the Occupation Force in central Tokyo. The library was open to everyone and had books on contemporary art. Using the still brand new LP record player, contemporary music was also presented. When America, especially New York, was becoming the center of the most experimental movements in visual art, music, and dance, such up-to-date information flow no doubt provided a ground for Tokyo-based artists and composers. It was missing from artists in other regions such as Gutai.

Another important issue in postwar art was politics. As the reaction to the wartime totalitarianism, movement for democracy and influence of communism widely spread, involving young artists. Struggles took place as the US government changed the policy before the end of the occupation and started oppressing leftist movements. The conflict continued in a greater scale in 1960 and in 1970, when the Treaty of Mutual Cooperation and Security between the United States and Japan was to be signed.

TECHNOLOGY AS A MEDIUM OF ART

What seems to be in common among artists such as Akira Kanayama, Atsuko Tanaka and Katsuhiro Yamaguchi is the conscious distance they kept from being trapped in domestic value system, and certain "coolness" in representing their concepts. Instead of being involved in "Japanese" aesthetics or local (i.e. Japanese) politics, or creating artworks that radiate strong messages, they used technology as a medium through which their ideas could be observed and enjoyed by others. Yamaguchi's "Vitrine" works offer different colors and patterns according to a viewer's position and movement. Kanayama's "Work" series is a whimsical experiment with a toy radio control car, which was an extremely popular hobby object of the time. By placing technology as a core part of their works, they opened up a new approach in art, consciously or unconsciously connecting the long tradition of "technology as entertainment" in Japan, and media art to come.

ENHANCING SPATIAL EXPERIENCES THROUGH DIGITALLY AUGMENTED SPACES:

Serhat Kut, Semra Aydinli & Arzu Erdem

This article will be discussing Augmented Reality in a trans-disciplinary approach to discuss the possibility of enhancing the experience of space through our bodies by augmenting it digitally in a 3d setting. The article will be searching for how could the experience of space enhanced digitally in terms of body-space interaction and what might be the consequences of this change.

The Library+ Project. Cybertectonics Of Space. Copyright: Serhat KUT.

Introduction

It has been two decades since Weiser had put forward the vision of Ubiquitous Computing in which he was foreseeing the shift away of computing from a desktop centered state towards a pervasive computing with smaller mobile devices distributed throughout the space (Weiser 1991). Today this vision is being realized with the emergence and pervasive use of tablet devices and smart phones connected wirelessly to public or private networks and each other as well. And supporting this vision, wearable computers and head mounted displays (HMD) has been much more accessible for end users in terms of price and ease of use.

The 1990s has been the era of virtual reality and most of the discussions in economy, politics, architecture and urban design theories were focused on the notion of cyberspace experience. However among the emerging new media and digital interaction technologies the Augmented Reality (AR) technology

enabling to overlay the digital information over the physical space is turning back the discussion on the physical space again. But this time a physical space which is augmented with dynamic digital media.

Cybertectonic Space

The term Augmented Reality is broadly being used for the Computer Vision technology which enables overlaying 3d registered digital dynamic media on physical space (Azuma 1997). But on the on the other hand in a wider perspective, in terms of spatial experience, any situation enhancing, transforming or manipulating our experience of space may be understood within the context of Augmented Reality. Emphasizing this point of view Manovich brings up the concept of Augmented Space, re–conceptualizing augmentation as an idea and cultural and aesthetic practice rather than as a technology (Manovich 2006).

In this perspective Augmented Space may be considered as a new space or transformation of the physical space with digitally overlaid data and even as a new realm providing a place for Being–in–the–world (Heidegger 1978).In another terms Augmented Space is a new realm containing virtual elements in a real physical space. Here reality and virtuality are not considered to be opposite concepts but they are viewed as lying on the opposite sides of the reality–virtuality continuum (Milgram et al. 1994) where Augmented Reality is located somewhere in–between.

Regarding McLuhan's perspective involving media as an extension of human body (McLuhan 1995) Augmented Reality can also be discussed as a new medium extending our bodies and therefore providing new possibilities of space experience. And from now on to pull back the attention from the computer vision technology to architectural domain, the new in–between space experience made possible by Augmented Reality will be called as cybertectonic experience, coining the words cybernetics/cyberspace and architechtonics. And the new space produced via cybertectonic experience will be called as cybertectonic space.

Within this context it might be concluded that Augmented Reality is not just a Computer Vision technology providing possibilities for overlaying digital media on physical space but more than that Augmented Reality is a concept strictly related with spatial experience and bodily perception and therefore in an ontological perspective it provides a new in–between place in the continuum of real and virtual and thus resulting a new problematic domain in Architecture that should carefully be considered. This new problematic domain might be a ground for understanding the structure and qualities of cybertectonic experience and how cybertectonic space is produced.

Library+

The Library+ project is a pilot study that has been experimented with undergraduate architecture students of Istanbul Kultur University Department of Architecture at the main campus library. The main goal of the project was to create an Augmented Reality scene in the conventional setting of a library by overlaying digital information over the physical space to provide a new realm for cybertectonic experience and observe, discuss and evaluate possibilities of cybertectonic space in an architectural point of view.

The hardware used in the project was a backpack system consisting of a laptop computer and a Head Mounted Display and the open source AMIRE marker tracking based augmented and mixed reality authoring tool has been used as software. Marker based augmented reality authoring software makes it possible get much more precisely set scenes in the physical space than gps based systems and yet easier to install and setup compared to RFid tag based systems since the only thing needed to register any digital object in the physical space are black and white patterns printed on papers which are called markers. AMIRE, not only making possible to overlay digital data on physical space but it also allows yo to design some interactive scenes according to parameters like distance of the body from the digital object, distance between two objects and markers and some logical operators like if and then. With all these parameters much more interactive cybertectonic spaces could be created and this interaction is not just pressing buttons and triggering some events more than that and most importantly the scene is interactively constructed based on body gestures and the movement in space, turning around objects, bending over and etc.

Therefore the cybertectonic library space is not only a physical space ornamented with digital media, it's a space which is open to interact with, a space that encourages bodily perception (Merleau–Ponty 1996) of the digital, which is intensively connected to or extending the physical.

Concluding Observations

We have experienced that Library+ offers a completely new library experience rather than searching the catalogs in the computers and accordingly finding the books in the appropriate shelves and reading them eventually. The space encourages one to discover the library space and reveal the hidden information between shelves or books and leading him or her to possibly unexpected results or experiences. The cybertectonic space of the Library+ changes the linear and usual process of research or reading experience happening in a library and we have also observed that the movement of the body dramatically changes in the cybertectonic library experience as expected.

Supporting the cybrid principles that Anders has mentioned earlier (Anders 2008) we have found that reciprocity between the physical and the virtual elements of cybertectonic space is an essential issue which should be undertaken as a key principle when creating cybertectonic experiences. Otherwise, the weak relationship of physical space with the digital content may prevent to create meaningful cybertectonic experiences when aiming to enhance the experience of space.

As a conclusion it could be told that Augmented Reality technology brings up a new problematic domain in to Architecture that should be discussed in terms of experience of space. The cybertectonic space is capable to change the conventional experience of space and therefore as an extension of our bodies it is letting us to have new experiences of space, leading us to get in a new ontological state of Being. With the emergence of smart phones and tablets, the concept of ubiquitous computing has the potential to create ubiquitous cybertectonic experiences and we believe that further work in architectural domain is essential to understand and interpret the cybertectonics of space.

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REPUBLIC OF THE MOON - A NEW ARTISTS AUTONOMOUS TERRITORY

ROB LA FRENAIS

How will we live on the Moon? Despite long-term plans to send humans to Mars, in the short term the Moon is the most likely place to rehearse living away from the Earth. Republic of the Moon discusses possibilities for artists' autonomous solutions.

Agnes Meyer-Brandis training Moon Geese (courtesy the artist)

"Earth is the cradle of humanity, but one cannot live in a cradle forever" - Konstantin Eduardovich Tsiolkovsky, 1911

In two months time from the writing of this paper 6 people (all men) will emerge from a 'wood panelled spacecraft' at the Institute of Biomedical problems in Moscow. This will be the conclusion of Mars 500, an attempt to simulate the logistics, psychology and monotony involved in a mission to Mars. This is the most ambitious of the analogue environments that have been designed on earth to investigate the human factors in long-term space travel – previously the Mars Desert Research station in Utah has been used to rehearse life on Mars complete with space-suited expeditions from a habitat into the desert.

But it is still likely that any long-term attempt to live off the planet will be on the Earth's Moon, only 3 days away by rocket, although reachable over a longer period by electric-powered spacecraft such as the European Space Agency's SMART vehicle, eventually orbiting the Moon. So, despite long-term plans to send humans to Mars, in the short term the Moon is the most likely place to rehearse living away from the Earth. It is envisaged that sooner or later a small outpost of humans and robots will be established, possibly living in tunnels drilled under the Moon's surface and quite possibly established by emerging superpowers such as China or India on the South Pole of the Moon where water ice is expected to be found. So how might we respond to this new territory, which technically belongs to everyone?

The idea of humans living away from the Earth's regular infrastructures also gives rise to alternative thinking about issues such as sustainability, human psychological factors and governance. The recent movie 'Moon' worked on the dystopic basis that we might only wish to send clones to exploit the Moon industrially. But what if we were to apply new 'open source' thinking about collaboration between humans and technology to create a liveable solution for an off-planet habitat. Space architects and psychologists such as Regina Pelzsus (quoted below) are currently proposing new paradigms for dealing with issues such as monotony and governance and artists are beginning to propose new models for living off-world.

One strategy could be the pre-emptive setting up of a micronation which could claim the Moon independent of national or commercial interests.This stragegy has already been used by artists such as Slovenia's Neue Slovenisch Kunst (NSK) who issued their own passports, the Danish group N55 or artists like Antti Laitinen. Alexandra Mir famously declared herself the 'First Woman on The Moon' on a Dutch beach. Other strategies are being proposed in the new Arts Catalyst project and exhibition 'Republic of the Moon'

The initial idea came from a recent International Astronautical Federation meeting in Paris attended by the exhibition curators, in which issues of space governance were discussed. A United Nations official with an interest in the peaceful uses of space stated at a private meeting "The last thing we want to propose is a Republic of the Moon". We wondered: why not? So we propose to set up, in advance, an artist's micronation- a Republic of the Moon and will communicate with specific artists and groups inviting them to participate, to start thinking about methods of governance, diplomacy and autonomy of this future artist's territory.

Regina Peldzsus is working with the internationally acclaimed artist and architect Tomas Saraceno to build an environment which will challenge a group of 20 volunteers to live for 20 days in a moving spherical module in which they will work, eat, socialise and sleep, but which has no 'up' or 'down' at any one time.

Saraceno, who has created the major exhibition 'Cloud Cities' currently showing as a one-person show in the main hall at the Hamburger Bahnhof, is a latter-day follower of Buckminster Fuller, following the dictum 'There are no passengers on Spaceship Earth, only crew'. His installation forces the viewer to become a participant in a different way, raised above the ground in semi-stable inflatable structures and become a physical metaphor for collaboration.

Peldzsus has written a written a short summary of the objectives of such a project:

"The conditions in an isolated and confined environment such as a Moon base pose a range of psychological challenges to a group of astronauts. In terms of crew cohesion – which is vital for both physical and emotional survival in a hostile and remote location – this can include social monotony, clique building, personal withdrawal and aggravation of interpersonal tension. [1, 2] Leadership becomes a crucial concept in ensuring harmonious and successful co-habitation [3] and, in a broader sense, represents or challenges models of governance on Earth.

As a central part of the programme of Republic of the Moon, a simulation of a Moon mission is proposed. It involves three groups of participants who help design, man and operate the base for the dura-

tion of the exhibition. A DIY Lunar Base will feature all necessary habitability aspects such as sleep stations, galley, windows, greenhouse, hygiene facilities, storage room, work lab, space suits and maybe even an exploration vehicle.

Space analogue studies and ground simulations are an essential – albeit expensive – component of research activities in the scientific spaceflight community. In the light of future long duration missions, space agencies and independent institutes around the world are preparing. Examples include the Houghton Mars Project in the Canadian High Arctic, the Mars Desert Research Station in Utah (US), ESA's Concordia Research Station in Antarctica, and – most notably at the moment – the MARS500 simulation study at the Institute of Medical and Biological Problems in Moscow.

Staging a simulation in the framework of Republic of the Moon will not only deliver insights and firsthand experience to the participating audience, but inspire and inform a wider public on human aspects of long duration missions."

A different approach to the Republic of the Moon project has been that of the artist Agnes Meyer-Brandis, whose poetic-scientific investigations weave together fact, imagination, storytelling and myth, past, present and future. Her project 'cloud-core scanning' involved research taking samples from the centre of clouds in to zero gravity in a parabolic flight in order to test how they behave.

Meyer-Brandis weaves a narrative based on writings by Francis Godwin based on an excerpt from the book The Man in the Moone, written by the English bishop Francis Godwin in 1603. Godwin was the first person ever to describe weightlessness – long before Newton's theory of gravity. The protagonist in the book flies to the moon in a chariot towed by gansas birds, more commonly known as geese. These special moon geese migrate every year from the earth to the Moon.

Meyer-Brandis has actualised this concept has by breeding 11 geese at the artists residency in Pollinaria, Italy - imprinting them on herself as goose-mother, training them to fly and taking them on expeditions. All these geese have been named after famous astronauts and she is proposed to build a Moon analogue habitat for them in Southern Italy which would be operated, in the same way as human analogues, from a remote control room in Northern Europe as part of the Republic of the Moon project.

The context of many of these artists interventions reflecting on a moon colony is inspired by other projects that attempt to take on 'big' infrastructures such as the space industry and bring them down to a human-sized level.

In 2010 a workshop and conference was held at Newcastle University and the AV Festival to examine artists autonomous infrastructures in the light of a potential 'planetary breakdown' Following Helen and Newton Harrison's notion of the 'Force Majeure – that we should be preparing for different forms of governance following radical blows to the existing infrastructures by inevitable climate change – Autonomous Infrastructures looked at the many models created by artists and by communities of people operating semi-autonomously in society in intentional and utopian communities. It examines the symbolic nature of many of these initiatives and propose the future realisation of unrealised artists infrastructures. One of the projects coming out of this was the Train project by hehe, which although not part of Republic of the Moon, symbolised the approach to the subject.

The artist group hehe (Helen Evans and Heiko Hansen) uses minaturisation as a method of playful nuanced critical intervention and reflection around issues of sustainability, such as their recent work in Cambridge during 'Invisible Dust' and at Ars Electronica 'Is There a Horizon in the Deep Water?', which re-enacted the BP Oil Rig disaster on a small scale in a pool of water.

The Arts Catalyst is currently working with them on a long-term research project called Train, which takes the problem of locomotion as a starting point. The project develops autonomous one-person vehicles that operate temporarily, in the form of a performance, on unused or abandoned rail tracks. An example of such a "dislocation" is the vehicle Tapis Volant (Flying Carpet). The Flying Carpet, which runs along the historic tram track in central Istanbul, appears as a soft red cushion with beaded tassels dangling down from each of its sides, large enough for one person to sit comfortably. It runs along a tram track, using one of the rails as a monorail, it's wheels propelled by an electric motor. Underneath the cushion is an electro- mechanical system that allows the rider to advance whilst seated in a cross-legged posture. This body position not only mimics the way of sitting on a mythical flying carpet, but also gives the body a different inclination and state of mind, suggesting that that rider has to be grounded and balanced to ride this particular vehicle. In this project they use their indirect comment on environment to the issue of public transport versus the apparent freedom of the motor car.

Hehe has made a widely publicised work call 'Nuage Vert' or Green Cloud, in which factory emissions are monitored and dramatised by a live interactive laser illumination of the shape of the smoke emitting from a factory in Helsinki, and most recently an incinerator in St Ouen, Paris. While not directly taking on issues of space exploration, hehe's approach is an example of the symbolic power of artists intervention into large-scale infrastructure such as the space industry.

Space exploration is also too often seen to be the province of the US, Russia and Europe. But the some of the most recent launches have been from India, in the Chandrayaan programme. Rakesh Sharma, India's first astronaut, said that India was embarking on Moon exploration in order to be part of the conversation of the future of the Moon. "But who is part of that conversation, where does it happen, who is excluded and who ever hears it?" asks Joanna Griffin, who with artists from Srishti School of Art in Bangalore along with interested scientists from the Indian Space Research Organisation (ISRO) are creating an open forum where meanings of the moon in culture and meanings of the moon to scientific projects, can be discussed, in the project Moon Vehicle.

Moon Vehicle will look at what is discussed in relation to the Moon in order to transport points of view – commonality and difference. To demonstrate to the small community deciding the future of the moon that they have responsibility towards cultures they do not know. The project is conceived as a perspective-altering exercise. The live image of the Moon will be projected from a telescope onto the ground, creating a new poetics that encourages people to think about the relevance of the Moon to our lives and the earth in new ways. It is a performance space, a storytelling space, a play space and a debating space Joanna Griffin: "It's been a way to bring people into a circle to talk about the moon. It does this really poetic thing of 'earthing' the moon so you look down instead of up and think differently We've tried to bring people from different walks of life to talk about the meaning of the moon to them. We've tried to have it as something non-hierarchical, so not just about 'experts' It's something kids absolutely love to play in."

So why this moon? And why humans? Andy Gracie, working on a project for a different moon that that of the Earth- Titan, the Moon of Saturn. His idea is to use DIY and bio-hacking approaches to creating the

atmosphere of that moon here on Earth, using everyday materials such as vodka and a bicycle pump and breed fruit flies in this environment to see if they would survive.

Gracie describes the project here: "The fruit fly Drosophila melanogaster has been used as a model organism since early 20th century and more recently has become a workhorse of space bioscience, having flown in biosatellites, space shuttles and space stations. Due to the 75% similarity of the Drosophila genome to our own, a range of experiments on this organism continue to inform us about the effects of radiation, microgravity and other space environmental factors on ourselves. Out of a wide range of experimental organisms it is the fruit fly which will arguably provide most of the data on how the human is expected to adapt to off-earth conditions.

Many scientists view Titan as an analogue to the early Earth, although the temperature is significantly lower. Some theorists cite Titan as a possible host for microbial life, or at the least as a prebiotic environment rich in complex organic chemistry. Anomalies in the methane cycle within Titan's atmosphere are identical to confirmed life signs from terrestrial microbes.

The selection criteria for astronauts has commonly and famously been based around the idea of 'the right stuff' – or in other words the candidates having the correct combination of attitude, lifestyle, physical prowess, political views and so on. There is also the strong connection to the military as a pool for candidates, despite the fact that scientific accomplishment is beginning to be seen as an additional virtue. Would the selection procedure for drosophila be in any way similar to the selection procedure for human astronauts? Would they be selected for their physical properties and attitude or according to more familiar and endearing traits. When would be the right time to send the first female drosophila into space?"

While we see the Fruitflies on Titan project as an interesting and provocative addition to the Lunar Analogue environment that would be at the Centre of Republic of the Moon, Andy Gracie's stark comments on selection are exactly what we will question in terms of thinking of who might live in a Moon colony.

We are humans, not fruit flies! Astronaut selection for Apollo, the Russian space programme during the Cold war are exactly what we regard when thinking of space travel as limited to those with the 'right stuff', exemplars of the top-down command-structures military paradigm that powers wars. By bringing artists into the equation, particularly those familiar with collaborative methods of working, can we redefine living governance and team behaviour in extreme circumstances in terms of collaboration, knowledge-sharing, consensual decision-making and multicultural approaches in rehearsing for, then living on the Moon? Or would it revert to Big Brother-style survival of the fittest? Republic of the Moon sets out an artist-driven manifesto that perhaps points out some alternatives for living and working in space.

(The Republic of the Moon project is a collaboration between The Arts Catalyst, London, FACT, Liverpool and other European partners taking place in 2011-2014)

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OPEN DESIGN PRACTICES + WEARABLES + 3LECTROMODE

VALÉRIE LAMONTAGNE

This paper investigates open design strategies within DIY wearable practices and the collaborative initiatives of 3lectromode and other design collectives in the field of fashion and technology. It looks at how technologies are facilitating access and small production lines in the changing creative and production practices of fashion and technology—from an industrialized vs. craft-based one—to a high-tech, hybrid, networked cottage industry.
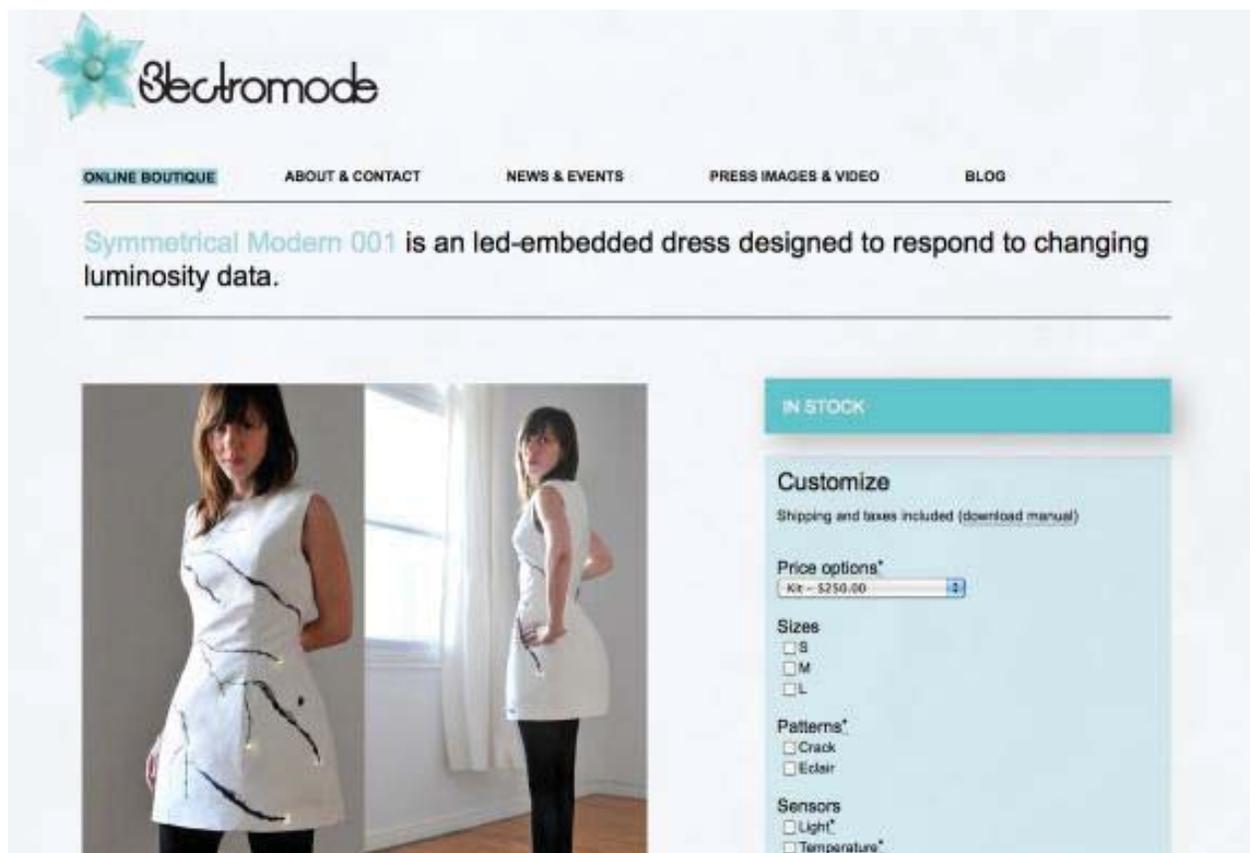
Fig 1. © 3lectromode website

Fig 2. © 3lectromode Asymmetrical Modern 001 (detail)

Fig 3. © 3lectromode Symmetrical Modern 001 Éclair

What is Open Design?

OPEN DESIGN IS ABOUT MAKING.

Open design is about making—it is about innovation in methods, materials, practices and technologies which are experimented in a hands-on, experiential, trial and error fashion. It is a practice invested in giving people the means to make things they could either have not made on their own or previously (because of lack of knowledge or access to technologies and methods) or would not have made on their own or previously (because of lack of exposure to the potential of new technologies, designs, materials and methods). Open Design is about tangible—material—dreaming. It is also about democratization of fabrication methods, aiming to include makers and users with no minimum experience standards, save lack of ideas or persistence. Open Design is also about a willingness to get your hands dirty, ask questions, mess around with materials, and question and contribute to ideas already in the air or literally on the table. Open Design is not so much about success or failure, but more about the process, about the relationship between ideas, people, machines and materials and how they come together to create a "thing".

OPEN DESIGN IS ABOUT ACCESS.

Open Design is about access—it is about putting the means, knowledge, techniques, technology and materials needed to make things easily accessible. Much of this access is done via internet culture promoting practices, tutorials, and information on where to find materials and services. Sites such as Instructables and Craft, featuring a wide range of technology and craft-based tutorials, are places to go to to find materials and methods. Other websites such as Open Hardware and Thingiverse share files for the emergent and growing practices of 3D printing and other forms of machine-tooled and 3-dimensional object making. While tangible meeting and working sites, Fabrication Laboratories (or FabLabs), such as Proto-Space (Utrecht, Netherlands) and Open Design City (Berlin) as well as Hackspaces such as c-base (Berlin) have made a significant change in the availability of access to machines such as 3D printers, laser cutters, and contact with a community of technical and computational experts. Of course, festivals, fairs and events such as MakerFaire, SIGGRAPH, SXSW, Transmediale (Berlin), FutureEverything (Manchester) and ISEA provide great opportunities to share knowledge, skills, and meet the actors involved in the global shift of sharing design expertise.

OPEN DESIGN IS ABOUT COMMUNICATION.

Open Design is about communication—it is a practice heavily reliant on documentation—video, photo, illustrations etc.—and the vulgarization of technical language leading to the simplification or elimination of specialized jargon. It is important that design concepts and methods be easily understood, communicated, modified and shared across platforms and knowledge bases. Without the ability to communicate practices, Open Design would perish. Open Design is about community, hence it is about the accessibility of information, knowledge, practice, tips, and knowhow—which would be impossible without shared language. It is about creating interactive relationships between makers, designers, and technicians, which can be interpreted over a broad range of experience and interests. Think of Open Design as a communal soup, which is expanded, modified, corrected, and enhanced over time—but always accessible. As long as we can follow the tread / information / instructions we can all participate.

OPEN DESIGN IS ABOUT SOCIAL ADAPTATION.

Open Design is about social adaptation—it invites initiated and uninitiated users to reproduce, modify, improve, customize—and be inspired by others and their work. It is about co-creation, and 'personal design nodes' where the shape and making of design can be seamlessly personalized, and adapted to use, whimsy, or even unforeseen practical solutions. It is both about the personal and the collective in as much as it solicits input from individuals for their needs and desires while also keeping the practice and knowledge open-ended enough for collective contributions and specializations over time. Works such as Nervous System's user-generated, nature inspired jewelry propose new and exciting design collaborations where the results unexpectedly unfold. Open Design stresses for adaptability on the material front (easily modified techniques and technologies) and the social front (easily personalized, accessed and interpreted designs) in order for it to remain conversant with future designers. Open Design is a future forward practice, which factors in social adaptation for processual design iterations.

OPEN DESIGN IS FREE!

Open Design is free—because making it free permits it to travel far and wide, gain exposure, be critiqued, improved through stylistic as well as technical corrections, additions and modifications, pushing the discipline forward. And if others give it away, so can you. It does not mean that you cannot make things, sell them, or get paid for what you do—but rather that key information, practices, and materials that contribute to the making are either distributed or rendered physically accessible for free in a belief that, sharing makes for better design, and better communities. An example of this economy of Open Design is Ronen Kadushin's Hack Chair, wherein the designer made all of the chair's DXF files available for download, copying, re-use, and interpretation. The only parameter implemented was that if a new iteration of the Hack Chair was marketed and sold, profits would shared with the original designer. The Hack Chair and its concept has led to a series of exciting and unscripted design iterations, collaborations, and exhibitions for Ronen Kadushin. This 'free' practice is predicated on the Creative Commons structure, which also allows for a spectrum of copyright attributions and uses which can be adapted to different production and cultural artifact contexts.

What can Open Design do for wearables?

UNZIPPING WEARABLES

Open Design for wearables democratizes and 'unzips' the practice, making it more accessible from a variety of angles, needs, technologies and visions. Wearables is a wide ranging practice as it stand, combining engineering, fashion design, craft and technical production methods as well as artistic expressiveness and computational know-how. With such a variety of input points and expertise angles, Open Design serves wearables by making the divergent axis communicate with one another, share knowledge, skip over technical jargon and schematics and create a platform that is richly and widely interpretive for many users and many uses.

SITES OF OPEN DESIGN IN WEARABLES

Sites specializing in e-textiles such as How To Get What You Want run by Mika Satomi and Hannah Perner-Wilson are a wealth of information on techniques for creating soft circuit designs while publication such as Fashioning Technology by Syuzi Pakhchyan (which now runs as a wearables blog and networking site) give numerous concrete examples are 'recipes' to create your own D-I-Y electronic garment or object. The recent Open Softwear publication on which Melissa Coleman collaborated also expands on the technical practice of wearables by untangling information around its production. Finally, real meeting points such Otto von Busch's Hacking Couture workshops and the E-Textile Workspace run by Piem Wirtz and Melissa Coleman at V2_ Institute for the Unstable Media (Rotterdam) give an interested or active public a forum to share information and get tips on practical issues, and conceptual developments in the field of wearables.

All of these sites, publications, and locations dedicated to wearables operate on limited or no funds, and are in principal free (or almost free) of access. Though perhaps not self identified as Open Design, they are certainly conceptually and practically oriented towards it. What is more, they seamlessly converge with and contribute to Open Design websites, spaces and practices previously mentioned, adding to the distributed network of knowledge and practices.

TRANSFORMATION OF WEARABLES VIA OPEN DESIGN

What we see with this increase in access to knowledge, spaces, technologies and practices is a professionalization of the wearables field. Previously craft or technical-only niche groups are becoming increasingly conversant with one another. Access to high-tech tools and experts are 'industrializing' the practice giving designers more options to professionalize their craft through custom circuits, 3D printing, laser cutting etc. The technical networks, both tangible and conceptual, help shape this hybridization of the wearables field by giving designers access to specialized knowledge and tools, resulting the expansion of their material repertoire and craft expressiveness. Fashion designers such as Pauline van Dongen have collaborated with 3D printing company Freedom of Creation to create 3D printed shoes, while Anouk Wipprecht has collaborated with wearable art labs such as V2_ to develop interactive garments. Meanwhile, Moon Berlin, a fashion label exploiting light in their designs, has combined the best of fashion with the best of technology by collaborating with the Fraunhofer IZM and incorporating their state-of-the-art stretchable circuits. All of these wearable designers are tapping into expertise and tools which are distributed in an increasingly open and free spirit.

The results of this open exchange is the emergence of an increasingly high-tech, hybrid, networked cottage industry in which fashion knowhow and electronics innovation are being merged in a professional yet highly democratic fashion culture and community. Though the overlaps come from at times divergent technical and artistic fields as well as economies, the push is, as noted in the Creative Common's recent anthology of interviews 'The Power of Open,' a solid argument for "sharing becoming a default standard". This is a revolutionary moment for the making of wearables and 3D objects, similar to that which occurred in the 2D world of desktop publishing in 1985, which we should embrace, share, contribute to and protect via Open Design philosophies and practices.

Open Design + 3lectromode

DEMOCRATIZED, AESTHETICIZED, AND PERFORMATIVE

I want to take this opportunity to speak about my own involvement in Open Design, via the 3lectromode platform. 3lectromode holds the vision of innovating in the field of wearables by combining technology with customizable prêt-a-porter fashion. We aim to inspire a future where wearables are democratized, aestheticized, and performative. We are a small design group interested in developing accessible wearables which combine D-I-Y technology with current fashion research. We are fascinated with the potential for technology to create new modalities of interaction between the body and its environment, and are interested in the performative potential of technology.

OPEN KITS + USER-INPUT

Key to 3lectromode's design ethos is a to create a library of open sourced fashion designs which can be easily assembled as kits by anyone with an interest in wearables, electronics or fashion. The kits come complete with the printed garment, necessary electronics and instructions, taking the guesswork out of electronics assembly while permitting the user to create a customized and fashionable design.

Designs are printed on textile printers on which also include the layout of electronic schematics and sewing directions. The methods for assembling the electronic components of the wearable are integrated into the design and can be visually followed much like a painting by numbers, without interpretation or recourse to manuals. Each piece is uniquely designed, and comes with customizable options for different print patterns, colours, models, and sizes - giving the user-end designer agency in creating his or her own iteration. Computational variations are also included to modify LilyPad Arduino program. So far, the designs with 3lectromode have focused on integration of LEDs with various sensors, utilizing the LilyPad Arduino platform for electronic components and programming.

3lectromode's kits are the perfect entry point into wearable technology because of their graphic visualization of electronics assembly methods, while also creating a uniquely stylish and fashionable garments. In the process of testing out this Open Design platform, we at 3lectromode have been interested in integrating feedback from the user-end designers and welcoming collaborations on the sharing of techniques, designs and applications. Ultimately, while keeping a stylistic curatorial vision true to 3lectromode, we are interested in seeing how people might hack and interpret our work in an Open Design fashion.

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TELE_TRUST FOR NETWORKING BODIES

Karen Lancel

Lancel & Maat explore our perception of augmented 'reciprocity', 'presence' and 'trust'. In an iterative research process they match theoretical insights with experiential data in a series of artworks, designed as 'Social Labs' in smart city public spaces. Experimenting with tangible interfaces and participatory systems, new insights, innovative technologies and the human body meet to inspire (yet) unimaginable types of engagement.
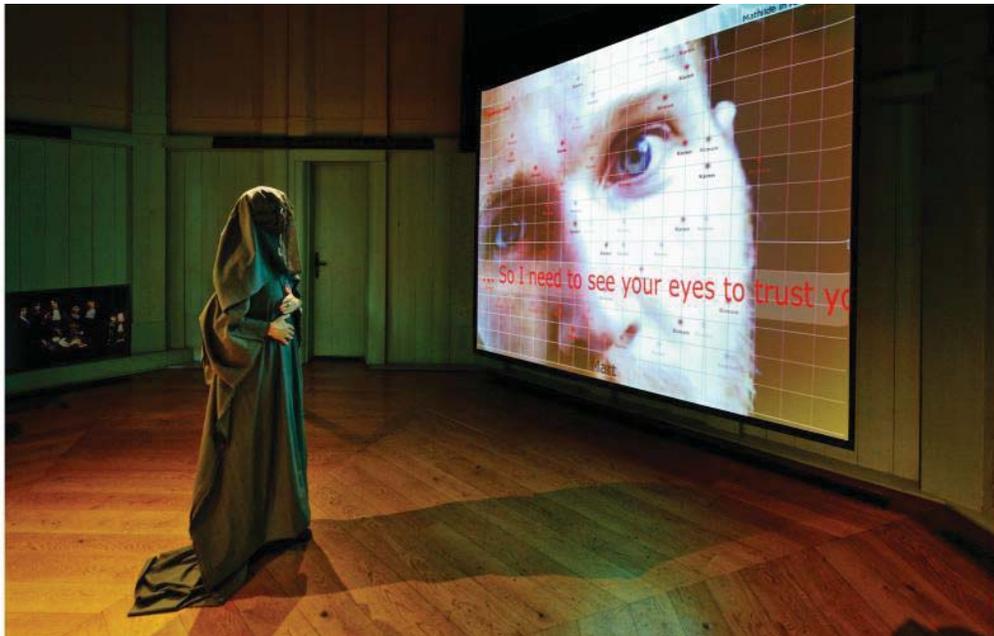
Fig 1. Tele_Trust, 2010, Lancel & Maat, photo by Pieter Kers. Location: Waag Society for Old and New Media Amsterdam. The 'DataVeil' is a smart textile wearable tangible interface connected to a free smartphone app; for an intimate networked body experience. Audience members wear the DataVeil.

Fig 2. Saving Face, 2011, Lancel & Maat, Photo by Maat/Lancel. Performance Installation 'Saving Face' is a smartphone app connected to networked urban screens. The smartphone app functions as a 'touching-body-scan'; with which one can create together a non-controllable composed 'networked identity' through the act of touching and caressing one's intimate face. Development with the Waag Society for Old and New Media Amsterdam and Dutch Media Fund.

Fig 3. Tele_Trust, 2010/2011, Lancel & Maat. In Festival'ElectroSmog', photo at BNMI Canada. Six Tele_Trust DataVeils are networked through an online database and smartphones in three different public spaces and time zones: Netherlands, Canada; New Zealand.

'I am part of the networks and the networks are part of me...I link, therefore I am. '[1]

How do we trust each other as networking bodies?

In our contemporary networked society, interaction increasingly takes place through wireless, social networked media. The possibilities of tele-presence have made place and distance irrelevant for the experience of social proximity and allow 'networking bodies' to be present at several locations, temporalities and social settings at the same time. At the same time the public space turns into a 'smart environment' that increasingly interacts with the electronically and digitally enhanced body. These developments cause profound changes in the role of the body and physical presence since mediated presence leaves little or no room for touch, face to face encounters, and body language that are core components for the building of trust and reciprocity, which are in turn the foundations of social structures.

Tele_Trust is a research into how in mediated and tele-present society bodily based experiences of presence, reciprocity, and trust can be generated, mediated and maintained. It is a critical and sensitive exploration in how we can intensify networked affective experiences in relation to the mediated body. It looks for new forms of interaction, participatory and multi actor systems and interfaces, in which the conditions for 'reciprocity' and 'trust' can be recognized and acknowledged or differently perceived. In Tele_Trust new insights, innovative technologies, and the human body meet to initiate and inspire (yet) unimaginable types of intersubjective engagement.

Tele_Trust is an inter-disciplinairy research. It is developed, tested, shown and published in collaboration with universities and (art) academies; tech-labs and media institutes; in museums, festivals and conferences. It is an iterative research process in which theoretical insights are matched with experiential research data:

A. *Theoretical context.* The theoretical context includes media-theories emphasizing the central position for affective and receptive sensory processes in the body experiencing the world - and perceiving the other. Among others it relates to texts of Donna Haraway, Caroline Nevejan, William J. Mitchell, Michel Foucault, Paul Virilio, Mark B.N. Hansen.

B. *Art works - 'Social Labs'.* The experiential research takes place in art works designed as technically smart 'Social Labs' in dynamic public spaces. For these 'Social labs' Lancel and Maat deconstruct existing social interaction models and subsequently reconstruct them into new models for semi-compatible multi-actor systems. They build on these systems because through the gap of incompatibility they experience a drive for creative, audience engaged experiment. The social labs develop as follows:

   1.   Firstly parameters for designing networking body presence and body proximity are distilled from theory and translated into model-drawing and 3-d maquettes.
   2.   This leads to the development of a series of 'Social labs', containing networked wearable devices and bio-interfaces. Examples of these 'Social Labs' are 'Tele_Trust', 'StalkShow' and 'Saving Face'; visible on http://www.lancelmaat.nl.
   3.   The 'Social Labs' provide the context for obtaining research data; through the networked devices and interfaces we test parameters for networked body presence and trust. With participants we discuss their experiences, perception, needs; and their gained physical, spatial and social knowledge. The 'Social Labs' take place in various social geographical cultures.

4.   'Social labs' participants contributions are added to a data-base and website, creating an engaging, intercultural agora on the notion of networked trust, reciprocity and presence systems.

Case Study: Social Lab 'Tele_Trust'

How do we trust as networking bodies?   Do you need to see my eyes to trust me or do we need to touch?

The social lab Tele_Trust is a performance installation. It creates an engaging agora researching new parameters for online trust. In Tele_Trust we are faced with a paradox: while we increasingly demand transparency in our changing social eco-system, we cover our bodies with personal communication technology. Tele_Trust it invites the audience in a semi-compatible social system for an innovative, reflective embodied encounter. In a visual poetic way, the artists research contemporary emotional and social tension in smart cities - between visibility, presence, privacy and trust.

How does it work?

Tele Trust networked performance-installation takes place in dynamic city semi-public spaces, like train station, museum, festival. Here the audience meets in an interactive DataVeil. This DataVeil is a tangible body interface for 'scanning online trust':

DataVeil.

The DataVeil is a full body covering garment, Gender neutral, and One size fits all. Its design is inspired by eastern and western traditions, like a monks' habit, a burqa, Darth Vader, and a 'trustworthy' chalk stripe business suit.

When wearing the DataVeil it functions as a second skin. Flexible, invisible touch sensors woven into the smart fabric of the veil, transform your body into an intuitive, tangible interface. It is a membrane for scanning an intimate, networking body experience:

Smartphone connected to a DataVeil.

Can I touch you now? By touching your body in the DataVeil, you meet strangers online through their smartphones. Inside the DataVeil you may be unidentifiable but before 'disappearing' your portrait is added to an online database. By gently caressing their screens, anonymous smartphone users worldwide can unveil your face online. In an intimate body experience and real time audio, you share emotions and statements of trust, about the questions: Am I here with you? Who is watching who? *Who is controlling who? In what identity and in whose body?*

Database.

In an ongoing process, user generated content is continuously added to the Tele_Trust database. With the DataVeil the artists collect knowledge about 'privacy' and 'trust' in different social-geographical cultures. Stories from different cities weave together into an exchanging narrative -

Everyone can wear a DataVeil.

Tele_Trust interactive DataVeil and *free smartphone app* are developed with V2_Lab for unstable media Rotterdam Netherlands; Banff New Media Institute Canada, Technical University of Delft Netherlands.

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1. William J. Mitchell, ME++: The Cyborg Self and the Networked City (Cambridge, MA: The MIT Press, 2003).

Tele_Trust performance-installations 2009-2011:
ISEA2011 Istanbul; V2 Lab for UnstableMedia Rotterdam; Banff New Media Institute Canada; Stedelijk Museum Amsterdam; Festival a/d Werf & PSI Utrecht; De Balie Amsterdam; ADA-network Dunedin New-Zealand; Waag Society for Old&New Media Amsterdam; Technical University of Delft; Lumineus Amersfoort; Tschumi-Pavillion Groningen; Exposorium Vrije Universiteit Amsterdam; Gogbot Enschede; ARTEZ Studium Generale Enschede.

Tele-Trust reserach on conferences:
Leonardo@ARS-ELECTRONICA Linz; Shanghai World-Expo 2010 - Mobile City, Virtueel Platform, DCC; Sonic-Acts Xlll Amsterdam; PSI and University of Utrecht 'Camillo 2.0'; University of Amsterdam and NIMK Amsterdam 'The Bodily Turn'; University Sabanci Istanbul ISEA2011; University of Utrecht 'Vrede of Utrecht - Utrecht Interactive'.

BUILDING ACCESSIBILITY STORIES: ENABLING MULTI-SENSORY EXPERIENCES WITHIN THE OLPC PROGRAM IN URUGUAY

Tomas Laurenzo & Gustavo Armagno

This paper shows *Enabling Stories*, a multimodal, interactive storytelling application, designed for children with physical disabilities, as well as children with normative development, that runs on *One Laptop Per child*'s computers.

Enabling Stories is a tool for stimulating the development of specific cognitive functions and skills, as well as promoting digital inclusion, and improving social, emotional and motivational aspects on its users.

A girl playing with Enabling Stories, a multimodal interactive storytelling application.

Introduction

The *One Laptop Per Child* (OLPC) program aims to provide each child in developing regions with a connected laptop to address the digital divide and to allow them "to become connected to each other, to the world and to a brighter future." [1][2]

Uruguay, through its governmental project –*Plan Ceibal*– was the first country to achieve the 'full deployment' status, after successfully delivering a laptop (named XO) to every public schooled child between 6 and 12 years old. [3] The acronym 'Ceibal' stands for Conectividad Educativa de Informática Básica para el Aprendizaje en Línea (Basic Computing Educative Connectivity for Online Learning; more information about Plan Ceibal is available at http://www.ceibal.org.uy). *Plan Ceibal* is now targeting secondary education (youngsters from 12 to 18 years old) as well.

Although *Plan Ceibal* successfully enabled internet access to all its users, by claiming that all the child population of Uruguay is now connected it ignores the fact that access to technology transcends the mere physical immediacy. There are users with disabilities that difficult or prevent them from fully take advantage of the *Plan*'s potentials and opportunities. An ethnographic study conducted in the primary school *Dr. Ricardo Caritat*– the only public school in Uruguay for children with motor impairments – observed that a combination of factors, including the XO ergonomics, the software interaction design, the lack of suitable software accessibility helpers, and the limited availability of accessibility peripherals, undermine the XO's accessibility. [4]

In spite of the fact that the *Plan Ceibal* program explicitly states that the children are the true owners of the computers, the accessibility problems discourage physically impaired children from appropriating this technology, and therefore, difficult their access to the knowledge society.

Accessing Ceibal

Thanks to OLPC laptops coming with an integrated webcam, a reasonably fast processor and a speaker, it is possible to develop multimodal interfaces to improve accessibility. [4] Potentially, multimodal interfaces accommodate a broader range of users than traditional graphical user interfaces (GUIs) or unimodal interfaces, allowing for the inclusion of users of different ages, skill levels, cognitive styles, sensory impairments, and other temporary or permanent disabilities. [5]

With the aim to address these problems, and to foster an authentic appropriation of this technology by children with motor impairments, an innovative interaction schema to access the XO was proposed. [4] The new schema avoids the "keyboard, mouse, screen" paradigm by allowing for the execution of actions that are triggered when the user shows an image to or occludes it from the XO's camera, and by also providing multimodal sensory feedback.

This images can be of any kind (our implementation utilizes printed images created with a standard printer), as long as they meet certain requirements of resolution, contrast between foreground and background, and uniqueness to be easily identifiable and differentiable from one another. Images that can be considered for the interaction include pictographs (such as representations of animals, people, or means of transportation), ideograms (resembling concepts, actions, or instructions), words, letters, numbers, two-dimensional barcodes, among other symbols. In addition, the images can be of any size or

shape provided they fit in the field of view; can be printed in paper, cardboard, stickers, or other printing media; can vary in color; and can be glued or attached to different objects.

Since the images can be arranged in different supports, they can afford different user actions, like touching, rotating, or holding. This versatility gives designers and application developers the freedom to create different games or applications based on diverse interaction strategies.

From an educational point of view, this approach can potentially be employed in developing cognitive, affective, and psychomotor educational aspects.

Multimodal activities

Three different types of applications (in XO jargon, *activities*) were created to explore different educational strategies that could help develop children's motor and cognitive skills, improve their self-esteem, augment their autonomy and foster their relationship with the environment and with other persons.

The activities are as follows:

Activities focused on developing specific cognitive functions and skills involve presenting users with a problem and waiting for the right answer. The solution could demand sorting images (e.g., distributed on several printed cards with a rigid base), or picking, from a set of printed images, the one that contains the correct answer. For example, to develop children spatial relationships, the layout could consist of a set of images illustrating the relationships up-down, in-out, or open-closed. The user's goal is to identify the abstract relationships and matching them with the corresponding cards in the deck.

Activities focused on promoting digital inclusion and enhancing autonomy allow for the user to trigger predefined actions in the XO –e.g. opening an activity, unrolling a menu, controlling a game character, moving the mouse cursor, or selecting a tool– by choosing from a number of options printed on a proper media, such as a sheet of paper. Three activities are being developed: a *faux keyboard* that associates drawings to some keyboard keys (e.g. the arrow and enter keys), *the bookmark* where the user can navigate to pre-defined web sites by touching its corresponding drawing, and *the launcher*, a menu from where the user can run XO activities.

Activities focused on encouraging social, emotional and motivational aspects incorporate musical, recreational and narrative elements. One of the prototypes under development is an interactive storytelling application, which will be discussed in the next section.

The proposed activities share some common characteristics:

- Beyond the cognitive challenge associated to the process of triggering a specific action from the computer, all the activities demand children to reinforce their motor skills, either by seeking a printed card from a deck, pointing at (or occluding) an image, or raising an image to show it to the camera.
- The simplicity and versatility of the input device –e.g. with a piece of paper it is possible to create a keyboard– allow the teachers to create their own exercises, encouraging them to effectively use the XO as an educational tool for their classes.

- Regardless of the fact that the framework was designed for children with motor impairments, nothing prevents it from being used by children without those impairments.

By the massive use of these prototypes we expect to obtain data about their usability within this target population. Our observation indicates that the activities are perceived as highly attractive by its users, showing that it is possible to design new ones with a high motivational component.

Interactive Storytelling

Storytelling -or the art of telling stories- is a fundamental characteristic of mankind. In the words of Hamilton and Weiss, "storytelling is the oldest form of education", since "people around the world have always told tales as a way of passing down their cultural beliefs, traditions, and history to future genera-tions." [6] The process of listening, creating, and telling stories is particularly important in the develop-ment of children: stories can help them to understand their world and to share it with others. [7] In early development stages, storytelling reinforces communication, recognition, and recall skills, favors social relationships between peers and adults, and provides meaning to their living experiences. In later stages, storytelling improve linguistic and literacy skills, and promote interpretation, analysis, and syn-thesis abilities. [8]

In addition, storytelling has been used as a method to work with children's conflicts and concerns, help-ing them to "objectify and, at times, to personify the problems that they experience as oppressive." [9] For children with disabilities, different storytelling approaches have been used to support the develop-ment of cognitive functions and skills. [8]

In recent years, interactive storytelling has become increasingly popular in the field of human-computer interaction. In 2010, the full-day workshop of the ACM's (Association for Computing Machinery) Ninth International Conference on Interaction Design and Children (IDC 2010), titled "Interactive Storytelling for Children", aimed to bring together researchers from different fields that share a common interest in the subject. [8]

Compared to traditional storytelling, interactive storytelling applications allow the audience to actively participate in the drama, by altering -during the course of the story- the action, character, dialogue, and narrative performance. As a consequence, interactive storytelling can multiply the narrative possibilities, upgrading the role of the audience from listeners to participants of the story. As in traditional story-telling, there exists the role of a storyteller, either human or synthetic, whose challenge is to make sure that the story maintains a certain level of quality.

This quality can be measured in terms of consistency, *enjoyability*, *memorability*, among other parame-ters. When designing and developing a digital interactive storyteller, these requirements can be difficult to accomplish since it is difficult to find a proper tradeoff between the story narrative and user interac-tion. [10]

Research in this field includes specific applications, such as the construction of furry storytelling robots to motivate children with developmental disabilities, augmented reality displays to communicate scien-

tific information in museums, and tangible interfaces for storytelling using physical objects (see, for example, [11]); studies about the educational value of authoring interactive storytelling in formal education, or how children can develop narrative skills by programming interactive storytelling games; and studies about using interactive storytelling for helping children with special needs. Garzotto, *et al*, provided a survey of papers related to interactive storytelling. [8]

ENABLING STORIES

Enabling Stories is a multimodal interaction-based interactive storytelling application, designed for children with motor or cognitive disabilities, as well as for children with normative development, that runs on OLPC's XO computers.

The application is not only an interactive storytelling game but also a tool for the stimulation of the development of specific cognitive functions and skills, as well as for the promotion of digital inclusion, and the improvement of social, emotional and motivational aspects on its users.

Enabling Stories performs the role of the storyteller. It is responsible for directing the story plot by modeling key aspects of the narrative, such as characters, places, possible interactions between characters, etc., and to present the story to the user.

Interacting with the storyteller –by setting scenes up or by answering to specific questions– the user is allowed to modify the story, building new ones on real time, and therefore actively participating in the drama. For example, the storyteller would describe a scene by using spoken text, images, music, video, etc. and then prompt the child for information.

The application supports an input modality based on the interaction schema mentioned before, as well as traditional input gestures, such as selecting a displayed option with the mouse. When an event requiring user interaction occurs, the storyteller waits for the user input. A rather trivial example would be: "the girl is taking a hike in the forest, who does she meet?", the child, then would take one of the printed images (let's say, one with the drawing of a dog), and puts it in the space seen by the computer's camera. The storyteller then continues with the narration using the user input. Depending on the type of event, the storyteller could time out the scene and then continue with the following one.

Conclusions and future work

Uruguay's OLPC program, *Plan Ceibal*, aims to provide a connected computer to every child and teenager of the country. Different studies show that the provided computers are not accessible for children with motor or cognitive impairments. To foster the appropriation of these computers, we proposed different types of applications that explore different educational strategies, based on an interaction schema that avoids the traditional "keyboard, mouse, screen" paradigm.

One of these proposals, named *Enabling Stories*, is an interactive storytelling application supported by a multimodal interface. *Enabling Stories* is aimed to develop children's motor and mental skills, enhance their self-esteem, improve their autonomy, and favor social relationship between peers and adults.

Beyond the application characteristics that make it attractive, we speculate that children with motor impairments can benefit from the physical and cognitive challenge involved in the action of showing the printed images to the computer.

FUTURE WORK

A new stage of the work has commenced in June 2011, under the project "*NEXO: New Interaction Modalities for the XO*". The project involves the study of the incidence of different types of applications, including *Enabling Stories*, in children development.

The study will be conducted by UDELAR graduate and undergraduate students of cognitive psychology and computer science, during a six-month period.

This stage includes the design and development of different types of applications, focused on developing cognitive functions and skills, enhancing children's social domains, and improving emotional and motivational aspects.

Within this study we expect to evaluate if the proposed applications effectively represents a positive impact on different developmental domains (physical, cognitive, social, or emotional domains).

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THE LEGACY OF EXPERIMENTS IN ART AND TECHNOLOGY (E.A.T.): AN ENVIRONMENTAL AESTHETICS

Christophe Leclercq

E.A.T.'s legacy rest on the early development of an environmental aesthetics. This aesthetics, however, does not focus on the idea of nature (as the prevalent notion of environment has it) but rather on the built and, particularly, the technological environment. This environmental aesthetics problematizes the nature/culture dichotomy in a manner that is of particular relevance to contexts that are increasingly infiltrated by technology.

Experiments in Art and Technology (E.A.T.) is a well-known example of interdisciplinarity at the intersection of art, science and technology. It was founded by Billy Klüver, Fred Waldhauer, Robert Whitman and Robert Rauschenberg in order to facilitate collaboration between artist, engineer and industry. As Branden W. Joseph wrote in *Artforum* in 2004 : "Klüver bequeathed to us a set of questions and contradictions involving art, industry, technology, and corporate sponsorship that--amid the glitz of new technologies and the renewal of foreign wars--deserves a place at the forefront of our historical consciousness." [1] Indeed, E.A.T. sought to recognize the role of technology in society and especially the new responsibility of artists and engineers in complex industrial societies.

The organization has been examined in part by curators, art historians and researchers who focus mainly on the *9 Evenings: Theatre and Engineering festival* (1966) and, to a lesser degree, on the Pepsi-Cola Pavilion at "Expo '70", at the Osaka World Fair. The Pavilion can be seen, as Fred Waldhauer says, as "a culmination of the experiment during 9 Evenings." E.A.T. and its projects are often interpreted either in terms of their success, by defenders of new media art, or their failure, by contemporary art critics in the main.

From a different perspective, however, the Pavilion can be considered a turning point, and some experimental works and projects resulting from collaborations initiated by E.A.T. meaningful attempts to renew fundamental aesthetic questions. Closer examination of the statements associated with E.A.T. projects pre- or postdating the Pavilion, or even projects that remained unrealized (which are numerous and merit attention), reveals the omnipresence of the concept of "environment." Beyond the development of devices as tools or instruments, that would be available to other artists, this notion, investigated in *Oracle* and in the Pavilion, can be seen as a key concept in seeking to understand the switch by E.A.T from an art to a non-art context. E.A.T.'s legacy can be said then to rest on the early development of an environmental aesthetics, which does not focus on the idea of nature (as the prevalent notion of "environment" has it [2]) but rather on the built and, particularly, the technological environment.

Following Allan Kaprow's *Assemblage, Environment and Happening*s or the exhibition Environments, Situations, Spaces, it is tempting to consider an environment as a new art form. The Oxford English Dictionary defines an environment in art as "a large structure designed to be experienced and enjoyed as a work of art with all (or most) of one's senses while surrounded by it, rather than from outside." The definition is precisely illustrated by a quote by Robert Whitman from *The New Yorker* on the Pepsi Pavilion.

[3] But the environment ("that which environs") is a much more difficult notion, according to Frank Popper or Peter Sloterdijk. Contrary to the artistic concept of landscape – which implies the idea of a frame – the concept of environment seems to be used in art to question our understanding of our "surroundings", and how it affects us and can be affected by us. As a result, certain of Tinguely, Rauschenberg and Cage's works can be seen as different attempts to focus on the perception of our shifting urban environment, in this case New York City.

Rauschenberg's *Oracle* is an essential work that deals primarily with this issue. Deeply affected by Jean Tinguely's self-destructive sculpture *Homage to New York* (1960), Rauschenberg subsequently tried to realize, with the help of Klüver, an "interactive environment where temperature, sound, smell, lights, etc., could be affected by the person who moved through it." [4] This resulted in *Oracle*. First exhibited at Leo Castelli Gallery in 1965, this work consists of a console with an aluminium staircase housing AM radios and electronic control equipment, to which Rauschenberg added four other sculptural elements described by him as "gifts from the streets": a round industrial duct in the form of a funnel; a window frame with duct; a car door mounted on a rolling typewriter table, with a large piece of crumpled metal behind it, and a basin combined with an air-conditioning duct through which water circulates. All of these assemblages were on wheels so that the artist could move them freely. As it is no longer possible to interact with the work, one has to revert to earlier descriptions of the experience, in the 1960s, to understand how this work problematises the perception of environment. Klüver specified that, in this installation at the Leo Castelli Gallery, "the viewer could freely walk among them and operate the controls on the staircase." Visitors were able to move control the volume and the speed of the dial scan. "In full operation," Klüver wrote, "*Oracle* becomes an animated cityscape." As an active participant in the work, the visitor took part in this urban environment and was responsible for what he did. *Oracle* was also described by the art critic William Berkson as "a funhouse, a torture-chamber or a laboratory for testing perception." This latter metaphor corresponds exactly to Andrew Forge's description:

To stand by the console is to be aware of a continual coming and going of sound, predominantly spatial. […] The very sensation of hearing, it seems, has become a kind of looking. One doesn't know which way to point one's eyes, so strikingly does the sound reframe the appearance of the machines, giving them a kind of speed -despite the fact that they just stand there dinning- or if not speed, a kind of flashing nowhereness like parked cars seen peripherally from a speeding scooter. And as soon as you move away from the console, among the pieces, you find your movements, your familiar physical measuring of close distances becoming a matter of urgency to be set alongside this new space that you are hearing inside your head. [5]

Forge's description of his experience focused on the plasticity of sound and the mutual interdependence between seeing and hearing which Rauschenberg would explore further during the *9 Evenings* with his performance *Open Score*. This festival took place at the 66th Regiment Armory in New York, in 1966, as a result of several months of collaboration between artists and engineers from Bell Laboratories. According to Clarisse Bardiot, the Theater Electronic Environmental Module, known as the TEEM, was the "major achievement of *9 Evenings* and its most important message for the art experimentation that would follow." [6] Designed to fulfil the function of an on-stage environmental electronic system, it enabled the performers to reconfigure the space in which the action took place by using a remote-control system for the lights, speakers, microphones, cameras, film, motors, etc. John Cage's statement for his performance *Variations VII* was to "use sounds available at the time of the performance" picked up indifferently inside or outside of the Armory. 10 telephone lines were installed in the Armory, open in different places in New York city including a restaurant, an electric power station, the New York Times

press room and Merce Cunningham's studio. In addition, there were contact microphones on the performing platform itself and on domestic appliances (a fan, a juicer, etc); there were also 20 radio bands, 2 television bands, and 2 Geiger counters. 30 photocells and lights set up around the performance area activated the different sound sources as the performers moved around. Classical musical composition and traditional instruments are here replaced by a protocol which welcomes, like *Oracle*, selected sounds "in the air" and challenges profoundly the perception of inner and outer exhibition space frontiers as well as the perception of distance.

McLuhan's theories – that John Cage always praised – were controversially discussed during the *9 Evenings*. The recognition of technology by Klüver and Rauschenberg as a "natural environment" resembled in a certain way the naturalization of technology as emphasized by the media theorist and essayist. The variable environments built in the Armory can also be interpreted as a means to employ "multiple models for exploration", McLuhan's so-called "method of our time", to make people aware of technology's effects on perception. Indeed, McLuhan described the role of the artist, with regard to the technological environment, as follows :

Environments are not passive wrappings, but are, rather, active processes which are invisible. The ground rules, pervasive structure, and over-all patterns of environments elude easy perception. Anti-environments, or counter-situations made by artists, provide means of direct attention and enable us to see and understand more clearly. [7]

Marcelyn Gow rightly established that Klüver's concept of the environment differs from McLuhan's understanding of a pervasive and ineluctable process. According to Gow, Klüver thought it "in relation to human interaction with technology or what could be called programming, in order to produce specific effects", i.e., where "feedback mechanisms" enable the effects of technology to be actively reshaped. [8] We can add that the core opposition, aesthetically, is based on the quantity *and* the quality of the feedback(s), that is to say between a conception of art as anti-environment (i.e as a reactive art form), and art as open-ended "experience, environment, process" (Barbara Rose), illustrated by the PepsiCola Pavilion for Osaka '70.

The Pavilion was a unique opportunity to work with industrial support, in the manner expressed in the E.A.T manifesto. While not deeply involved in the project, Rauschenberg suggested that artists working on the project "shift their approach to include elements that appealed to all the senses rather than just the visual, that is, elements that would create what people would feel as an 'invisible' environment." [9] This "invisible environment" was quite different from McLuhan's determinist understanding of such an environment, since the visitors would be encouraged to participate and then to "create their own experience" in what they called a "living responsible environment." Despite the relationship with Pepsi breaking down, the design and development of artificial fog and of an indoor programmable environment, responding respectively to local weather conditions and to visitors, can be considered meaningful artistic research. Outside the pavilion, Fujiko Nakaya's designed a *Fog Sculpture* in collaboration with the physicist Thomas Mee. 2,250 special fog nozzles were developed to create an artificial fog made of pure water at the request of the artist. Pumps were programmed to respond to different weather conditions: an automatic control system for programming was designed with real-time feedback of local meteorological data; namely, wind direction, velocity, and wet/dry bulb temperatures transmitted from the sensors at 6-minute intervals. The artist described her work as a "negative sculpture" because atmospheric conditions sculpted the fog in a concrete sense. She thus abandoned so-called "artistic control" in the shaping of this hybrid nature-culture artefact. Here again, however, she defined a protocol. Inside the Pavilion, a hemispherical mirror made of aluminised Mylar produced striking optical effects. One of

these was an effect known in physics as 'real image', consisting of an upside down or inverted image that exists suspended in the 'real' space inside the dome, rather than in the 'virtual' image created by an ordinary mirror. (i.e. images produced in ordinary mirrors exist in a 'virtual' space behind the mirror itself). Above all, this interior space, consisting of the mirror plus lighting and sound systems, was also designed as an "instrument" to be used "by individuals from different professions who [would] come to the Pavilion to implement their program ideas, and through this participation be able to adjust, expand and extend their ideas in response to the situation and opportunities they [would] find there." [10]

The Pavilion is a turning point not only because E.A.T. assumed an environmental approach to its activity but also because the team moved to a non-art context; in large part they weren't even sure what they were doing was art (they came to recognize it as such by the end of the project). The move to a non-art context – which had already been achieved by 1969 – may disturb the world of art but it makes sense from an environmental aesthetics approach. Thinking indeed that "the main influence of art and technology together will come in the area of the environment," the aim of E.A.T. was redefined in 1969 by Klüver, to "encourage the artist-engineer collaboration to fulfil its potential as a revolutionary force in shaping the hardware and software of our technological environment." [11] It is not a utopian definition since the nozzles developed for the Pavilion's Fog are currently used by Mee Industries Inc. in agriculture and industry, proving that successful transfer of an innovative technology, developed in collaboration with an artist, to industry is possible.

The word 'art', however, tended to be neglected in 'non-art' projects. Nevertheless, one can still recognize Klüver and Rauschenberg's aesthetic statements in an unfunded proposal for ten exhibitions. E.A.T. proposed a series of exhibitions for which the overall theme would be "Technology for the Individual: Recognition and Choices." [12] Indeed, the subjects chosen represent "areas of technological change where the unresolved issues will affect the direction of technological development in advanced as well as developing societies." The aim of these exhibitions was "to promote a recognition of the options presented by the new technology for the individual." The exhibitions were planned for October 1969, with the opening of Automation House in New York City, established by Theodore Kheel for "people to adjust in a rapidly changing world of automation and helping the individual to have a sense of participation in the society in which she or he lives." These exhibitions would have been designed by contemporary artists in collaboration with experts in the appropriate fields. The working titles for the ten exhibitions speak for themselves: "Variations of the Body: Genetics" by Allen Ginsberg; "Variations of the Body: Renovation, Transformation and Extension" by Steve Paxton; "Interactive Technology for the Three-year-old: Environments Designed by Teenagers" by Olga Klüver and Robert Rauschenberg; "Woman: Her Technological Environment" by Jean Dupuy; "Sports Equipment: Individual and Nature" by Claes Oldenburg; "Secrecy, Privacy and Snaring: Effect of the new communication and information technology" by William Burroughs; "Automation: Involvement or Alienation?" by Jean Tinguely; "Technology and the Environment: an Interactive, Computer-Simulated Ecosystem" by John Cage; "Atomic Energy: the Cloud and the Clear Sky" by Öyvind Fahlstrom; and "Shaping the Environment: Participation by the Individual" by Robert Whitman. This list comprehensively reveals the different preoccupations of the artists by this time, the extent to which they were concerned by the shifting environment they lived in and their desire to analyse the mix of technology, human and nature subsumed within this concept. Rauschenberg and Whitman's propositions in particular suggest an insistence on personal involvement as opposed to a more analytic approach.

Projects Outside Art (1969-1972) notably illustrated how E.A.T. paid attention to the specificity of a given environment, in contrast to McLuhan's position. Presented as "an exhibition of realizable projects in the environment", interdisciplinary teams were asked to propose a project dealing with education,

health, housing, concern for the natural environment, climate control, transportation, energy, etc., using the most innovative technology. Participants were asked "to recognize, in particular, the scale adequate for the problem undertaken, social and ecological effects, organizational methods necessary for realizing the projects" and for their project to "apply to specific geographical environments." In *Children and Communication*, two groups of children from remote parts of the city of New York (considered as a rich and a poor district) were placed in two connected environments built by Robert Whitman. They were invited to experiment with available communication technology through the use of telex, fax, etc., a situation that Hans Ulrich Obrist compared to "a sketch for connected schools ages before the emergence of the Internet." Another selected project, *City Agriculture*, aimed at creating closed-environment systems that would make it feasible to undertake city agriculture on a large scale. This also sounds extremely contemporary. Crossing different cultures or sociological contexts – city/countryside, rich/poor – was considered as a means of discovering solutions to contemporary problems while developing creativity.

Part of the multi-dimensional scaling projects or studies realized in collaboration with psychologists at Bell Laboratories, A Scaling Project Facing the Nation precisely dealt with the perception of social problems. The project aimed to correlate 22 economic, technological and social problems (i.e. unemployment, inadequate healthcare, pollution of the environment, racism, over-population, war, misuses of technology, etc.) with technical and scientific resources applicable to these areas. Individuals were given questionnaires and were asked to evaluate the relation between these problems and different contexts. The data was then processed by statistical analysis algorithms – the INDSCAL program developed by Douglas Carroll and Myron Wish at Bell Telephone Laboratories – and "the results were such that the axes in a three-dimensional space could be interpreted as local political--national political; technological--non technological; and moral individual--large scale organizational." The subjects and the techniques involved (information visualization) are at the forefront of our contemporary preoccupations.

This move "outside art" makes sense as an attempt to escape the reification of art by the cultural industries and by the art world itself and to promote, as Klüver has it, variety and choice against repetition and uniformity. Nevertheless this move was misleadingly interpreted as a departure from aesthetics. However, the importance of aesthetic decisions and aesthetic conflicts in collaborative situations had already been noted and an aesthetics symposium was scheduled as part of the Projects Outside Art in 1970 to analyse these problems as well as to question the relevance of interaction between artists and engineers and of artists participating in non-art projects.

Through the concept of environment, the works and projects described stress the notion of artist or engineer control in art, technology and sophisticated industrial societies, and subsequently the role the artist can play therein. There was a belief in the possibility of improving the world quite different from postmodern cynicism. This belief placed the emphasis on the artists themselves – and in a larger context, on individual responsibility in a high-industrial context. E.A.T.'s environmental aesthetics does not consist of an aesthetic appreciation of natural, human environments or indistinct everyday activities. Rather, it is a question of examining art through the concept of environment and the environment through the practice of art; recognising a specific artistic expertise for environmental issues in art or non-art projects which require collaboration between artist and engineer. Moreover, this aesthetics problematises the nature/culture dichotomy in a manner that is of particular relevance to contemporary contexts increasingly infiltrated by technology. As a result, it can be brought to bear, fruitfully, on discussions of contemporary strategies in art and design, ecology and technology.

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PHYSICAL CINEMA: PRACTITIONERS AND RECENT PRACTICE

MICHAEL LEGGETT

Physical theatre, Live Art and Cinema have through performer and filmmaker established a vigorous practice in recent years, challenging the confines of more traditional art forms. Practitioners have come together with audiences to create between them a physical cinema converging as a series of spatial modes.This paper will outline some recent developments in this interdisciplinary field.
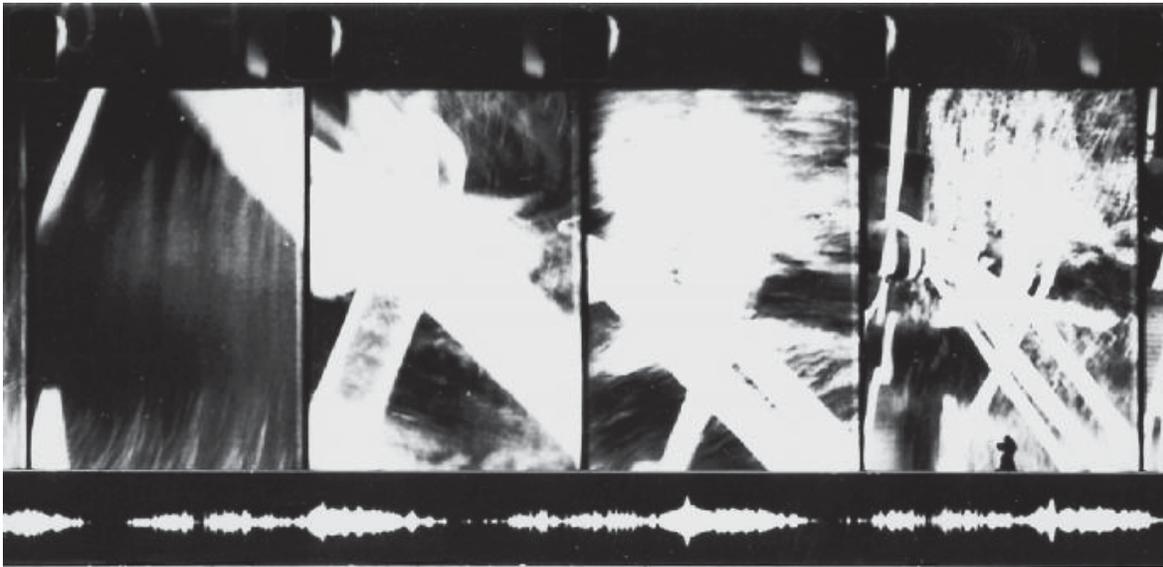
Fig. 1. Shepherds Bush, 1971, Mike Leggett, 16mm film, © Mike Leggett

Fig. 2. Brunel, 1983, Mike Leggett (filmmaker), John Downie (playwright) 16mm film and performance installation © Leggett & Downie

Fig. 3. Critical Path Lightways, 2010, Alan Schacher (Live Artist), Mike Leggett (filmmaker), video and lighting installation © Leggett & Schacher.

Physical theatre, Live Art and Cinema have through the processes of collaboration between performer and filmmaker, established a vigorous practice in recent years that challenges the confines of established art forms. Practitioners have come together with audiences to create between them, a physical cinema converging as a series of spatial modes. Place as much as practice determines the kind of experience a visitor, or participant, will encounter. Practitioners employ the phenomena of light and sound, darkness and silence, to propose courses of actions and ranges of responses for the individual participant to follow, or be provoked by. The participant becomes a performer, bringing the work into being through the realisation of a physical cinema. In performing the work, the participant echoes the practitioners own physical performance explored during the making of the moving image artwork.

Experiencing the phenomena of motion pictures in the past became associated with place – the building called the cinema – as certain conditions were required to enable the images to be seen and later, for them to be accompanied by sound. Technology expanded the requirements of place from darkened spaces in which light was reflected from a screen, to the semi–darkened space of the living room, with light emitting from the screen. Home movies spread the making of motion pictures, on film and video-tape, to a section of the cinema audience confident with manipulating tools; this included an ever increasing number of artists.

At the London Filmmakers Co–op in the 1970s, we became mechanics and chemists and set up printing and processing machines, adjacent to the cinema space and a distribution office; integrated practice was

how we described what is now called interdisciplinary arts practice. Using the printer for instance, I was able to duplicate a fragment of 16mm time–lapse film many times over by simply looping the original film footage in the machine (Fig.1). A body of work emerged exploring these kinematic principles, the fundamentals of cinema, focussed on material presence and structuring processes. The experience for the viewing participant as part of the process was, and remains, attentive, self–reflexive and closely perceptual. [1]

Part of this practice expanded away from the convention of a projection box facing a screen with the seated audience in between, toward open gallery–type spaces, where the audience moved between projectors and screens. Performance, in effect, occurred in front of both the camera and the screen.

Eve Kalyva's consideration of what constitutes a performance is useful in this context. She has noted:

"Surely there is the factor of threat and keeping it under check, for presumably … one can interfere with a performance; or to put it another way, the whole point of a performance is this conditional interaction." [2]

Conditional interaction refers to the physical space between the audience and the performance. The invisible fourth wall in theatre or cinema is the membrane through which the product(ion) is delivered, regardless of the state, or frame of mind, of the audience. The agency of each member of an audience in conventional proscenium arch venues is restricted by custom, to removing oneself from the auditorium.

Such was the case in the Unword series of performances which commenced as a collaboration between myself, a filmmaker, and a visual artist; whilst a framing distance would be maintained by the physical delineation of the space, the rules for the audience kept them on the other side of the invisible membrane as spectators (of a spectacle) and not participants. The film (and later digital documentation), [3] as artworks in their own right, similarly maintain the distancing frame of the screen as a visible membrane. The conditions for response, reflexive rather than interactive, are reversed; with the liveness and the presence of the performer(s) removed, the condition of interaction changes the terms of individual agency. The screened image can now be approached and appropriated into the physical space of the viewer. [4] The modality of encounter switches from one tradition to another; from that of theatre and cinema, where agency is limited, to that of the gallery, where agency in the physical act of viewing is essential. As Kalyva has observed; "This act exposes the limits of social constructs such as subject and object, galleries and spectators, not at the level of the *effect*, but of the mechanisms that create, enable, and sustain such constructs." [5]

What is quickly understood is the relationship between the spatiality of the act of viewing – audience to performer(s), screen to viewer – and the hybrid spatiality of the images and sounds they observe.

Paul Dourish describes this as a "..social act of communication as participation and selection..",[6] and the performative occurs through both the advance of motion picture technologies – in this case, digital video and the video projector – and the willingness of the artists to experiment with the possibilities thereby afforded.

In tracking the morphology of the moving image in this way – from live performance to its record, a palpable presence when film is projected as performance, to many variations of encounter when video is projected – a physical cinema is located not in places but in attitudes and ideas.

My own practice included collaboration with playwrights, dancers, scientists, musicians, technicians, programmers and comedians in pursuit of expanding the boundaries of practice. A History of Airports [7] brought together all of these skills into a converted warehouse space through which the audience moved, encountering performers and screens during the 90–minutes of the show. Promenade theatre as it was known in Britain in the 1980s, brought together geographically local communities with professional artists. The restrictive and contained practice of theatre was replaced by a state of conditional interaction, that enabled spatial participation within the performance area whilst witnessing the work of the production through words, screens and physical presence.

In another similar collaboration, the convention of an audience facing a stage, like the audience facing a proscenium arch screen in the local cinema, was maintained. The mechanics of film back projection was visible as a part of the action in the performance area concerned with the career of the British 19th Century engineer Brunel. The roll of film containing moving images of carriage through the countryside, was loaded on the first of a row of projectors and then through a series of supports threaded through each of the six projectors on the gantry (Fig. 2). This was an analogue solution to a synchronised multi–screen array and thus required constant adjustment by a small team of minders over the film's ten–minute duration.

In the 2010 Biennale of Sydney, Isaac Julien showed the multi–screen work Ten Thousand Waves. [8] The 50–minute cycle of the work references the Chinese film industry, the rural peasantry, the diaspora and as a part of the narrative, emergency services footage documents the atrocious drowning of twenty–three Chinese migrant workers on the mudflats of Morecambe Bay in the Uk during 2004. Visitors to the exhibit were able to promenade the 20 x 40 meter space, choosing where to stand or sit and in which direction to place their gaze. The sudden duplication of an image behind another encouraged the viewer to redirect their gaze to another alignment of screens, either by a turn of the head or a shift of position in the space. Interaction is conditional on engaging with the internationalist themes of the narrative, tightly controlled in the structuring of the work and, like Hollywood's product, imported into a suitably equipped venue. Using a hard disc array delivering perfectly synchronised sound and image across nine screens, the cinema system ran all day, every day for the three months of the Biennale; switching on at the beginning of the day, switching off at the end.

Physical cinema as promenade theatre is developed in my recent work with Alan Schacher at Critical Path, the choreographic research centre in Sydney. The interdisciplinary collaboration between a filmmaker and a Live Art artist and performer, a sound composer, other performers and an audience investigated 'the multiplication of space and presence to generate looped choreography–image systems". (Fig. 3) The location itself, a heritage building, is the place and substance of audience experience, augmented by projected and performed interventions into the buildings fabric and its human context.

In all of these collaborative interdisciplinary works there are moments where for the viewer, the moving image is tenuous and seemingly fragile. There is a breaking down in the moving image's connection with a visual world which we can comfortably recognise. Jesse Shapins affirms in a recent book; "The shift enabled by new media, in particular the internet, mobile devices and wireless technologies, is the ability to literally transform the lived experience of the city into an active read/write database ....today, the media artist can craft physical cinema that takes place on the streets of the city." [9] 'Taking place' means the act of participation, whether initiator or participant. For instance, the miniature works for mobile device made by the Sydney artist, Sam James are short poetic statements that like a book, can be opened at any moment in any place, to augment the passage of time. [10]

When the context is provided, as in Isaac Julien's work, the narrative of oppressed people plays out before us. Throughout 2011 we have become familiar with receiving moving images from the streets of the Arab world; moving in the sense that they were shot on mobile phones, but emphatically moving in the sense that we were encouraged to believe we were witnessing the transitioning of a group of nations into another stage of social and political development.

The use of mobile tools to both *organise* gatherings by mostly young people, and to *record* the events as they unfold have attracted much comment. The moving image recordings made and relayed to the world we experience only as observers of the media accounts, editorialised to encourage natural feelings of empathy and even admiration for their acts of defiance.

This is a physical cinematic practice based on the physicality of place and the dynamics of context, the tumble of events far from the planned situations encountered in the art gallery, festival and cinematheque.

To haul these images into another but related context, the performers and activities develop as a series of durational and movement elements, approaching Deleuze's discussions of Cinema and the terms movement–image and time–image. The first term is the series of actions which relay the intent of the narrative – gatherings of people in public places to express the opposition of the governed to the governors. The second term can be applied to the fragments of moving image recording the events with mobile phone; the brevity of the images, the indistinct appearance and the media who convey them locally and to the world repeatedly for each and every News update, even several times in each bulletin. Though these time–images are different from the kind Deleuze described as existing in art house cinema. For the protagonists, the *indexical* moment of confrontation is relived each time they are seen again in the present. For the watching world the images are *icons* to a state of revolt. These moving images grabbed and relayed by mobile phone move rapidly between function and use; as Deleuze suggested, "A flickering brain, which re–links or creates loops – this is cinema." [11]

As expressions of faith in place and culture, these revolutionaries are the flux of change, an expression of a culture.This kind of mobility as an example of a physical cinema is the converse of the meanings fixed through representation in pictures and carvings say in Medieval and Renaissance churches, through which the audience move. The 'conditional interaction' requires that we remain quiet and contemplative as we move between the icons, in the same way as we regard the icons of celebrities performing on the screen in popular cinema today.

Conclusion

Developments in the interdisciplinary fields of art, science and technology have sought aesthetic change over the previous forty years, not only the last decade. From mobile screens and projectors that emphasis the cerebral experience of narrative encountered in the external settings of urban public spaces; to temporary projection surfaces and rigged light devices providing audience experience of the interior / exterior of place, activated through mobility within and around a specific locality. As a form of promenade theatre, new technologies have extended qualities and the range of audience experiences through touch screen and sensing systems. Accessing motion picture collections and augmenting performance as an extended practice, form the core of these experimental investigations.

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DEVIANT MEDIA TACTICS: CREATING FACES

Asko Lehmuskallio

Increasingly, forms of deviant acts have emerged: images are reworked, fake-identities employed and existing mediated communication is organized into novel forms. By focusing on Goffman's notion of 'face' as a situational image of self, constructed according socially approved moral attributes, this paper explores deviant media tactics as sets of images promoting other kinds of moral attributes, and thus other forms of maintaining face.

With increasing digital mediation of everyday communication, novel forms of deviant acts have emerged: political posters of candidates are reworked, fake-identities employed and existing mediated communication is organized into novel forms. Empirical examples of deviant media tactics abound. Take for example the reworked posters of parliamentary candidates during the election in 2011 in Finland. The acting prime minister at that time, Mari Kiviniemi, lent her face to her political party's campaign, accompanied by slogans such as "This country has to be led responsibly, with agreements, not by ripping it apart" and "Do you want to change Finland? So do I".

The 800 000 euro campaign was seen on television, the Internet, newspapers and outdoors, and was designed by the advertising agency Skandaali, a part of the Publicis Group Worldwide advertising and communications company.

With the help of digital software, animal rights activists targeted Kiviniemi's campaign in order raise attention to fur trade in Finland, and Kiviniemi's reluctance as prime minister to address animal welfare issues associated with it. Special attention in mass media was guaranteed when reworking some of Kiviniemi's outdoor advertisements, printing the reworks in billboard format and plastering them on top of the original advertisements. The advertisements were slightly modified, resembling the original ads, with slogans such as "Do you want animals in small cages? So do I" and "A fox without stimuli? Great."

Kiviniemi's mouth received red color connoting blood, but in a way that did not make it instantly evident if these were original advertisements or reworked.

These techniques of deviance, and the normative ascriptions associated with them, suggest a different morality than presented in the original advertisements. They bring to light issues that are kept invisible in the original communication acts, trying to engage interactive communication, instead of quasi-mediated communication.

Similar techniques are used for a wide variety of purposes, and techniques of deviance and specific normative ascriptions do not always go hand in hand. In making moral dimensions of visual communication acts explicit, as well as the mediating effects of the techniques used, we can come closer to working on situationally shared understandings of the kinds of communication environments we'd prefer.

Advertising as trapping

Advertising, as we all know, strives "to transform the way people think, feel and ultimately behave" as one of Publicis advertising networks, the Leo Burnett Group puts it on their website.

Following the idea of advertisings' transformative effects, advertising images, created in order to influence bodies' behavior, can be understood as traps, because they are constructed in order to impede the passage of unsuspecting bodies and hold them in suspension, eliciting particular response. Alfred Gell [1] has drawn this analogy to trapping for artworks with complex intentionalities, I suggest that the metaphor of trapping suits also advertisements.

Marketing language itself is filled with concepts from the world of hunting and trapping. 'The hunt for customers', 'cool hunting' and 'customer trapping' are examples for the use of this kind of language. In saturated urban environments, images are used in winning customers, by claiming that, as the German marketing authority Werner Kroeber-Riel famously suggests, "Images are quick shots in the brain" ("Bilder sind schnelle Schüsse ins Gehirn"[2]). The assumption behind this idea is that images are processed by beholders subconsciously and emotionally, and that images are remembered much longer than for example text. There are various counterexamples for this general assumption about images, but of importance is a widely employed reasoning why images are used in advertising in order to influence customer decisions.

In designing advertisements, advertisers inscribe intentionality into the artifacts created in order to guide the behavior of those seeing them. The created traps are both models of their creators, as well as models of their victims, of those to be trapped. Functional traps are not all purpose devices, but they have to fit the behavior of those to be trapped, their techniques of the body. A significant amount of marketing research, for example, is done in order to learn how customers use the kinds of products advertised, in order to attune both products and advertisements to customers' behavior. When behavioral action is known, it can be modified with the help of successful advertisements.

Advertising traps are not lethal, nor do those trapped necessarily experience being caught by a functioning trap as negative, but often enjoy finding for example novel products, using them with ease and buying them for themselves and as gifts to others. In political advertising before parliamentary elections, an obvious purpose of advertising traps is to get people voting those advertised for. Political advertising, done in order to influence and possibly change citizens' behavior, is a means to change previous voting behavior in favor of new candidates.

Advertisements are interesting examples for discussing deviant behavior, because many advertisements per se constitute a norm for public communication, a communicative form accepted as part of our everyday experience. But the intentions behind advertising are geared usually towards *transformative* effects, towards *deviating* from earlier behavior. Of the two examples presented, the 800 000 euro campaign is seen by many as a form of 'standard' and 'normal' communicative behavior, because explicitly in that way influential societal actors communicate publicly. Only the rework is considered deviant, because it deviates from this widely accepted communicative norm.

This shows the relationality of deviant behavior, since actions can only deviate from something that is not regarded to be deviant, such as 'normal', 'accepted' and 'standard' behavior.

Embodied everyday communication

The digital mediation of everyday communication lures us sometimes to think that these kind of acts break with former communicative practices. In a way they do, since the communicative means we have

today at hand differ from the ones used earlier, but too often the discourse on the effects of digital mediation forgets the elementary interconnection between bodies and media. Our techniques for communication are first and foremost techniques of the body, [3] although they take in a 'digital era' artifactual form. Hans Belting [4] suggests that we use our bodies as media in communication, and it is in his sense that Erving Goffman can be understood as a media theorist with a fine-grained understanding of the ways in which we use our bodies as media in interaction. The medium Goffman has paid most attention to in his approach to studying communication is the human body.

Goffman has studied presentations of self with the help of theater metaphors, focusing especially on how bodies present self in different situations and why they do so. Instead of being interested in the informative dimension of communication, he focuses explicitly on the ritual side of interaction, on the ways in which communities and communality is created within interaction. Goffman uses face as his main concept around which he explains the communicative rituals in reciprocal interaction. Importantly, face is for Goffman "an image of self delineated in terms of approved social attributes." [5] With face-work, the work needed to create situationally proper face, we create images of situationally positive social values, such as honesty, trustworthiness and friendliness. With the help of face, created as an image on one's body serving as medium, we seek to orient interaction to a specific direction. By performing according to accepted social attributes and re-presenting them in mutual interaction we create actively moral sociality. Proper face serves as an index for mutual solidarity.

 In face-work, we perform moral characters that are emotionally rewarded or sanctioned. Performing proper face is valued and acknowledged by interactional partners and is emotionally satisfying, whereas unsuccessful face-work accounts for blushing, shame, embarrassment and other unpleasant feelings. What is especially interesting here is that in face-to-face interaction mutual face-work has agency in stabilizing social interaction.

The original political advertisements shown suggest a specific face 'delineated in terms of approved social attributes' which voting citizens' would choose as their candidate when voting on election day in the voting booth. If the advertisement is successful, and transforms 'the way people think, feel and ultimately behave' it maintains social order, hierarchies and thus power structures and does not deviate from a situationally shared sociality. The acting prime minister will continue as prime minister after the elections, and the communicative methods chosen have worked in 'trapping' as intended.

Goffman's theory of face rests on Durkheim's understanding of the sacred. According to Durkheim the social reality of communities is constructed substantially around sacred things, which are special and treated with prohibitions. Durkheim believed that communities stay together by fostering the special and prohibited sacred with the help of rites and beliefs. The sacred is for Durkheim a universal phenomenon: without a common sacred communal life does not exist. [6]

Maintaining face is in Goffman's understanding sacred, which we guarantee with the help of a wide array of interaction rituals. Interaction rituals uphold common morale, and thus shared ways of situationally presenting face. Face is a sacred part of interaction that creates a temporary bond between those who interact, with elaborate interaction rituals advising how to deal with things treated as sacred. From a social perspective, this kind of a "ritual is a mechanism of mutually focused emotion and attention producing a momentarily shared reality, which thereby generates solidarity and symbols of group membership." [7] These symbols of group membership might be preserved in visual form on media that extend the ephemerality of face-to-face interaction.

By challenging particular ways of presenting face we challenge the moral foundation of interaction rituals. When we look at someone for too long, or when we do not look at her at all, we violate situational interaction rituals, situational visual orders. The face, as a sacred part of interaction, is both used in order to create 'successful' interaction rituals, but as well in desecrating communicative partners. The reworking of Kiviniemi's face in political advertisements by adding red paint to her mouth suggesting blood, and using slogans in her name that create other associations than the political advertisement as a trap for voters initially intended, suggests other kinds of moral attributes, and thus other forms of maintaining face.

Surveillant subversion

The kinds of tactics presented by those in communicatively weak positions are often applauded by critical audiences who want to question existing social and visual orders, and especially so if questioning the moral foundations of contemporary socioeconomic structures. Although highly creative, interesting and to some extent efficient (and at times illegal), these kinds of communicative techniques are not preserved to critical minorities, but employed as well by actors with a heavy supporting apparatus, often for very different kinds of purposes than employed in small-scale activism.

A telling example comes from Simon Menner's work at the Stasi archives opened for research, in which he found visual strategies employed in intelligence and surveillance work. [8] The Ministry for State Security (Ministerium für Staatssicherheit), also known as Stasi, was the intelligence service of the German Democratic Republic (DDR). Their aim was to ensure that deviant acts in the population were not made, and if they were, that deviance could be uprooted, if necessary.

Menner discovered two practices of special interest for our discussion: the first was the use of Polaroid photographs for taking pictures of homes to be searched just before the actual search done, so that all items could be placed in correct order again. The intention of this practice was that the people whose homes were searched never noticed any searches done. The second example is a photo set of spies presenting various outfits in order to 'fit in' into everyday social situations, so that they are not identified as spies. Here the deviant acts, morally questioned by those not participating in them, were masked as being part of situationally shared visual orders that seemed socially approvable. Any discreditations were done later on, after first suggesting a shared social reality with 'mutually focused emotion and attention producing a momentarily shared reality'.

Goffman focuses in his discussion of interaction rituals explicitly on expressions given off, which are non-verbal ways of influencing social interaction, as done in the case of Stasi spies dressing in order not to deviate and raise suspicion in the eyes of others. He attests communication partners a high skill in reading expressions given off, understanding that specific kinds of gestures, attires and verbal expressions are specifically crafted for particular situations. But in situational interaction, talking to Stasi agents dressed up as tourists for example, we have to "accept the individual on faith, offering him a just return while he is present [...] in exchange for something whose true value will not be established after he has left [... our] presence." [9] Deviance is thus not always recognized as such before it is possibly too late.

Unintended subversion

The examples discussed are examples of intended actions deviating from everyday action precisely in order to trap and transform those interacted with. Instead of sharing situational morality, the interaction partner's face is questioned either during the communication act itself, or later on when evidence of deviant behavior has been found. If the trap set up triggers, morally despised behavior is made known and is, perhaps, sanctioned or transformed.

In our contemporary here and now, marked by global flows and translocally shared practices, a wide array of deviances do not result from trapping, intending to transform the behavior of others, but due to cherishing situational practices shared with people dear to oneself. Public praying, hand-holding or kissing is in some places seen to deviate from morally expected behavior and thus contests situationally shared interactions. When done by migrants, tourists, 'parasocial' beings on television or in movies the deviances are often unintended. Too often in these cases special techniques are policed (e.g. specific techniques of praying, hand-holding or kissing), instead of discussing the actual moral implications behind these acts. In quite a few cases, if actually taking up the moral foundations of specific actions, the techniques employed would not be that problematic after all.

The role of mediation

Although Goffman's approach is especially valuable and useful for studying deviant acts, focusing solely on symbolic action does not give us any information about the role of the specific medium used to create and regard normative or deviant images. The role of devices used is here secondary, since from this perspective on images the role of the medium used is, surprisingly enough, not essential for discussing interaction rituals. In Goffman's theory social interaction is ordered around the face, an image of the self, which is regarded as a nearly anthropological universal. Thus various versions of presentations of self can be found in different contexts, face-to-face, on profile pictures of social network sites or ways of decorating one's home.

The transforming effects of mediation are best understood in relation to embodied actions, and in relation to the inherent processuality of situational interaction. Our bodies are our first medium used when interacting with others, used in order to show social cues of accepted or deviant behavior. The mediation of everyday communication, while sitting at computer screens and navigating via various software applications from e-mail programs, social network sites to blogs and news sources translates the kinds of cues that can be used in social interaction. Our social encounters in these kinds of digital environments are often shorter, more condensed and interaction partners have, if they choose so, usually more time to prepare their communicative acts compared to the time available in face-to-face behavior. This opens up various spaces for communicative acts that can transgress expected processes of social interaction. Activists have famously made it to television interviews and spurred heated debate with fake identities just by creating a web site and an e-mail address suggesting to represent an institution or person in whose name they communicate. When contacted, their mails have seemed professional enough in order to convince their interactional counterparts of their performed identity. [10] These acts of deviance done in order to discredit other kinds of actions considered immoral have been possible explicitly because of changes in the mediation of communication. Less cues given off, prepared well enough in advance, have made it difficult to not to 'accept the individual on faith, offering him a just return while he is present […] in exchange for something whose true value will not be established after he has left […our] presence.' Often when it is too late.

Technology employed can itself lead to deviant acts, as has happened to quite a few who have either not understood the mediations they use in communicating in the first place, or the changes employed later to these systems. Social network sites that are constructed in ways that do not let users control their communicative acts as they have been used to have led to deviant acts that would have been considered normal among the intended communication partners. Because of this, employees have been fired, social relationships have been broken, and some know a little more about their relatives than they'd possibly like to. [11]

When differentiating between techniques employed and the normative ascriptions associated with them it becomes clear that they are often not similar 'things'. In our everyday interaction they are nevertheless tightly integrated: it matters how we maintain face.

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POP ENTRAINMENT

Jon Leidecker

As the techniques of Audio Collage slowly migrated from formal conceptual practice to the commercial mainstream, a mood of cautious experimentation gave way to cavalier mispresentation. But even the most problematic examples of music that caricatures the cultures from which it borrows still inevitably raise useful challenges to ownership, and the paradigms of authorship and individual intent.

Entrance

By the early 1960's, the location of what the listening audience perceived to be a musical composition was in the process of migrating, moving from the classical domain of written notation on paper to the carefully engineered audio recording. Tape collages, new compositions created from pre-existing recordings of earlier ones, made this process overt and audible to the listener. A commonly reoccurring concern in many of these early pieces was the juxtaposition of the music of different cultures, an attempt to compose the music of what Marshall McLuhan referred to as the Global Village. The idealized definition of music as a universal language could now be examined and challenged with formal explorations, both in Utopian pieces attempting to synthesize new harmonies between disparate musical disciplines, such as in Stockhausen's "Hymnen", Teiji Ito's "Tenno" or Ruth Anderson's "DUMP", and in critical investigations that juxtaposed seemingly similar sounds to underline the wildly different meanings when those sounds were heard in their original contexts, such as Richard Maxfield's "Bacchanale" and James Tenney's "Viet-Flakes". Some of these new harmonies were beautiful, some were violent, and which of these were which depended on the perspective of the listener. But the works of this early period were not easily mistaken for mere entertainment – the pleasures they evoked were often the exact result of the questions they were formally asking about this new village, and what it even meant that this music could now exist. As the influence and the practice of these art music collagists were taken up by others, first by experimental pop musicians, and later by commercial Hip Hop artists, some of those questions were drowned out by other concerns. Questions of authorship, collaboration and exactly what agencies are being expressed in a tradition that were naturally raised by the earliest tape collages often seem to go missing when music settles into the guise of simple entertainment. But we find that those questions are never lost entirely, as they lie too close to the intrinsic nature of the practice itself.

Experiment

"Sometimes it seems to be better when the musician cannot hear the other one during his recording", said Holger Czukay about his classic track "Persian Love". A student of Stockhausen's and a founder of the legendary experimental German rock group Can, the track is the centerpiece of his 1979 debut solo album "Movies", and is one of the first pop songs whose lead vocals are sourced entirely from a sampled recording. Built around a shortwave recording taped off from Radio Tehran by the composer which has

been painstakingly synchronized to new music written and performed by Czukay, the cascading rhythms of the original Iranian vocalists have gone missing beneath a swaying 2/4 beat. But their melodies still seem to fit perfectly over the slowly modulating chords, creating a truly striking hybrid. After the seamless first impression, the piece reveals itself as having required hours of meticulous listening and editing in order to exist. The hybrid is also one that could have only been realized through appropriation; the vocalists' mastery of their own idiom would have almost certainly made it impossible to sing the same lines in accompaniment to the shifting key changes suggested by Czukay's new chords. In much the same way that sheet music allowed composers to fashion and perform harmonies more complicated than performers could improvise, recordings allow for cross-cultural fusions to become audible. And once made audible, the most promising and relevant of these hybrids can be intuitively learned and evolved by musicians in live practice.

David Byrne & Brian Eno's 1981 album "My Life In The Bush Of Ghosts" expanded the concept of Czukay's track to an entire album of songs whose lead vocals were sampled from talk radio samples and globally sourced field recordings of spiritual and religious ceremonies. The track "Qu'ran", which sampled Algerian Muslims chanting the Koran, drew the attention of the World Council of Islam in the UK, who sent Byrne & Eno's label a letter the year after the record's release to signal that a recitation of their holy book to funk music constituted a religious offense. Byrne & Eno responded by agreeing to remove the track from future European and eventually all editions of the record. For all of the positive connotations that the word 'Hybridity' has for artists, in Post-Colonial Studies the word is precisely used to describe the "new transcultural forms [created] within the contact zone produced by colonization". Or as Byrne later noted, musical fusions often result not from collaborative choice but as the result of "unfortunate circumstances, like slavery or something else." Though some have decried what they see as a pointless act of self-censorship in an age where the track can easily be found online, the choice to quietly withhold the track without a mention of its existence on the 2006 global reissue of the album provides an interesting example of an attempt to show respect to the sampled culture, long after the initial act of creation.

These two albums stand at the mid-point between their early 60's art music collage predecessors, and the appropriations of Persian, Egyptian and Indian music that would explode into the language of Hip Hop in the late 90's.

Entertainment

A host of lawsuits in the late 80's and early 90's brought the Golden Age of Hip Hop to an end, the musical development of which had been defined by an increased density and wider range of juxtaposed sample sources, as typified by bands like De La Soul and Public Enemy. Increasingly forced into accountability in the wake of these lawsuits, record labels began the meticulous work of clearing the samples uti-

lized by their artists. Firms specializing in securing these rights began to flourish, offering specialized re-
lationships within the music industry that helped them broker the best deals between labels. By the mid
to late 90's, the artists working within the intrinsically referential genre of Hip Hop were generating such
revenue that it always seemed to be better to be safe than sorry when it came time to license nearly any
sound or concept utilized or even remotely referenced in their songs.

So it is all the more interesting to observe the utterly cavalier attitude these same labels adopted when
their artists began to sample outside of the known products of the Western record industry. Jay-Z's 1999
track "Big Pimpin'", produced by Timbaland, is built around a four bar loop of the 1957 song "Khosara",
composed by Baligh Hamdy and made internationally famous by Abdel Halim Hafez, one of Egypt's most
beloved and popular performers. The loop was initially thought to have been rerecorded with modern
production values by Timbaland, but was later found to have been directly lifted from a cover version
found on Hossam Ramzy's 1995 CD "The Best of Bellydance from Egypt, Lebanon, Turkey". On an album
whose liner notes are filled with publishing credits for the samples used on nearly every track, the lack
of publishing information for "Big Pimpin'" was striking, especially considering its debt to a song that
was instantly recognizable to an audience of millions outside of the United States. Similarly, the publish-
ing for the 2002 track "Addictive", produced by DJ Quik for the artist Truth Hurts, failed to disclose Bappi
Lahiri as the composer of the song "Thoda Resham Lagta Hai", which provided the 16 bar foundation on
which all the additional melodies are based. And audible in nearly every second of the song is the unmis-
takable voice of the great Bollywood singer Lata Mangeshkar, creating a presence so strong that even
listeners unfamiliar with the original song heard the production as a particularly daring act of musical
borrowing.

Artists have traditionally enjoyed a tiny bit more latitude than journalists when it comes to issues of pla-
giarism; giving a personal voice to material drawn from a shared heritage often requires the artist to
erase the quotes -- effectively to steal, though often with the assumption that the audience will recog-
nize the material as a reference. Commercial artists usually relinquish this freedom, or more to the
point, have their people deal with the thornier issues of attribution and licensing. It remains a point of
confusion as to why DJ Quik's label found it unnecessary to secure the rights to a song featuring the
voice of one of India's most beloved and instantly recognizable voices. And while the artistic imperative
to freely create variations on the work of others must be evaluated separately from the more mercenary
concerns of the businesses that exist to monetize that work, in the cases of "Big Pimpin'" & "Addictive",
the carelessness with licensing is reflected in the carelessness in which the musical samples are pre-
sented. The cultural heritages of Egypt and India become exotic settings for lyrics which glorify the plea-
sures of either being a pimp or belonging to one.

Both of these songs have since prompted lawsuits making claims on the order of half a billion dollars. DJ
Quik's assertion that Lahiri & Mangeshkar had been honored by his use of it was rejoined by an attorney
representing their studio's publishing company: "The curses, the sexual suggestions – these are against
the Hindu faith. Their religious convictions have not been honored or respected." In an interview, Lahiri
himself went all out and accused those who had sampled him of cultural imperialism. Lahiri, whose

songs include so many flagrant & uncredited 'cover versions' of Western pop hits that they are the subject of several web sites devoted to connecting the dots, is clearly no stranger to musical borrowing himself. But if a charge of mere plagiarism might have been hypocritical, the charge of imperialism retains a sting.

Articles appearing in weeklies, academic journals, and the internet by authors such as Richard Zumhhawala-Cook and Wayne Marshall have already eloquently described the offensive aspects of entitlement and caricature embodied in these appropriations. One nearly runs the risk of appearing naïve or idealist by arguing in favor of them, by claiming that these are songs that act as works of collage simply by virtue of introducing these intact musical works into the new context of the Western radio airwaves, that music itself always trumps lyrical content, that doors left open to new cultural references not only stay open but invite listeners through them for further experiences. As Tina Chadha quoted DJ Rehka in the Village Voice in 2003, "I see Indian kids in a club who get so excited when these hip-hop songs come on, because for that one moment they feel visible. They don't see the misrepresentations." Those misrepresentations are there,

but they are not seen because they carry less of a long term impact than the sound of the music itself which is now an increasingly accepted feature of the American sonic landscape.

Eric Sermon's 2002 song "React" is a perfect illustration of this early awkward stage in Hip Hop's fascination with non-Western pop music. A song in which the sole purpose of the sample is to support Sermon's boasts of worldwide fame, the chorus drops an interpolation of the Bollywood song "Chandi Ka Badan" as sung by Meena Kapoor. Making a point of being confident ignorance of her Hindi lyrics, he responds 'Whatever she said, then I'm that'. It is perhaps only a beautiful coincidence that the vocal fragment, chosen for its sonic appeal, is actually a perfectly framed sentence: "If a man wants to commit suicide, what is there that you can do?" The degree to which you are indifferent to the range of meaning embodied in the music that you are sampling is literally the degree to which you are only embarrassing yourself. And yet, the result of this chance is a song with multiple authors, an inadvertently profound dialogue that resonates with far greater depth than either the author or the appropriated collaborator could have intended. Historically, collage, as an art form, has a habit of cultivating these exact coincidences and collisions, even now that its practice is largely taken for granted, decades after having been assimilated into the commercial mainstream.

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RE-CONCEPTUALISING THE PLAY-ELEMENT IN ELECTRONIC ART

OLLI LEINO

This paper seeks to clarify the ambiguities at the overlap of electronic art and computer games by reconceptualising the play-element evident in both as not only a set of stylistic and creative strategies which we might approximate as "playfulness" but also as a material affordance of a particular kind of audience engagement, which is referred to as "playability".

INTRODUCTION

The technological make-up and interface conventions of many electronic artworks invite configurative audience practices which resemble those we are familiar with from the context of computer game play. Not unlike the players of computer games, audiences of electronic art can be invited to use, for example, a touchscreen, mouse, or other pointing devices to manipulate audiovisual representations on the screen, perhaps triggering a variety of spectacles along the way.   In this light it is not surprising that some contemporary critics have seen it necessary to be concerned about the associations between play and media art. For example, at ISEA 2008, Daniel Palmer, in his paper The Critical Ambivalence of Play in Media Art, [9] concerned with media art's "association with entertainment spectacle" suggested that if "media art aspires to be taken seriously by the broader contemporary art world, the links between media art, children and mass culture are fatal." Not only do computer games have a certain stigma within the discourse of institutionalized new media art, but the description works also the opposite way.   For example, on the online discussion fora devoted to the topic of computer gaming, "art games" is sometimes used as a derogatory euphemism.

While computer games and electronic art have many qualities in common, they are clearly two different cultural phenomena. However, given the hardships that await those who seek to define either (computer) games or (electronic) art, it is feasible here to consider any account of differences between the two as referring not to the qualities of the works themselves but to the institutional, economical, cultural and political conventions and practices that surround the creation, distribution and consumption of both computer games and electronic art. Instead of dwelling on the conventions that separate the phenomena, this paper attempts to see through them into the forms the "play-element" takes in both electronic art and computer games.

BEYOND THE CONFLATION OF PLAY AND ART

In Western thought, the concept of play has always been closely intertwined with that of art: it occupies a central role in many aesthetic theories and over the course of art history, various movements and traditions have made use of ideas of play in different forms. However, we must note that the play of light sought after by the impressionists, the playing of Exquisite Corpse by the Surrealists, and finally the activity of play as an engagement in an electronic artwork are all significantly different phenomena, which come together only in a benevolent colloquial application of the term "play". Sutton-Smith, [11, pp 133-4] who attributes the origin of the conflation of art and play to the romantic parallel between children's art and modern art manifested in the attempts to appreciate and emulate the "infantile innocence",

suggests that the conflation obscures "whatever the true relationship between play and art actually is." The conflation rightly suggests that some of the concepts we may associate with play, like some of those mentioned by Caillois; [2, pp 10-11] freedom, separatedness, uncertainty of outcome, and perception of alternate reality, seem all equally fitting for the descriptions of both artistic and ludic practices. However, if we stick to Caillois' definition of play (ibid.), we find other concepts, such as non-productivity and rule-governedness, which seem to hold a slightly more marginal significance if applied to artistic practice.

While there certainly is enough evidence to claim that art and play are associated, it is important to bear in mind that the simple concept of "play" masks a variety of practices (some of which we would be better off conceptualizing through the notion of a game) and modes of experience not necessarily compatible with each other (cf. Malaby [8]) . Thus, addressing the play-element in electronic art requires more specificity than what can be attained by understanding "play" in terms of the lowest common denominator in all examples fitting under the umbrella of play and art intertwined. Pursuing this specificity, I shall in the following distinguish between playful strategies and playability, where with strategies I refer to the decisions that an artist makes in the process of creating a work.

PLAYFUL STRATEGIES

Among what we might call playful strategies we have play, or perhaps more accurately playfulness, as a referring to a work's theme or style. Consider for example the impressionists depicting the 'play of light', where the players, assuming whose involvement is a precondition for any significant application of the notion of play, appear as embedded in the work: neither the artist nor the audience are playing, but the work can be described as representing some kind of play (cf. Sutton-Smith [11, pp 135-47]). In addition to play as a thematic metaphor, we can identify creative methods that fall under the umbrella of playful strategies. Here the artist-player's choices precede the work, and thus the play is not 'inside' the work. Consider *Exquisite Corpse*, the Surrealist drawing-game, as an example of a creative method, users of which are engaged in an activity resembling a game, which in the end produces an outcome identifiable as a discreet work.

This description can be applied also on the tradition of generative art, which Gallanter [4] describes as a practice making use of a procedural system which when set into motion assumes a degree of autonomy and produces a work of art. Generative art, in terms of its implementation of rule-based like principles is not unlike surrealist games – the significant difference being however that the procedural system may not need intervention but can itself occupy the position of a player. However, the emphasis on the outcome challenges the applicability of the notion of "play" for the description of creative methods. Following Caillois, [2, pp 43-55] we may observe that the more emphasis we place on the outcome of the game/play activity, the further the activity moves toward its "corruption." Hence any rationale for addressing it as "play" instead of for example as a value-creating strategy diminishes. It seems that the game-like creative methods that are geared towards producing a discrete result supposed to sustain hermeneutic projects can be distinguished from game/play per se, in which the process itself is the primary locus of experienced significance.

This does not mean simply that some works require a focus on the process in order to be understood. Consider, for example, Allan Kaprow's happenings. In *Household* (1964), a group of women were asked to lick jam off a car. To make any sense of *Household*, we must begin with the process, as there is no ob-

ject to analyse, but we will not find the locus of significance within the process of the participatory performance of *Household*, but somewhere on the fringe between the process and the discourses surrounding it, including those of theatre and audience. Consider *Tetris* (Pajitnov 1984): while it can be subjected to a multitude of interpretations, inherent significance unfolds from process of playing *Tetris* as it gets underway. The player is presented with a condition that her survival depends on her ability to keep the stack of falling blocks from reaching the top of the container. The *Tetris* artifact evaluates the player's performance and decides whether the playing of the game should end or continue. At will, the player, who we assume is voluntary and thus desires to be a play, can extract a number of value assertions from her condition: for example, constructing unbroken lines of squares at the bottom is good as it keeps the stack from reaching the top thus the player from ending up in the undesirable state of 'game over.'

FAILURE AND INTERSUBJECTIVE SIGNIFICANCE IN PLAY

To illustrate the idea of locus of significance within the process, let us imagine *Tetris* without the possibility of failure, allowing the heap of blocks to rise up indefinitely.   From the condition of the player of this game we could not extract the kind of assertions mentioned above. Seeing any difference between the significances of constructing broken or unbroken lines using this or that colour would require reference to outside *Tetris*, not unlike making sense of *Household* requires looking at outside the performance. Playing the ordinary *Tetris*, we soon find out that the colours mean nothing and unbroken lines are good. Hence, we observe that if the possibility of failure is removed, the locus of significance moves outside the process.

The failure here is not a purely subjective failure, as in a failure to interpret or to appreciate. There are works which invite some kind of 'mental play' in their audiences – regardless whether we consider it as "aesthetic play" or as solving a crime mystery depicted in a novel. We can consider these works, like *Tetris*, as using play as a means to engage their audiences, as suggested by Sutton-Smith [11, p.141] regarding "literature of nonsense and humor". Reader of such works, is, according to Sutton-Smith, "immediately at play in an imaginary world of textually incongruous transformations." However, regardless of how we define play, we can observe that the existence of a possibility for a failure on the audience's part distinguishes between the ways in which *Tetris* and a novel use play to engage their audiences: the condition of a reader of a book does not include the risk that some choices lead to not being able to continue reading. Hence, perhaps works which incite 'mental play' would be better referred to as works exemplifying playful strategies.

As observed before, many new media artworks invite input from their audience, perhaps through an interface easily associated with computer games. Often, the audience's choices have consequences in what they see as output from the work. This is similar to how computer games work. We might consider the audience engaged in this activity of input-output as 'participating' or 'performing'. Again, by looking at the kinds of failures afforded we can distinguish these participatory and/or performative phenomena from each other. The failure in *Tetris* discussed previously is not a failure defined primarily by the social reception situation - it is not an ambiguous failure to behave or to use something 'properly,' which might happen in the input-output-situation around a participatory/performative artwork. While the possibility of this kind of failure creates a tension that perhaps contributes to the attraction of "performativity" and/or "participation" in the context of electronic art, it is important to observe that the standards by which the audience's performance or participation are measured are as ambiguous as those suggest-

ing that one interpretation of a novel is better than another. If an artwork is able to evaluate the audience's performance, and decide based on this evaluation whether the audience should be allowed to continue interacting with the work, we can find a more descriptive term with which to refer to it than simply 'participatory' or 'performative'. This term is, I suggest, playability, considered as an affordance in the work.

PLAYABILITY AS AN AFFORDANCE

Playability refers to a work's ability to effect successes and failures on its voluntary users. The criteria for distinguishing a successes from failures are contained in the work itself, not unlike in an "ergodic artwork" which Aarseth [1, p.179] defines as one "that in a material sense includes the rules for its own use, a work that has certain requirements built in that automatically distinguishes between successful and unsuccessful users." However, when referring to computerized forms of play, it makes less sense to talk about rules, as they exist in computer games only through a benevolent reading, at least if we consider rules as they exist in traditional games – as, for example like Huizinga [6, p.8] suggests, something the players have to remember in order to play. If we instead understand these playable artefacts as endowing their audiences with a degree of freedom while simultaneously making the audience responsible for this freedom, we can describe the distinction between a success and a failure with no reference to rules. Failure is the player's choice that led to the material impossibility of continuing playing, and success is her privilege of subjecting her choices to be evaluated by the artefact again. This is what I have elsewhere [7] referred to as the gameplay condition. Thus, in addition to playful strategies, we can establish the concept of playability, referring to a work's affordance of being played. Playability does not exclude performance: the kinds of failures associated with 'performance' and 'participation' and defined by the reception situation, are possible around playable works, which can also incite 'mental play'.

The notion of playability allows distinguishing between works which at a first glance might seem similar – those which invite participation, performance, interactivity, or navigation, and those in which the activity, whether playful or not, is evaluated by the work as described previously. Similar specificity is brought by the notion of playability to the application of the term "navigation" to describe that which goes on between a work and its audience. It allows us to distinguish between works that invite us to navigate merely for the sake of "exploring" the work, and those which specify where to go. The former works, while exemplifying playful strategies, are not playable, unlike the latter. Similarly, while the popular online game *Farmville* (Zynga 2009) certainly is playful in terms of its audiovisual appearance, it does not contain a possibility of failure and is thus not playable. Consider also the Japanese *Konapun* toy set, which we might read as a simulation of cooking à la Frasca [3]: among the behaviours retained from the original activity are for example mixing of ingredients inside containers and setting the finished products on a plate. The standard by which the user's performance is evaluated is arbitrary. A parent might tell a child that her performance was superb even though the dish hardly resembles the one depicted on the box of the *Konapun* set. In contrast, another cooking simulation, *Cooking Mama* (Office Create 2006), is much less ambiguous: not only the player gets a score and Mama either smiles or her eyes glow in fiery red, but unsuccessful cooking attempts prevent the player from advancing in the game while successful dishes unlock new recipes. While both *Konapun* and *Cooking Mama* are simulations, *Konapun* is playful, but not playable, whereas *Cooking Mama* is both.

While the idea of a possibility of failure leading to a locus of significance being within the process itself poses certain challenges for the interpretation of playable works. Previously I have mentioned that the colours of *Tetris* blocks mean nothing, while simultaneously suggesting that if there was no possibility

for failure, we would have to refer to outside *Tetris* to find out whether the blocks have any significance. We may observe that playable works contain the standards for their own interpretation, but in doing so we must remember that the interpretation for which standards are contained is not the only interpretation to be made. Instead of referring explicitly to 'meaning,' perhaps the observation about the colours of blocks in *Tetris* would be better formulated as: treating blocks of different colours differently would not help the player to survive in the game. However, it is important to bear in mind that a successful pragmatic, or, survivalist interpretation of what is going on in a game is a precondition for any interpretation about the game's significance in the larger socio-cultural context. Exploring the consequences of one's choices in relation to failure is necessary before one is able to see why for example *The Marriage* (Humble 2007) has its name.

Playability prescribes a sense of purpose to which any kinds of interactivities (participation, selection, performance, navigation, exploration etc) the work may afford are subordinated. Hence, from the perspective of playability, the actions available for the user of an interactive artwork appear sometimes rather purposeless, not unlike actions in a game of Tetris from which the possibility of failure was remove. While we must note well that the domain to which the concept of playability refers is not the only domain of experienced significance in the reception situation, perhaps the generation of new media art audiences who have grown up with computer games are accustomed to expecting intrinsic significance from the works with which they interact.

CONCLUSIONS

In relation to both Palmer's concern about the links between entertainment spectacle and media we can observe that "playfulness" and "playability" are two separate phenomena, whose coexistence in either electronic art or computer games is accidental rather than essential. Based on what has been said, it should be possible to come up with a definition of "playable (art)works", those from which all the playful "childish" elements are weeded out but which nevertheless subject their users to a gameplay condition. However, assumedly the definition and that at which it would point would be fairly conventional.

While distinguishing playfulness and playability is analytically sensible, it is not to impose a normative agenda of keeping them separate. Especially interesting are those examples in which playfulness as an artistic strategy or a thematic metaphor manifests itself through playability. These we can, following Sutton-Smith [11, pp 147-8],consider as "meta-play", defined as "that which plays with normal expectations of play itself". Galloway's [5, pp 107-126] six strategies for "counter-gaming" are relevant in terms of meta-play, outlining a playing field for meta-play on the conventions of computer games. Another interesting conflation of the playful with the playable is what Ryan [10] calls "dysfunctionality", taking variety of forms. As an example of "politically motivated dysfunctionality", Ryan cites *September 12th* (Newsgaming.com 2005), a game which makes a point by not being winnable. Also Sicart & Wilson's [12] abusive game design strategies, which seek to highlight "the dialogic relation between player and designer" through placing the player in an awkward and/or uncomfortable position, deserve attention as forms of meta-play. In relation to the gaming public's tendency to downplay the so-called art games, we can only remark that while in terms of expressive possibilities of the media, there is room for a variety of artistic strategies for negotiating the relationships between playfulness and playability, the gamers' expectations might sometimes clash with the artistic sensibility of stirring the old in search for the new.

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PRECARIOUS FLUX

DONNA LEISHMAN

Mixing theory with applied perspectives this paper generates a series of questions and describes how contemporary social technologies have significantly changed our practical reality, a reality where human experience and technical artifacts have become closely intertwined. The paper's conclusion explores the ontological consequences of this change and the potential in establishing 'Precarious Design' practices and methods as a response.

Samples of the positive social and digital media branding straplines.

Introduction

The physicist David Bohm (1980) posited that the "world is full of movement and becoming, in which any thing, caught at a particular moment, enfolds within its own constitution – the history of relations that brought it here."[1] This is an intriguing position and one that in spirit captures the inherent limitations of a singularly defined experience and gives prominence to the notion of complexity and "being in flux." Some years later and based in another field entirely, design thinker and curator Antonelli (2008) opinioned that "… core human experience is rendered more urgent by the speed at which technology is moving…"and that a great number of us "…routinely live at different scales, in different contexts, and at different settings – Default, Phone–only, Avatar On, Everything Off on a number of screens, each with its own size, interface, and resolution, and across several time zones." [2] This modern way of existing is often described as appealing, stimulating and empowering. Various social media platforms, digital agencies and technology developers all strive to assist, to connect us through these multiple interfaces and time zones. The corporate/civic/personal rhetoric of social media is driven by the positive (see Fig 1.). However a few notable counter voices have arisen. The Baroness Greenfield inspired a fierce bout of media anxiety in April 2009 after she published an article in the Daily Express titled "How Facebook addiction is damaging your child's brain: A leading neuroscientist's chilling warning" in which she claimed that there were (probably) lasting neurological effects from frequent exposure to social

media websites. Since 2007 there has been increased pressure from the American Medical Association for the American Psychiatric Association to include internet addiction, video game addiction, e-mail/text messaging along with sexual preoccupations in the upcoming 2012 Diagnostic and Statistical Manual of Mental Disorders (DSM – V), the standard diagnostic text used by psychiatrists worldwide, and on the 16th of February this year Physiologist Kathy Charles, writing in the New Statesman, likened once again the social network to something compulsive and destructive, claiming that: "Facebook keeps users in a neurotic limbo, not knowing whether they should hang on in there just in case they miss out on something good." This paper will attempt to avoid the techno triumphalism of being better 'connected' and similarly the paranoia around digital media's so called deleterious mental effects on users. An idea that will now be revisited and debated in British parliament after many sections of the British press blamed social media arenas for aiding the London, Birmingham, Nottingham, Bristol and Liverpool city looting problems on the 6th, 7th and 8th of August 2011. Rather this paper accepts that we are now in an age where cultural and technological change has created a new reality of sustained rather than temporary movement. Although Bohm and a plethora of thinkers, scientists and artists have either instinctually known, or through intellectual observation made peace with this worldview, this paper shall explore the problems and potentials that arise when applying such a notion to the everyday user of technology in society.

Context Theory

The majority of users remain uncomfortable around confusion, and if we do encounter it we still expect confusion to be of a fixed and short nature, it's a basic tenet of the knowledge is power aspiration. Human Computer Interaction (HCI) was a field that historically had not been concerned with representing complexity or mirroring the precariousness nature of our existence. Rather HCI's goal was to gain user satisfaction, to make digital tools more receptive to our needs. Media Art arguably has never contained any stable goals or ideologies and is populated by a mix of pioneering creative technologists (Robert Hodgin, Jer Thorp), obsessives (Joshua Davis) and niche collectives (Antirom, c5corp).

There is a danger associated with being in flux, it suggests change, pressure, and movement even Bohm's 'becoming' implies an end rather than an endless becoming. A fundamental of good HCI design was to eliminate or reduce user confusion, to allow us to be stable, to have permanence, to perceive and connected to and transact with the systems and devices that we need. User legibility was preferred over ambiguity. Design thinking was all about making things better a form of modernist 'heroics'. Recent developments in the field have seen a turn towards experience design, described as a situation where experience and technology are intrinsically enfolded. Lucy Suchman an anthropologists specializing in the digital described the "relations of human practice and technical artifact [have] become ever more layered and intertwined. At the same time that the technological project is one of congealing and objectifying human activities, it is increasingly also one of animating and finding subjectivity in technical artifacts. The assimilation of lived experience to technique goes both ways, which only makes the project of re-imagining technological objects the more urgent." [3] This turn to experience with a need for engagement with dense multidisciplinary methodologies will inevitably expose the field to the poststructuralist problem of endless subjectivity. In traditional dialectical tension to Design, Art has traditionally functioned as society's most deliberate and complex means of self-expression and as such is comfortable with subjectivity. When artworks follow anti-hierarchical ideologies (post Dada, Fluxus et al.) a certain level of dissonance can be felt by the user as they struggle to identify what are the expectancies of them given the lack of explicit rules. The ensuing paradigm of uncertainty, ambiguity and ambivalence in early twentieth century Art preceded Bauman's turn of the century notion of 'liquid modernity,' [4] a new

modernity in which fractured timelines were normal, where social structures were no longer stable, and a state of being where fixed concepts like 'career' and 'progress' could no longer be meaningfully applied.

Context Corporate

Today's torrent of societal change and unrelenting uncertainty has left many industries sluggish and effected many corporate identities (consider the state of journalism, publishing, music distribution, retail). The speed to change is recognized (no longer new) but many are now feeling the impact of this sustained change. For Designers questions now arise about their role in solving societal problems and how do they confront the idea that a theory of everything is needed, that everything must be considered before anything can be addressed? The traditional path to a clearly defined problem and solution becomes a challenge, perhaps even futile in this period of dense movement and uncertainty.

Context Ludic

Cultural theorist Huizinga (1938) conceptualizing play stated that within a game you are "…spatially and temporally segregated from the requirements of practical life". [5] Whereas now to be spatially and temporally segregated (from workmates, lovers, family and friends) are now common requirements of practical life. Perhaps there are merits to re – exploring the ludic discourse above and beyond the past the preoccupation with narrative aesthetic and revisit the psychology of role – playing. Role – testing or –playing is expected to be transitional - done in our youth, but within the social network and digital gaming contexts we can extend this process. What happens if you can't manage our new 'practical life'? In this scenario what does suspension of belief and or self now mean. The gaming analogy can also be distinctly felt within the observations of Jenkins [6] who described a move away from transactory culture into participation where play is becoming a default method in engagement and knowledge attainment (and almost universally seen as a good thing).

Context Social Skills

Western society has been through an adjustment; we have adjusted to acceleratedchange, hopefully learned most of the tools required for this new practical reality. Graduating from the novice state towards the intermediate level we psychologically lean on our tools (Charles 2011) to such an extent that dissociation anxiety has become a popularly understood term – describing our contemporary difficulty when we do not have access to our connective technologies. There have been recent attempts at convergence, by bringing together all our feeds, our emails, texts, tweets into one interface. [7] This attempt to unify the users experience is a logical but perhaps anachronistic goal when each media instance fosters a different cognitive connection, simply blending these mental conditions this may not be a unifying reductive solution. We 'need' these tools to provide different things for us: acts of sharing (Blog, Twitter, Podcast, MySpace, YouTube, Flicker, Vimeo), discussion (Twitter, Newsvine, StumbleUpon, Youtube) and connecting, re – connecting (Facebook, MySpace, LinkedIN, Friendster) are all distinct practices. Each of these different functions requires significant effort to immerse and different commitments in terms of assessing, changing and publishing content; each interface (after all conceived as a discrete experiences) cues the user into different mindsets. Bringing them all together may result in a useful Meta view of activity but perhaps not in itself a unifying experience that can solve the more fundamental mental and emotional conditions of confusion, noise and anxiety.

Context Depth

Mike Bergman, credited with coining the phrase 'DarkNet' has said that searching on the Internet today "can be compared to dragging a net across the surface of the ocean; a great deal may be caught in the net, but there is a wealth of information that is deep and therefore missed". [8] Intermediate media users can quite effectively create a closed private network of devices used for file and content sharing such as the encrypted messages sent via BlackBerry to various mobs during Britain's August 2011 riots. There is also evidence that users are finding new modes of communication and semantics [9] such as the increase in personally curating our entertainment and nested linguistic meaning. Whereby a message or sentiment is embedded, disguised or hidden within a linked text or video, which can only be truly understood by select users who are aware of the specific total (online and offline) context of the user. The deep and cognitive Web is several orders of magnitude larger than the surface or representational Web. This level of subjective and structural complexity means that the Internet still constitutes a free activity where we can move around, sign-in, explore, search, look, understand and comment without a sense of sanction. What then if anything constitutes expert usage, traditionally denoted as prolonged intense practice through experience and education, in a world full of multiplicitous digital experience? Anatonelli (2008) addressed the role of design in a world which humans have surpassed their Enlightenment roles as neutral observers and have become 'actors on the very forces of nature'. Implying that to effective one must be active within the complexity. She also saw a need for users to develop personal elasticity, that being: "the by-product of adaptability and acceleration, elasticity means being able to negotiate change and innovation without letting them interfere excessively with one's own rhythms and goals." This paper also considers if to be expert now means to be agile and surface than deep. Huizinga's (1938) seminal quote goes on to extend the description of games in that we are also "bound by a self-contained system of rules that holds absolutely." As stated acceleration of the Internet and its online culture left the corporate world far behind, conventional advertising strategies were ineffective, the environment was to a large extent unstructured. New rules were slow in coming; what remained meanwhile was self-governance. We explored our user role and sense of self in a freer system of ethics and behavior – many used alter egos, role –playing and exploration of promiscuity and the taboo [10]. What constitutive and regulative rules now control our behavior?

Context Semiotics

If we remain in a gaming mindset, then the conventional wisdom is that life shall intrude, that there is a porous magic circle. In offline, online and everything in-between people are crossing this reality / non-reality threshold all the time in both directions, "carrying their behavioral assumptions and attitudes with them" (Castronova 2005). [11] Practically testing or breaking through the offline and online bubble has resulted in some contentious legal interpretations such as the recent conviction that Paul Chambers received for his 'tongue-in-cheek' tweet about blowing up Robin Hood airport in Britain back in January 2010. A vigorous debate has ensued around appropriate contextualization of Chambers actions. The presiding judge interpreted that "*Any ordinary person*" would interpret the tweet as alarming. [12] The notion of ordinary is now in itself a fraught concept. What is ordinary social insight when at different scales, in different contexts, and at different settings? There are still no clear regulative rules that prescribe acceptable social conduct/communication within social media (the UK Digital Economy Act 2009 is mainly interpreted as copyright protection). The Chambers case shows how problematic words without appropriate context are.

Context Physical

Service design and co–design go some way to addressing the HCI context of complexity but from a procedural and often corporate view. When attempting to congeal and objectify contemporary human activities is not surprising that Design has moved away from an industrial to emotive centered approach. An excellent example of this is the 'The We Feel Fine' project (www.wefeelfine.org), an emotional search engine started in 2009 whose goal is to collect the world's emotions to help people better understand themselves and others. Having come through the other side of dematerialization, re-materialization is also becoming more prominent. The uptake in programming projects such as Processing (Java) and openFrameworks (C++) by non-computer scientists is making engineering physical and digital interaction more achievable (see 'Pigeon d'Or' by Tuur Van Balen). Another example of rematerialization is Tim Kring's augmented reality game 'Conspiracy For Good' which confidently attempts to make a virtue out of the game fiction / social reality divide. This paper proposes that such practices could be considered as Precarious Design.

The Precarious Designer

When asked to reflect on the art of the first ten years of the millennium, art critic Hal Foster [13] focused on the 'precarious', art which functions as a social – political critique, work which foregrounds its own schismatic condition, its own lack of shared meanings, methods, or motivations, Art if you will, that captured a sense of cultural vertigo and liquidity. Applying Foster's description, a Precarious Design paradigm could be a community of precarious designers who create experiences and or artifacts from a position of living and observing and testing within acknowledged and accepted precarious contexts. Such a designer accepts acceleration, recognizes the fluxing user position by being one. As with Foster's precarious art precarious designers can function within a post – conceptual space where there is no distinction between works of self-expression and works of social critique (i.e. they are part and parcel of the same activity). Precarious design by collectivizing or collating works could also give life and voice to the broader fluxing context, objectifying places within the complex digital–physical continuum of our current reality a chaotic continuation of uncertainty.

Conclusion

Both applied and artistic practices are striving to synthesize and express what constitutes a core human experience and develop methods to survive and succeed within our fluctuating context of sustained extraordinary change. In a sustained world of acceleration the aims of design become interesting. If we fully embrace Bohm's implicate possibilities then, as Suchman writes: "Integration, local configuration, customization, maintenance and redesign on this view represent not discrete phases in some 'system life cycle' but complex, densely structured courses of articulation work without clearly distinguishable boundaries between." [6] User experience should no longer be explored in terms of a singular moment but also over longer periods, or indeed we need to consider that the different interfaces work as differing forms of personal histories. What then becomes significant is establishing what people are actually doing and what people need to do.

Problematically this practical reality is both without perceived sanction and seems to offer limitless individual agency; however, we are not free of corporate or political and legal influence and ramifications.

Users need help in delineating new cognitively useful, safe and or dangerous personal and legal boundaries. Given the cognitive freedom of theersatz ludic space, existence feels quite different. Without rules our identities and ontologies need support. In addition to the recent strategic investment of the designer as facilitator or conduit in multidisciplinary methodologies (Britain's Design Council), this paper offers up the notion of the Precarious Designer, who by way a personal insight via a personal/niche epistemology, is well positioned to conceive of these new expressions and being lighter of foot is able to dance along with the inevitable redefining moments within society and technology.

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IN TIMES OF CHANGE: AN INSTITUTIONAL PERSPECTIVE ON COLLECTING AND CONSERVING BORN DIGITAL ART

MELANIE LENZ

The social and networked aspects which permeate the process of making and dissemination for many New Media Art works brings to the fore questions not only about how works are made and used but how they should be collected and conserved. Within the museum context it is the care of the collection for future generations and public access that drives the need for expanded research into the collection and conservation of digital art.

The social and networked aspects which permeate the process of making and dissemination for many New Media Art works brings to the fore questions not only about how works are made and used but how they should be collected and conserved. Within the museum context it is the care of the collection for future generations and public access that drives the need for expanded research into the collection and conservation of digital art. This paper uses the V&A's recently acquired born digital works *Shaping Form 14/5/2007* by Ernest Edmonds, *Study for a Mirror*, 2009-2010 by rAndom International and *Process 18* , 2010 by Casey Reas, as case studies to explore the acquisition, documentation, preservation and the challenges of working in new ways.

The Victoria and Albert Museum is the UK's national museum of art and design. In its early years as the South Kensington Museum, the V&A attempted to unite the arts and sciences. Its collecting policies, which today include born digital acquisitions, continue to emphasise the importance of technique, process and innovation. The V&A's acquisition of contemporary born digital works builds on the museum's existing comprehensive holdings of historical computational work, providing a route for understanding the contemporary significance of early computer artists' work. The V&A received two major collections of computer-generated art and design, one from the Computer Arts Society, London, and the other from Patric Prince, an American art historian and collector. This combined with more recent acquisitions has solidified the museum's status as the national collection of computer art.

The early history of the museum's computer art acquisitions offer important insights into the impact of preservation strategies, the construction of art history and the potential bearing this has for collecting contemporary digital art. The museum began acquiring computer-generated art and design as early as 1969 with the purchase of a portfolio of prints from the 'Cybernetic Serendipity' exhibition held at the ICA in 1968. However until recent years acquisitions ceased, in part due to the difficulties of preserving fragile computer-generated material compounded by, and contributing to the exclusion for many years of computer art by the mainstream art world. The Museum's 2009/2010 display entitled 'Digital Pioneers' sought to redress this and raise awareness of this lesser known field of art and design. The display ran consecutively with 'Decode: Digital Design Sensations', a major exhibiton curated in collaboration with onedotzero and showcased the latest developments in digital and interactive design, from small, screen-based, graphics to large-scale interactive installations and new commissions. It included works by Danny Brown, John Maeda, Rafael Lozano-Hemmer and rAndom International. A later prototype of the latter's work was subsequently acquired by the museum; a decision that was informed by the close working relationship between the V&A Conservation Department and the artists.

In May 2010, the V&A acquired *Study for a Mirror* by artist collective rAndom International. Described by the artists as a contemporary 'light painting' it uses face recognition technology with software to transfer the onlooker's image onto the screen. *Shaping Form 15/5/2007* by Ernest Edmonds, acquired in April 2011, is a generative and interactive artwork using software to create a continuous stream of abstract images that evolves in response to external stimuli. Casey Reas, who together with Ben Fry developed the open source software known as Processing, is the latest digital artist whose work has been acquired by the Museum. *Process 18* by C.E.B. Reas is a visual and kinetic system.

The challenge of preserving these works rests on the question of how born digital art can be understood and used in the future when systems, software, and knowledge continue to change. The vulnerability faced by all software-based artworks is its susceptibility to change. The obsolescence of hardware and format, the bespoke nature of the code and the rapidly changing systems and technical envrionment all pose risks. To reduce these risks the museum has developed a series of steps, firstly identifying what elements need preservation. Through a series of discussions with the artists the museum acertains the significant properties assigned to the concept, material components, the expereince and perceptional quality of the art and identifes which component parts are interchangable. Details about the the code are recorded such as what software the programme is written on and how it is saved. The production path is documented along with information on how to recognise failure detailing what consititutes acceptable and unaceptable changes.

Migration and emulation are the two strands through which preservation is managed. Migration, the process of transferring data from one platform to another, is undertaken at the earliest opportunity and where possible saved in multiple formats. As part of an ongoing migration programme the V&A is currently investigating the feasibilies of saving the code for all three case studies on VADAR, the museum digital repository. Changes to the appearance of the original format is a risk associated with migration, thus emulation offers an alternative method involving imitating the original look and feel of the piece but by different means. Where possible these methods are discussed with the artists at the point of acquisition. The current strategy relies on the museum continuing to record as much metadata as possible including descriptive, technical and artist-dependent; developing procedures for the acquisition of software-based artworks; identifying tools useful for preservation and initiating a program to test recovery strategies, recording results over time.

The acquisition of born digital artworks has highlighted the need to work in different and more open ways, drawing on the strength and knowledge from an array of people across the museum, in addition to expanding and sharing expertise externally. The social ideas encompassed in the participatory works and collaborative approaches of the artists have given rise to intriguing questions and new challenges both in terms of preserving, conserving and documenting the concept, experience and physical components of works. The V&A has learnt invaluable lessons with each new born digital acquisition which in turn has informed how the museum operates.

THE CREATIVE IPOD LISTENER

Tuck Leong & Nina Gram

In this paper we suggest that people's iPod listening and their interactions with iTunes software result in experiences that are suffused with emotional, physical and social potential. Listeners can use music in order to manage, enhance or facilitate different situations, affective states, processes or activities. This paper will explore how this is informed by listeners' complex understanding of musical genre and style in their collection.

Introduction

Studies of iPod (and mp3) listening have primarily focussed upon the listeners' wish for auditory control and their attempt to withdraw from public spaces.

[i]

This focus has led to a skewed understanding of iPod listening as being an exclusive and excluding activity where listeners are only interested in their personal listening experiences and their individual auditory version of the world. However, the technology of the iPod and mp3 affords more than just an auditory 'shield' from the world. This paper describes a range of possibilities that includes emotional, physical and social potential when listeners engage with and manage their music through interfaces such as iTunes and while listening 'on the move'. We argue that listeners, through a complex understanding of their music, can creatively design their listening experience according to different situations, use music to manage their emotions and space, and in the process contribute to their sense of well being and adding to their sense of self. But first, we will briefly examine the technology involved and its affordances.

[ii]

The iPod - design and technology

People's listening experience via an iPod or other mobile mp3 players is greatly influenced by the associated design and technologies. Firstly, the compressed size of mp3 files means that listeners can easily carry their entire music collection with them. Although the compression may sacrifice some of its audio quality, listeners can quickly and easily choose the exact track to listen to whilst on-the-move and under different situations. The mp3 format makes it easy to buy and share music, and applications such as iTunes facilitates the organisation of the music according to genre, mood, artist, tempo etc, allowing listeners to create different types of playlists, and to add meta-tags (ID3 tags) to their music. Thus, people's interactions with mp3 when listening to the iPod is very different from the interactions with and listening to analogue music which have previously involved taking either the LP, tape or CD in your hands, placing it in the stereo and perhaps reading on the cover or flicking through the booklet. With the

iPod, listeners manage the music on their computer without having any direct physical contact with the music. Furthermore the possibility of listening using the shuffle mode affects the way we listen to mobile music and the experiences we have while listening. Whether shuffling from different playlists or from the entire music library listeners have less control over their listening thus allowing themselves to be surprised, captivated or even to encounter meaningful experiences like coincidence and serendipity.[iii]

Thus, besides supporting the individual's shielded listening, the affordances of the iPod (discussed above) allow people to not only develop an awareness of their music, but also its social and psychological potential in different situations. In this light, listening is not only about finding your favourite song. People can use music to stage different activities for self and/or with others under varying contexts. Our discussion will present this as the different types of agencies afforded to listeners when using the iPod.

[iv]

The agencies can be described as either having a social function, a mood managing function, or as being connected to an activity.

iPod agency

SOCIAL AGENCY

iPods can be plugged into sound systems for social listening. They are often used at parties where people in turn take on the role as DJ mixing the music from their private music library or using self-constructed playlists that suit the current mood. In more intimate situations, iPod listening can be part of a group activity and be central for the constitution of social situations and collective memory.

" My friends whom I have not seen for nearly a year were visiting. So we were looking at old photos from high school while listening to music that we used to love during that time. My iPod was plugged into the sound system. At one stage Laura pointed to a photo and reminded us that in that photo we are dancing to a Timberlake song and then at the end of that current song, the iPod threw us the same Timberlake song from the photo! Spooky! The coincidence heightened the party mood! We all shouted and started dancing!" (Xana, 2007)

Another example of the social agency afforded by the iPod is found amongst music enthusiasts (both amateurs and professionals). One informant reports for instance how a party band is using drum tracks on their iPod instead of an actual drummer. On their band poster they are promoting and branding themselves by focusing on their unusual instrumentation. On the poster it says: 'iPod on drums!'

 Besides allowing for shared listening experiences, the iPod can also be used as a way of developing and communicating one's personal taste in music and in the process, one's personal identity.

[v]

MOOD MANAGEMENT AND MOOD CHECKING

The use of music to manage personal moods and feelings has been emphasised by many (e.g., Bull, 2005, 2008; Leong, 2009; Simun, 2009). Here, we want to examine how this is executed. Researchers usually examine listeners' emotional 'peak experiences', such as whether they are very happy, sad, angry or other strong and easily definable emotions.

[vi]

Under such situations, listeners often know exactly what they want to hear and what will put them in the desired state of mind. Nola explains:

"Lets say that I have a broken heart. That is a classic. […] Then you can have this empty feeling […] And you can enhance that feeling and perhaps give it meaning for instance by listening to depressing music and in that way having a sort of cleansing moment or by creating a space that makes sense of the emotion you are feeling. […] At the same time the music can help to enhance or support any happy emotions. That is amazing." (Nola, 2010)

However, more frequently than not, our emotional states are often somewhere in between these extremes, which makes a definition of the private mood and the subsequent choice of music challenging. Here, we show that under certain circumstances, listeners use the shuffle mode as a way of 'checking in' or locating their own emotional state.

"Walking to Uni to submit my assignment and I had my iPod in my hand constantly pressing forward in shuffle. I am not quite sure how I am feeling and I am using the skip button to try and find a song that fits this mood." (Josh, 2007)

And when listeners succeed in managing moods through their music listening, they are relieved. It gives them a feeling of accomplishment or success:

"It is one of those small victories in everyday life […] It is not a giant boost of happiness but more like pressing the elevator button and discovering that the lift is already there at your floor. If this happens at the University it is the greatest joy of all. You feel on top of it all." (Frederik, 2010).

ACTIVITY BASED AGENCY

The organization of the music according to mood management is closely connected to the activities that accompany the listening. Often the choice of music will depend on a combination of the current mood of the listener and the activity that is carried out while listening to music. If the activity requires energy the listener can use the music to get in the right energized mood. The iPod user is very aware of these qualities of the music and of mobile listening and this consciousness shows in the organization of the music. One iPod user for instance reports how she listens to her playlist 'Run for it' when she goes out for a run. The numbers on this playlist are carefully chosen in regards to tempo and mood and the order of the songs is organized to fit a certain development in intensity throughout the workout.

Patrick donates blood once every two months and he chooses a particular playlist to listen on his iPod:

"I have one playlist of a classical composer that I listen to when I'm giving blood at the blood bank, cos I can get through a whole symphony in that time, makes the time goes very fast" (Patrick, 2007)

Several informants also use the iPod at the grocery store. One of them is easily affected by the crowd and the noise level of this place. He uses the private soundtrack to shut out the many inputs that characterize this public place. Another listener uses the small breaks in a day, for instance while standing in line at the grocery store, to create positive experiences for herself.

"A lot of people say that they listen to music to avoid wasting time. They think they are wasting time while standing in line in Aldi [a supermarket chain]. I feel like listening to music gives me different experience […] It cannot make the trip to the supermarket shorter, but it can make it more exciting. It gives it meaning." (Rocha, April 2010).

As mentioned the iPod can have a practical function for listeners that work with music either professionally or as a hobby. One informant, Frederik, a drummer, uses metronome tracks when rehearsing to help him keep time. Furthermore he uses the iPod to prepare for band rehearsals:

"...And if I am going to rehearsal and I am not prepared, then I cal prepare my self using the iPod on my way there" (Frederik, 2010)

The negotiation for music that best fit the activity appears to be learnt through previous experiments and with particular goals in mind.

"When I choose a playlist for work, I need something that keeps it light and kind of happy, bouncy. You don't want something that depresses you and the customers. For drawing, it's about keeping my attention focused on what I am doing. For drawing, I am the biggest procrastinator, takes me forever to draw things. So I need some music that didn't distract me completely. Need it to keep me chained to my desk." (Xana, 2007)

Our empirical material has also revealed that iPod listening is not suited for every situation. For instance most informants do not use mobile sound media when they are tourists in a new city.

"Let's say that I'm in Mumbai for the first time. Then I wouldn't feel qualified to create a space there […] does that make sense? […] Well I think by automatically blocking out things from the beginning I would drown the great experience it could be seeing a place for the first time." (Nola, 2010)

'Frederik' also explains how the music can be a disturbing element when you are in a new city. However, it depends on what you are hearing, he says:

"It mustn't be attention-demanding music. […]It mustn't be great art haha…"(Frederik, May 2010)

AGENCY OVER PLACE AND SPACE

By using their iPods plugged into sound systems, some listeners show how they enact agency over their environment – the place and space they happen to be in. This can be related to who else are in the space. For example, Xana 'broadcasted' certain tracks from her iPod through the home sound system as

a weapon against her flatmate whom she was not getting along with. This was because her flatmate, Emma watches certain TV shows loudly that annoys Xana. In fact, this cheered her up.

"Thinking about procrastination and how I should be doing work. Also about how stupid Em's TV shows are. Action: choose music that I know Em hates and play it loudly – so music as weapon of noise pollution. Wahaha!" (Xana, 2007)

Xana also uses her iPod to feel more comfortable and 'in charge' of her environment at work. In her new job, she deals a lot of with strangers. So when she was told that she was allowed to bring and play her music at work, she carefully curated a playlist to make her feel in control and more confident.

"I have a playlist with songs that reminds me of happy times, my good friends, family and so on, as well as songs that I know that are popular with most people. By having these familiar songs and being in charge of the soundscape of the shop, I feel more confident when dealing with strangers." (Xana, 2007)

The creative iPod listener

These different ways of using the iPod bear witness to a new type of listener – one that has a well-developed comprehension of the potential of music and mobile listening. As mentioned the design of the iPod and the 'materiality' of mp3 files bring about a different interaction with music when buying it and listening to it. Even though people don't have any physical contact with the mp3 files, the above examples of the different agencies attached to mobile music listening seems to indicate that people's relation to the music is as personal, emotional and extraordinary as ever. The physical interaction is now with the iPod. The listeners carry it close to their bodies, and while listening they are often in continuous contact with it as they manage the volume and the order of the songs. One informant even explains how he does this on the move without even looking at his iPod. This familiarity with the iPod suggests intimate relations between the iPod and the listener. In some situations the listeners feel that they need the music in order to be comfortable

 Even though there is a bodily familiarity between the listener and his iPod, the listening experience, when using headphones, is very different from hearing music on a stereo or at a live concert. The iPod listener will not have the same bodily reactions of the bass resonating in his chest or the bass drum vibrating through his body. However it seems that iPod listening still engages the body and that the combination of body movements and music are essential to the experience:

"It creates a possibility for contemplation. Partly because the body is activated… like walking to the beat of the music…that is pretty normal, I think […] 120 beats per minute that fits just right." (Jeppe 2010)

As mentioned the listening also affects the body by the energy and tempo of the songs getting the listener ready to perform physically or calming him down after a busy day. According to Shuhei Hosokawa (who has examined *The Walkman Effect*, 1984) the body is central to the concept of the Walkman. In fact he states that:

"Whether it is the Walkman that charges the body or, inversely, the body that charges the Walkman, it is difficult to say. The Walkman works not as a prolongation of the body (as with other instruments of musicam obilis) but as a built-in part or, because of its intimacy, as an intrusion-like prosthesis…" (Hosokawa, 1984:176)

Hosokawa believes that the Walkman opens up the body and initiates a process of aestheticisation of urban space. Furthermore the listening process becomes a way of interpreting our selves as the music seems to come from within our own bodies. When applying this notion of a musical interpretation of the self to our current examination of musical agencies it seems to characterise the process of managing personal moods though mobile music listening. By constantly (perhaps unconsciously) evaluating one's personal mood and organizing the music according to one's physical and emotional needs the listener is trained in and becomes familiar with his own reactions to certain situations and to different music genres. The mobile sound media becomes tools in a personal education of the self.

The compressed quality of the mp3 files also affects the role of the listener. According to Jonathan Sterne an mp3 file takes up a tenth of the space of a song on a CD. This extensive compression works because the listener unconsciously fills in any missing auditory information making the music seem the same as when it was heard on a CD or the like. However, somewhere in the middle ear we can detect these reductions in detail and complexity.

[vii]

This change in the quality of the music also affects how we listen. As mentioned many iPod listeners report how they use the mobile music to manage their mood or create memorable experiences in different situations. Nevertheless when they really want to focus their listening and enjoy a piece of music they primarily listen on their stereo at home or go to live concerts.

 It is interesting then, how the mobile listening, if it is not necessarily a focused listening, can give the listener strong emotional experiences. The French sociologist Antoine Hennion explains this by describing how iPod listeners construct their own passivity letting themselves be swept up in the music and in the emotion.[viii] So instead of popular music pacifying the listener, as Adorno describes it, the listener actively chooses to surrender to the music and create a personal and emotional experience. As such the listener is very much in control throughout the listening. Even when he himself might describe it as 'losing himself in the music' the experience will often be staged and designed.

This controlled and staged listening can however in some situations influence the experience of situation's authenticity. The listener Nola describes how it feels when she becomes aware of her own staging of an emotional listening situation:

 "…and it was like 'uh, now I'm in the country, and it is so beautiful' […] and then suddenly there was this song, that did not fit in at all […] and it was so funny because I suddenly realised what I was trying to do, and that sometimes I fail at it, and how ridiculous it sometimes can be, right?" (Nola, 2010)

Conclusion

This paper has presented different ways people exert agencies during music listening through their iPods. We have shown how the iPod is used in many different situations and with different emotional, physical or social needs/agendas. Throughout, iPod users are found to understand implicitly how different kinds of music can affect both their sense of self and its influence over different social situations, whether or not they actually succeed in managing their situation and mood. But regardless of the outcome, the iPod listener is found to interact actively with the music, and sometimes in novel and perhaps

a more unexpected manner. Thus, far being the listener who is locked and immersed in their sound bubble, iPod listeners are actively involved in their soundscape: creatively tuning, adjusting, and designing a soundtrack that not only support their sense of self, identity, mood, and aspiration, but also their activities and surroundings.

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3. *For more on listening experiences while using shuffle mode see Tuck Wah Leong: Understanding Serendipitous Experiences when Interacting with Personal Digital Content.*
4. *Quotes are taken from fieldwork conducted in both Australia (2007) and Denmark (2010) to understand people's listening experience of the iPod. Names of informants have been anonymized.*
5. *Valcheva, Playlistism: a means of identity expression and self-representation.*
6. *Juslin and Sloboda, Music and Emotion, 548*
7. *Sterne, "The Mp3 as a Cultural Artefact", 834.*
8. *Gomart & Hennion: Music Lovers. Here taken from Juslin & Sloboda: Music and Emotion.*

THE DOUBLE HELIX AND THE OTHER-FRAME

Malcolm Levy

Throughout the history of the camera, a main thread of discussion has been on the mechanical repetition of photography, camera usage, and how aspect can alter, reshape, and change our existing understanding of the tool itself and its usage. 'Other-frames', specifically references abstract frames that are not typically part of the normative captured sequence, offering an alternative methodology within digital photography.
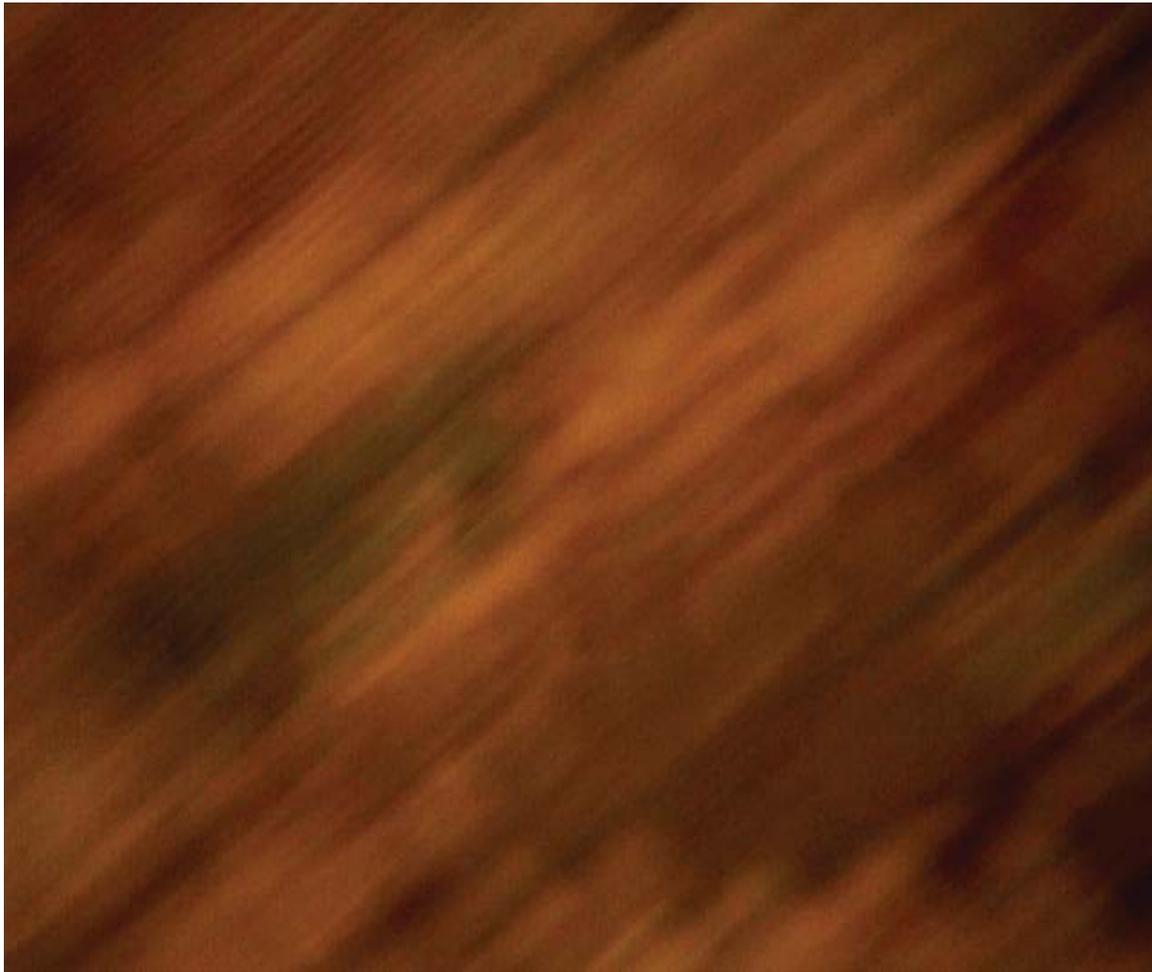
Future Cities, Shanghai, 280"

"No doubt we know less and less about the nature of the image, an image, or the image."

_Raymond Bellour, *The Double Helix*.

In both painting, and more recently in photography, the conversation around abstraction, with regards to its meaning, creation and place within art, has been an animated one to say the least. Currently, with the advent of digital technology and numerous artistic practices (both digital and film) related to the debate, the discussion has taken on new meaning. One area of study that has been emerging in the conversation focuses on the location at which digital and analog practices meet.

Within this current discourse around Abstract and Concrete practices and Video / Still Image / Photography, the computer chip within the digital camera is an object of much contradiction and beauty. How this small sensor can be manipulated to reveal frames that are in between, or not really part of the actual logical frame rate pattern is both a striking and explosive phenomenon. Through practicing techniques of movement, focus and speed, there is a location where the digital chip stops working properly, where it cannot handle the workload it is being given. The implications of this are the creation of an array of visually abstract stills.

Other-Frames

Throughout the history of the camera, a main thread of discussion has been on the mechanical repetition of photography, the usage of the camera, and how these usages can alter, reshape, and change our existing understanding of the tool itself and its usage. The camera 'chip', or sensor as it is known, based on its makeup and intended action, has only certain processes and actions that it is designed for, in terms of its use. The processes create 'other-frames', specifically referencing frames that are not normally part of the sequence and capture methodology of digital photography. 'Other' in this case lies within its historical philosophical usages of the term not as oppositional, but more so as that which is unconscious or silent.

Techniques with the ability to affect the usage of a digital camera above and beyond the normative practices of commercial video and photography are varied. These techniques exist outside what is considered relevant to the specific needs or usages of the camera with its normative function of traditional documentation. Some of these, based on quick movement, speed and focus in particular, have the ability to create Abstract Expressionist-like formulations out of what could be best described as analogical methodologies within a digital landscape.

The frames live beyond what would be possible in a film reel due to the undiluted analog nature of film in comparison to the digital-analog hybrid form that exists within the digital camera/process. Within the process of slowing down imagery, frames are found that were never intended to exist, and more so, never conceived of as ever being part of the process. In using the chip of the camera, not for its original intended purpose, but for an originally unintended purpose, views beyond the human gaze begin to appear.

The "Chip" itself is an abstract notion. Much in the same way as a synthesizer, the current digital cameras run on mini micro-processors that are then amplified to create imagery. Though the common name for these devices is a chip, they are more accurately referred to as image sensors. In looking at both the CCD (charge-coupled device) or CMOS (complimentary metal oxide silicon) image sensor, what is being created is a mix of analog and digital processes, and therefore reactions and endpoints in creating imagery. The Chip, or image sensor as it is technically referred to is a device that converts an optical image to an electric signal. The purpose of the sensor is to convert light into electrical signals.

As with the sounds that can be extracted sonically from synthesizers and other sorts of outboard equipment, the reaction of the amplifiers in a chip to speed, light, noise, and other exterior factors can manipulate the chip with mystifying results. As opposed to the 'invisible', being that of the darkroom, in this case it is the chip itself, *which is the digitized duplicate of the filmic process of the filming - darkroom process*. The visible process of the camera (dominant action) is pushed aside to give precedence to the usually invisible process (submissive action) of the inner workings of the camera's chip and functionality).

In analyzing the mechanical functions of a camera recording an image, Raymond Bellour investigates the possibilities of abstractions and narratives that can pass through this process. Specifically, Bellour identifies the possibilities for frames outside of the normative process to exist: "This is what, in their way, the words passages of the image refer to. First of all, the ambiguous word *of* includes the sense of between. It is between images that passages and contaminations of beings and systems occur more and more often, and such passages are sometimes clear but sometimes hard to define, and, above all, to give a name to."

These passages and contaminations, as Bellour correctly describes, are specifically, 'Other-Frames'. The digital space within the analog chip, when exhausted beyond its capabilities and capacity for retention, lies very much in the world of the 'in between'. A newly found nature of the image comes through, in this case redefining a space where it didn't exist before. This requires us to question not only what it produces or *could* produce as art, but, above all, to evaluate what becomes of art when it is confronted with a different structure outside of semiotics, and specifically what it signifies (or de-signifies) within its abstracted result.

Bellour referred to this as the Double Helix, specifically the work that lives between the lines of what is foreseen, and unforeseen by science with regard to nature. In analyzing the apparatus, there are two forces, (arguably more) working together to create these new realities, and once the movement of video comes into play, there is the ability for loss of recognition, when the movement is diverted. With the advent of the video camera, and specifically the chip that is contained within it, the abstract nature of what can be created begins to take on a completely different context, both with regard to its final outcome, and the process associated with that outcome.

While the digital process is happening in a video camera, it is really also an analog form, which is why the end result can be so different. This passage, as Bellour refers to it as, is the transportation of the image from the digital to analog space. It is within that space, and through the movements that occur there, that different forms of abstraction can be achieved. "The phases of movement, of false-movement, of passage from one frame to the next, which are very sudden and punctuated with a blue flash, amount to so many outburst of distortion whose effect spreads beyond their own duration; they damage the image we discover, the resemblance that is being created to the point that we are hardly surprised at what is most surprising, and look at it twice before we watch out"

These 'outbursts of distortion' are, in fact, focused on one of the main tools of photographers over time; that which is the dynamic range of a shot being photographed. This has to do with the traditional range of what can and cannot be recorded. This includes the opacity range of captured film images, as well as the reflectance range of images on paper.

The dynamic range of sensors used in digital photography is many times less than that of the human eye and generally not as wide as that of chemical photographic media. In the domain of digital imaging, algorithms have been developed to map the image differently in shadow and in highlight in order to better distribute the lighting range across the image. When images challenge the dynamic range of what can be digitally recorded, the results are in abstractions that can occur within the image.

Video in a sense is the last analog point, or more so the place where the two worlds meet. Video is comprised of analog signals and data, but it is being created and used within a digital capture source. So within video, you have a duality that has grown over time. In a technical sense, we speak of video as having analog data, analogical signals, which is opposed to digital or numerical computer technology; in effect, it is really a meeting of the two. For Olivier Richon, this becomes a matter of reinvention, not only of the tools, but the discourse its self:

New technologies necessarily change the material production and diffusion of images, but what is of interest to me remains the question of the image. The image comes first, not the technology. The binary opposition analogical/digital is intriguing. To use the term "analogical" to define a non-digital photo is now commonly accepted, yet remains paradoxical. Before the development of the digital world of imaging, nobody used the word analogical. There was just photography. There is a reversal here, we can say that at the level of discourse, the digital has invented or reinvented the analogical. The digital needs its other, the analogical, in order to define itself. In a certain way, it follows that the analogical comes after the digital after all.

The practice of generating other-frames is based on what can be foreseen or predicted. Conceptually it is rooted in imagining what is possible based on this transition/passage, of what might be created out of this transference, and the multitudes of possibilities that rest within: "there is still the eye, there are images, quasi images, what one sees, and what one foresees… the computer image is nevertheless on the boundary of an everything-analog whose limits are obviously the creative (or should I say reproductive?) capacity of human movement and the interest that inspires it, with an outcome that is uncertain and stakes that are problematic."   The camera creates an eye of its own, which can be carried out through the actions and movements of affecting it. This uncertainty is a place of limitless possibility for experimentation.

Other-Frames are part of the greater and more profound transformations of the electronic age with regard to the changing relationship of representational imagery and abstraction. Historically the advent of photography as the medium of choice for documentation, created a space for painting in some cases to prioritize formal elements over representational content, creating a vocabulary of meaning derived from colour, shape, texture, and gesture. This space eventually culminated in the movement known as Abstract Expressionism. With the usages of the camera today, this same path is now being taken by a number of photographers and video artists who are coming across the same reactions to our current state of art and documentation.

Living in a culture where cameras have become synonymous with constant daily interactions, (whether this is the news, surveillance, online, urban screens and mobile devices) recording of memory is once again facing the challenges that happened during the shift from painting to photography. As Gil Blank correctly points out around our current state of events: "If ultimately there is anything to be learned from simulacra, it is that we can never in fact separate ourselves from the world or the real….   abstraction, whether aesthetic, mnemonic, or epistemological, is never so complete that it obviates even the

least attempt at a transparent reckoning of history, nor so corrupt that its shortcoming does not in itself offer some model for understanding the human contingency of that same history.

The camera has created a time in history where the impression of analogy has been the object of such deliberate construction, that it has been able to fundamentally question normative practices and certain techniques to the extent that such techniques become the guarantee of a capacity for analogies, the problems of which are posed by the techniques themselves. Continual techniques of the camera, in the same manner as computer software, three -dimensional rendering and other means of visual rendering, are continuing to shift, grow and emerge over time. The construction of the digital-analog space, the process which is undergone in creating this, and the abstract reality that this follows, is in line with the current movements and responses to the constant debate around what can be recorded as memory, and the multiplicity of memory currently.

WELCOME TO ARTOUT - THE FIRST ARTIST ESCORT SERVICE IN THE HISTORY OF ART!

I-Wei Li & Anton Koslov Mayr

ARTOUT furthers the ongoing inquiry into the nature of art production and its economy and test the limits of the "art scene". Indeed, is "art" an altruistic cultural gesture, a form of business transaction, or both? Or neither?

Fig 1. Artout artist escort, available 450 euro/hr. To book www.artout.org

Fig 2. Artout artist escort, available 250 euro/hr. To book www.artout.org

L'art… peut deriver d'un sentiment genereux: le gout de la prostitution; mais il est bientôt corrompu par le gout de la propriété.

_Charles Baudelaire

ARTOUT artist escort service, launched in Paris in 2006, in many ways is a fruit of a long observation of the art scene both in Europe and in the United States. Between 2000 and 2006, Artout founder, Anton Koslov Mayr, was in charge of an educational project Engarde that investigated the political economy of art through a series of exhibits, seminars and conferences. Engarde primarily focused on the issues related to production of cultural objects and meaning, their consumption and the identity of artists, critics, curators and collectors within a larger framework of the capitalist market system in general and the art market in particular. However, the traditional academic approach upon which Engarde was based demonstrated its limitations, and by 2006 it became clear that any serious inquiry, in order to produce tangible results, demands a more radical strategy. [1]

The ideological genealogy of Artout may be traced to various sources. Mikhail Bakhtin's theory of the carnival, developed in his seminal *Rabelais and His World* is one of them.Performance art as a form of this *carnivalesque time*, in which accepted boundaries and distinctions between reality and representation are subverted (and this is why it is radically different from traditional theater) may be an example. and it explains why Artout has a large number of performance artists as participants and enters squarely into the tradition of "distubational art" to use Arthur Danto's term . [2] Artout may also be put in the

context of *institutional critique* as developed by artists like Andrea Fraser and others. Institutional critique was conceived as a form of commentary of the various cultural institutions and assumed *normalities* of art as well as disarticulation of the institution of art and its various practices. In the case of Artout, it is the relationship between the artist and his/her collector/consumer (both individual and institutional) that is being staged as a performance.

Artout has also been informed by the conceptual art inquiry into the very morphology of art. This inquiry, political in nature, questions the economic dimension of art production, namely the commodity fetish of cultural production, mystification of products and commodification of the artist's personality. At a certain stage of its development, art lost its ability to generate its own definition and, therefore, produce any significant oppositional movement outside of the existing cultural institutions. Creation of culturally significant objects have been turned into an enterprise of creating marketable "novelty"; fetishisation of novelty meant the collapse of the avant-garde since any political opposition to the existing mode of art production and distribution became impossible. In many ways, collectors had become the supreme consumers of "art", its new "aristocracy." The art market imposed total reification of the process of art production, reducing it to manufacturing of objects and events in specifically designated spaces by professionally designated people. Cultural institutions became the superstructure of the market place on which art was being bought and sold like any other merchandise, relying on an all-encompassing process of mystification. This mystification consisted of investing objects with the market value by placing them in the context of art history. Art object as a commodity fetish that offers "art historical value" became an investment vehicle and as such re-affirmed (and continue to re-affirm) a certain economic model with its history of art and its hierarchy of culture. and the entire art market and its adjacent institutional territories became a one big Bernard Madoff collection…

In other words, the law of the capitalist market with its emphasis on the ever-narrowing specialization of labor and maximization of profits invites artists to reinvent themselves over and over in order to escape the market-imposed limits to their identity. This limited identity confines artists to seek satisfying the ruling class demand for the special commodity fetish known as Art and reproduce institutionally-defined ideology of culture. Dercon, director of Tate Modern, even describes artists today as 'zombies and vampires' due to the precarious working conditions they face and endless free services they are willing to offer. [3] In both cases, the producer and the consumer of Art are limited in their freedom by the traditional modes of material exchange.

De-materialization of the art-production process led the rise of immaterial ephemeral time-based art, be it performance, sound or light installation, or simply personalized time. If legal council or P.R. manager's time may cost X $ an hour, why shouldn't artist's time be valued just as much? The social function of an artist is as important and its cultural message is surpassing anything other economic actors are capable for. Artists are the last ones who are still capable of evoking the real sense of modern tragedy, despite or may be because of their clownesque derisionary behavior. [4] And yet, our society treats them as a bunch of extravagant clowns at best, and state employees at worst.

That is why artists must defend their economic interests, their identificatinal integrity, they must find new organizational forms that must surpass the logic of late capitalism. Artout is an open-end project that is set to operate on the threshold between "reality" and "art" and defies the idea of a designated art space. Artout may very well be a relational project, although, we do not believe that one night-out with an artist can produce a relationship – an enterprise too utopian to be taken seriously. However, we believe that the meaning in art, just like the meaning in a language, resides neither in the artist's intention nor in what he or she does but at a point between the artist's intention and that of his or her viewer

and consumer. Our goal (and/or our product) is to create a *dialogized heteroglossia* that explores an already existing set of meanings, relations, clichés and pre-conceived ideas. By doing so we want to further the ongoing inquiry into the nature of art production and its economy and test the limits of the "art scene". Indeed, is "art" an altruistic cultural gesture, a form of business transaction, or both? Or neither? Do we have to accept the impossibility of conversation in the same way as it was formulated a deacde ago by Michel Houllebecq: "L'effritement tendanciel de la créativité dans les arts n'est ainsi qu'une autre face de l'impossibilité toute contemporaine de la conversation. Tout se passe en effet, dans la conversation courante, comme si l'expression directe d'un sentiment, d'une émotion, d'une idée était devenue impossible, parceque trop vulgaire"? [5]

To conclude, we, at ARTOUT, believe that art is an open concept and artistic praxis is the process of becoming that corresponds to the totality of individual temporality. Artistic creativity results from the dialectical relation between the acceptance of the market as the underlying principle of social reality, and the need to escape its imperatives of obedience and consensus; its locus is the individuality of the artist. The artist plays the messenger and the message, the self-medium that finds its legitimacy through the charismatic negation of conventionality.

We believe that the individuality of the artist is far more significant than the material end-product of the artist's labor. We are extending the limits of the traditional market-model to recognize the artist as the self-defined commodity whose value resides in the immateriality of artist's creative becoming. Spending time in the company of the artist is a new "creative" commodity exchange; it reveals power relations within the existing artist-patron paradigm and leads to the mutual liberation of both artists and art patrons from the condition of simple material production and accumulation to the next level of the direct creative exchange within the dominant capitalist art market paradigm.

Be it in your international head-quarters, or in privacy of your home, offer yourself a true artistic experience! To book, http://www.artout.org

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NETWORK CULTURE, MEDIA ART: CULTURAL CHANGE DIALECTICS

PATRICK LICHTY

The emergence of Network Culture represents a fundamental paradigmatic shift in society.Networked connection replaces abstraction in terms of cultural production.This paper investigates the influence of Actor-Network Theory as discursive strategy that explicates public spheres such as the New Media art world creating a new form of Virtual social space.

 The emergence of Network Culture represents a fundamental paradigmatic shift in society, as it resituates the concept of mediation as a default condition, in everyday life and the art world. Here, networked connection replaces abstraction in terms of cultural production. Actor Network Theory redefines the relations of all elements in a milieu in terms of their effects on the system, and not on their base significations. This results in a heterogenous semiotics of symmetry, where the material, intellectual, and social effects of agents within a network differentiates their degree of agency. This can be seen in terms of Latour's systemic "artworld", consisting of a fractal aggregate of subordinate sites, such as galleries, festivals, websites, and blogs, as well as various overlapping social spheres of influence. This paper will investigate the influence of Actor-Network Theory as discursive strategy that explicates public spheres such as the New Media art world as creating a new form of Lefebrian social space, that of the Virtual. This will be done by considering two New Media art works, *Face to Facebook* and *Wikipedia Art* as examples of cultural production that utilize virtual space as site of social agency under the ANT paradigm.

THE EMERGENCE OF ANT

It has been said that with the rise of network culture, that the shift in focus occurs from the online community to that of the "smart mob"; that this represents a decentering of concentration from the concept of located/dislocated (place-based and place-less space) to that of a flat, relational network. In *Science in Action*, [1] Bruno Latour theorizes the concept of Actor-Network Theory, in which he deals with agents in a network of relations as being *mediated, symmetric, ubiquitous, and material-semiotic.* Ubiquity is assured in that there is nothing outside the network; once someone or something engages an ANT network, it becomes an actant and therefore part of the network. Material-semiosis relates to the actant's relevance having to do not only with its signification, but also with its material circumstances. For example, someone contrasting silk versus nylon hose as social intermediaries would not deal solely with its metomyny as signifying class structure. But taking both as mediators through the material circumstances of silk versus nylon and thus constructing meaning from this as well, these objects become relevant. This is merely to say that meaning in an ANT network is a constant state of socio-cultural mediation and negotiation and is dynamically dependent on the circumstances of the whole network and its architectonic of meaning, rather than merely with its base significations. Latour also states that elements within an AN are regarded as equivalent, or described in the same terms. This includes human, non-human, and material actants, and therefore creates a 'flat' space of signification, and *does* illustrate networks of equal actants, such as flash mobs or online communities (as in our examples), rather than systems that derive difference from less complex sets of criteria.

In terms of ANT, perhaps we could conceive of the network as an heterogenous infinitude of equivalent spaces, but it may be useful for us to consider the nature of constructed space within an AN in order to

consider artworks that engage networked culture. Henri Lefevbre, in *The Production of Space*, [2] posits a unitary theory the division of space into three types, the physical, the social, and the mental. These are derived from Aristotelian "Becoming" to Kantian space to contemporary epistemology as theoretical underpinnings of his construction of space. He critiques Chomsky and Derrida is not addressing the mediation of the "the abyss between the mental space on the one side and the physical and social spheres on the other." [3] In our case, we would like to suggest that, given the need to bridge this abyss, that we could theorize a fourth space; a Lefevbrian Virtual space as being the combination of the mental and the social. This is the space of our given artworks.

But what of the environment-net they inhabit? To construct an AN within which works like Face-2-Facebook and Wikipedia Art operate, we will look at Howard Becker's conception of an "art world." [4] Congruent with ANT, Becker asserts that the work of art is a system within a system which is the product of a set of a complex sociological propositions that are dependent upon one another, which we could consider as analogous to an AN. There is no homogenous "art world" per se, but heterogenous fields of spaces, milieu, individuals, and works. If we allow ourselves to extrapolate to the virtual space in our network, we can see that this expanded artworld exists as a series of overlapping and nested spaces (example, an exhibition is situated by being on a certain website or in a certain gallery, and is then contextualized by the curator and critics, and seen by the audience). There are not just overlapping spheres of museums, galleries, fairs, curators, gallerists, critics, patrons, visitors, but also social media, blogs, forums, maillists, and tweet feeds. Furthermore, our examination of artworld-as-network only denotes the mediated relevance of the milieu (spaces virtual and/or otherwise) merely as construct or our range of interest. The art world, per se, exists within the expanded fields of society, so stated not to imply it existing in social space, but art world as embedded in that larger environment. As such, we could expand the AN to encompass the globe, its societies, all objects, and their dynamic relations. For the sake of discourse, it is assured that this is beyond the scope of our inquiry, and we shall remain largely in the criteria of examining a limited art world network in a virtual space. But even so, we will see that our examples (Face2Facebook and Wikipedia Art) bleed outward from their points of origin into the larger Lefevbrian spatial landscapes.

FACE-TO-FACEBOOK

Face-to-Facebook [5] is a project by Paulo Cirio and Alessandro Ludovico that "stole 1 million Facebook profiles, filtered them with face-recognition software, and posted them on a custom-made dating website sorted by their facial expressions characteristics." Face-to-Facebook "screen scraped" various data (name, country, groups) along with profile pictures from which a mock dating site called http://www.lovely-faces.com/. The artists create a virtual function of agency by harvesting the million faces (social) and processing them to create relations between them (Mental), for a critical Website for wider viewing (virtual agency). Cirio and Ludvico make explicit the theory of agency relating to the idea that facial cues are chosen and used as markers for sexual attraction, although this is a basic metric of mediated relevance in the AN. On Face-to-Facebook, the faces are analyzed using facial recognition software and grouped based on arbitrarily categories determined by the artists, "climber", "easy going", "funny", "mild", "sly" and "smug". In Dan Jones' essay, "The Love Delusion," [6] states that "men typically overestimate the sexual interest conveyed by a woman's smile or laughter", grouping the faces creates a dialogue by implicit discourse of sexual attraction and explicit critique of privacy in social media. Cirio and Ludovico create a critical Actor Network in virtual space as critical device to explicate to make visible the cultural terrain created by social media. Furthermore, the impact of the site on larger networks is shown

by the degree of press the site has created, although this is only a visible indicator of the relational activity within this Actor Network construct.

WIKIPEDIA ART

Another project that plays with differing levels of agency in virtual space is Kildall, Stern, et al's *Wikipedia Art*. In *Wikipedia Art,* [7] Scott Kildall created a performative citation in virtual space as a combination of a mental statement (citation) in the social space of Wikipedia, creating a virtual gesture. It was placed on Wikipedia as "art composed on Wikipedia, and thus art that anyone can edit". Its header reads:

"Wikipedia Art is a conceptual art work composed on Wikipedia, and is thus art that anyone can edit. It manifests as a standard page on Wikipedia - entitled Wikipedia Art. Like all Wikipedia entries, anyone can alter this page as long as their alterations meet Wikipedia's standards of quality and verifiability. As a consequence of such collaborative and consensus-driven edits to the page, Wikipedia Art, itself, changes over time."[8]

This listing lasted for a full fifteen hours until its deletion from the Wikipedia site, but not without widespread discussion throughout communities like Rhizome.org, [9] Art Fag City, [10] The Whole9, [11] and others. The importance of Wikipedia Art was not so much the work itself but its gestural aspect as networked performance that questions the social networks of consensus.

If we could look at Wikipedia Art as an Actor Network, the project would appear as a series of subnets nested within/overlapping one another as a series of spheres of agency or influence. First, the initiators, Kildall and Stern, represent a home node in the network, with rhetorical conspirators (Sherwin, Coffelt and Lichty) representing another sphere. Socially, the project engages the Wikipedia community and the Beckerian art worlds of the Rhizome.org online community and Whole9 and Art Fag City blogs, which in turn have bled to many other venues such as the Transmediale festival and London's HTTP Gallery. Considered as a larger "art world" aggregate, this network influenced the larger society by invoking the rage of Wikipedia founder Jimmy Wales, and gaining notice of the Wall Street Journal. [12]

DENOUEMENT:

While we have explored the concept of ANT, Lefevbre's division of space, and how the two contribute to the construction of "art worlds", the emergence of networked culture creates unique modes of artistic expression. These consist of taking a metacritical role in examining virtual (mental/social) space as medium through the intervention of social media. Face-to-Facebook, Wikipedia Art, Google Will Eat Itself and others probe networks of agency to critically show the shape of networked culture. The fact that it does have a tangible effect reveals the reality of modes of agency within the network, and reveals the critical landscape of the Actor Network.

CONCLUSION:

In closing, this essay has sought to explore Latour's concept of Actor Network Theory (ANT) to describe a paradigmatic shift. That shift is from that of locative/embodied discourse to that of purely networked

culture; that is, the shift from associating culture with places and things to purely that of symmetric networks of equivalent mediated agents. As opposed to the widely conceived hierarchical nature of the artworld, ANT conceives of "art worlds" as conglomerates of spaces, ideas, and social contracts that define milieus and works. Artworks described by ANT critique virtual milieu by engaging artworlds-as-networks, and as such explore a virtual Lefevbrian space by bridging the abyss between the Social and Mental spaces through engaging online communities. These critical pieces explore the relations between actors in social situations in context of "art worlds", with the tangibility of result of their agency being the response in the general audience or public sphere of the mass media. We can examine, using ANT, networked art such as Face-to-Facebook and Wikipedia Art, and as such, describe networked cultural production in its own terms, as demanded by ANT. The rise of networked culture has created a fundamental network shift within society, and ANT is a valuable tool in understanding the relationships created by art within networked social environments, and networked culture as it expands into the future.

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NOISE AND TRANSLATION: REMAPPING HABITUS ACROSS THE US/TURKEY BORDER

PATRICK LICHTY

Theorist Gayatri Spivak wrote of the politics of translation as being intrinsic to the construction of meaning if one looks at language as being central to that locus of meaning. Asking the question of why recurrent issues emerge is not enough, but examination of the phenomenology of dialogue between these milieux can lend insight into the experiences of who have traversed spaces which, in their own way, have been everything yet nothing.

Gayatri Spivak wrote of the politics of translation as being intrinsic to the construction of meaning if one looks at language as being central to that locus of meaning. But we can use the distance between root languages (Altaic for Turkish and Anglo-Frisian for English) as metaphor for distance between cultures, to the disjuncture of a notion of home, the translation of meaning, identity, and trans-mapping of cultural mythologies. For many artists crossing into the position of geographical otherness, the issues of translation, dislocation, and nomadism reemerge within the work. How does translation of alterity of space, time, culture and identity evidence itself through the milieu of cultural production? Asking the question of why recurrent issues emerge is not enough, but examination of the phenomenology of dialogue between these milieux can lend insight into the experiences of artists who have traversed spaces which, in their own way, have been everything yet nothing. This is not a space of universals, but a heterogenous discursive space arising from the shock of dislocation. For our purposes, this disjuncture involves America, the fading center of the world, and Turkey part of Europe, Middle East, and Eurasia and center of Byzantium, the reemergent center of the world. In this paper, we will examine works by Turkish and Anglo-American artists who have either worked, studied, or created in the other country. In doing so, we will explore points of translation, transmapping of meaning, and concurrent cultural threads, not insofar to reduce this matrix of relationships, but to consider points of liminality expressed by the work of these artists. This simultaneous locus of commonality and dislocation becomes the expression of "others" who have themselves been influenced by that "other" place to reflect on their own hybridity and alterity.

As a brief aside, I believe that this process of cross pollination is part of a rich historical conversation over the past 150 years, starting with Osman Hamdi and the establishment of the School of Fine Arts in Istanbul. This continued with the Military Painters, A and B schools of the Early 20th century, who were in dialogue with European artists and schools[1]. More recently, the Istanbul Bienniale has been a lively forum for cross cultural conversation, and some argue constitutes a key platform for the emergence of the Contemporary in Turkey. Of note are the Third "Production of Cultural Difference" [2] which expanded its scope under the leadership of Director: Vasif Kortun and the Eighth, under the curatorial leadership of ProspectOne curator Dan Cameron. This last instance has led to his curation of the first show at the C24 gallery, the first Gallery in Chelsea NYC that focuses on Turkish Contemporary art [3]. All these events are merely a trajectory of Turkey's interaction with Western contemporary art, and is the subject of a book in itself.

But what are key to the work of many artists working across borders are issues of transcultural translation, liminality, politics, notions of home, and mappings of mythologies, of which we will discuss translation first, which is core to the process of cross-cultural interpretation. Gayatri Spivak, in her *Politics of Translation* [4] writes of the dialectic between logic and rhetoric, where between the regular logical order of words, sentences and paragraphs lie the pauses and gaps that constitute rhetoric. The logico-rhetorical dialectic intrinsic to translation creates semilologic "frayings" that present many risks. These include violence to the subject through misreading and colonization of the other. However, Spivak also posits that the desire to translate creates other discourses. The desire to translate is borne from a love of the subject and as such, creates a space for the cohabitation of the subject and the translator. Even though the translator cannot inhabit the location of the other, the creation of a space in which the translator can attempt to identify or empathize with that other out of love for the subject. This, I propose, serves as a plausible situation for many of the artists here, and as an apologia for any mismappings I may author here.

Another notion that emerges in the work is the notion of home, its construction, habits, and the role that global nomadism plays in cultural production. In a workshop that I co-facilitated at the Cura Bodrum residency on the Bodrum Peninsula in Turkey, the consensus was that we construct the notion of home through aspects of the Heimlich by bonding home to a place, things, or people, like family or colleagues. In addition, home could be ascribed to sets of habitual practices, as suggested by Chicago-Istanbul artist Sevgi Aka.[5]   However, this is challenged when individual enters Deleuzian nomadism that moves the body across space, which breaks the hegemonic discourse of boundaries such as those imposed by the nation state. This is in agreement with David Morely, in *Home territories: media, mobility and identity*[6], that describes a "geographical promiscuity" and deterritorializes the individual from practices of language and custom of their point of origin. This creates a liminal mode of being, establishing a space of alterity where one's identity may have a starting point for its vector of flight, becomes, as Bhabha would put it, hybridized [6] – being an aggregate of experiences accumulated while in the process of motion. It has been said, "We are all aliens", and perhaps it is the contention of the notion of home that brings this assertion into relief. We are Others when in the other country, but also return as dislocated/deterritorialized aliens as well, or at least arrive less familiar with the implication of home.

Hale Ekinci, in her *Alligator Skin Box: Memoirs of a Young Nomad* [7] playfully intersperses her nomadic dislocation of self through a series of surreal vignettes mixing her experiences in Turkey and Chicago that have existed as online media, single-channel projection, and interactive sculpture. In pre-release versions (not seen here), all her pieces are subtitled phonetically in English, but with the Turkish alphabet. Therefore, "I should do that" would be spelled with Turkish descenders for the "sh" and the like. Stories like her childhood neighbor Arzu distributing bulgur balls out her apartment window and her boyfriend being eaten by an alligator skin box on a bus take on an added disjunctive quality when subjected to the act of subtitling (reserved for foreign movies). It becomes more so when that subtitling is a transcoded/transcultural language barely accessible to either culture. Ekinci is a Deleuzian nomad who has slipped the bounds of her borders, but now inhabits both and neither. But what happens when the communication between cultures shifts to that between species?

Zeren Goktan's *Aboveground*[8] chronicles the activities of Eastern "pigeon-raisers" who have analogues in Europe and the US, but has very ingrained traditions in the areas she studies. Within the video, the pigeon raisers exhibit great intimacy with their birds, handling them with great care, their hands resembling forms of sign language, signaling a resemblance to interspecies translation. Goktan relates that this avocation is male-centered, although she constantly searches for women engaged in the practice, to no avail. This "hobby", as the men state, keeps them from what is considered less desirable activities,

such as frequenting coffee houses and playing cards. Furthermore, what is discovered is that this is one of the few spaces in which the men can actually openly love. *Aboveground* examines an expected space of male predominance which is also a site of intimate translation, which is interesting for its relation to its culture as well as its relation to the global nature of the practice.

Iz Oztat's *Reliquary*[9] inhabits another sacred space, that of the reliquary. The work mimics a reliquary of the Prophet in which was related to this author contained a tooth. In this case, Oztat has placed an heirloom seed in the place of the sacred tooth. Such a placement suggests the holiness of the seed in future days in light of genomics, but also calls into focus critical issues of human agency. Placed in context of the referent (an Islamic reliquary) the dialogue of the tooth with the seed calls into question a faith in the Prophet (tooth) with seed as signifier of human agency or holiness of Creation. The question that comes to mind is critical discourses about corporations such as Monsanto and the primacy of nature bring forth a complex narrative, especially when placed in the context of a farm in the Midwestern United States, which is where it was exhibited.

Chicago/Istanbul artist Sevgi Aka's *Gulf Gossip* project[10] is based on the interjection of noise into subsequent rounds of transmission and how we increasingly misunderstand one another with as stages of translation increase, like the classic "telephone game". Based on Baudrillard's *The Gulf War Did Not Happen,* mediations of the event, in this case, depictions of the Gulf War, are reiterated by successive redrawings of representations of Gulf War images. All but one of the participants are female, between the ages of 9 and 81, and the subject abstracts with successive stages, taking forms of nature scenes and increasingly generic affective responses as time progresses and entropy increases. This piece comes from Aka's frustration with global mediation of the subject, with the injection of noise into the mise en scene with successive iterations of retelling, and the commonalities and misunderstandings these communication presents, cross cultural or not. This translocation of information also plays itself out in terms of identity as well as the nomadic individual inhabits the globs and McLuhan's global village of information.

The mapping of information as identity and political representation plays a central role in Ali Miharbi's *Delegations.* As the visitor interacts with the piece, which consists of an LCD display and camera combination, they "see a real-time processed image of their faces, constructed using the combination of statistically extracted face features of that country's members of the parliaments." [11] Delegations is a representation of political representation as identity of the viewer, framing her in terms of the political landscape of the country of exhibition (Turkey, South Korea, or Mexico). This piece calls into question the fracturing of mediated identity, not only in Donna Haraway's cyborg agglomerate structure, but also the composite identity of the political individual in terms of the place the piece is viewed.

The idea of place is dealt with in N. Eden Unluata's series of books on urban excavations[12]. In this series, Unluata constructs a truly nomadic space, in this case from the artifacts of Paris or Montreal or Istanbul by enacting a series of chance operations for collage within his book-as-doorway. While in the third space (especially Paris), he engaged colleagues from Turkey and the US through Facebook as random number generators so that he could select entries from phone books, video collections, and other ephemera. The door is a liminal space that suggests passage, perhaps for him as much as the visitor-interactor as they peruse the contained videos (via iPod), images, and texts. The *Urban Excavations* are a place where he and the visitor occupy a liminal third space between places by placing all the excavations of place within the door while potentially occupying none. This also is congruent with his audio piece, *Digital Tunnel,*in which he deals with being of mixed birth, and is not "X" (insert identity here)

enough, and chooses to drill a "digital tunnel" into his countr(y/ies) of exile, and exist as a cybernetic nomad.

But when speaking about liminal discourses in transcultural art of artists who have occupied the opposite space, it is important to mention the work of Chantal Zakari and Mike Manden in their book, *The State of Ata.*[13] Manden identifies as American Jewish, while Zakari is Levantine Turk, as signified in their book project, *The Turk and the Jew*, places them at times in a minority position either in the US or Turkey. This fact gives rise to sharp irony when speaking of a famous photograph of Zakari holding a portrait of Mustafa Kemal, (also known as Ataturk, the father of the modern Turkish state) before a Islamist parade in Ankara. The result was a mass media sensation in Turkey, where Kemalist and Islamist positions sought to place the image, and Zakari and Manden with it, as everything from a heroine of the Republic to promoters of Israeli propaganda. However, at a 2011 talk at the School of the Art Institute[12], they stated that the photo was purely taken as a composition for the book *State of Ata*, and the media controversy placed them as a fulcrum between contrasting politics outside their original intentions.

The enmeshing of the political upon the space of the other is no stranger to New Media. American Andy Deck created *AntiWar404* as part of the 2010 Istanbul WebBiennial. As Deck states, AntiWar404 "catalogs the various anti-war initiatives that have gone offline since the rise of the Web in the 1990s (with) thousands of projects started in opposition to wars in Iraq, Yugoslavia, Afghanistan, and elsewhere. But these online media projects have tended to be unfunded and temporary."[13] The site catalogues these now absent sites in an elegiac move as a global gesture towards cyber-amnesia and the elision of memory in the age of Google. Deck's sensibility is also reflected in a 2010 interview with Alper Güngörmüşler, Deck reflects on his time as a teacher in Izmir in 2005-6 where the IT department of the university where he taught had banned articles from CNN because they contained the word "nude". The problem is, as Deck states, that "In understanding how people reconcile themselves with limitations of their freedom and awareness, you can go a long way towards understanding culture and ideology." This is not to say that the US does not censor certain sites, such as Wikileaks, but Deck's discourse seeks a comparative dialogue between cultures that shows the ideological terrain of any society through the examination of the disjunctures of what is allowed to be seen and what is unseen.

Another existential disjuncture experienced by cross-cultural artists is that of cultural mythologies, that is the mythology of the other that is brought into relief through the shock of the real. In Mark Slankard's *Toplu: Landscapes of New Turkish Suburbia,* he documents the emergence of the large-scale residencies of Toplu Konut, beginning in 2008[14]. Many of these sites are just placed upon empty fields on the outskirts of Istanbul, either in degrees of completion or as neat high-rise condominiums. He also contrasts this with gecekondu, or quickly built residencies constructed without permit on public land. The contrast of these sites is stark, and differs sharply from the mythological romantic landscape of palaces, mosques and ruins of Slankard's guidebooks.

The difference between the romanticized and the real is also illustrated in Patrick Lichty's panoramic series, *Modern Ruins*[15] captured through composite cellphone images on the Bodrum Peninsula. The sites illustrate construction that he infiltrated during the summer of 2010 which began "on speculation" and then lie fallow when potential buyers failed to materialize the sites. These include unbuilt apartment buildings, similar to Slankard, and hillside villas. These structures merely add to the barnacle-like encrustation of white structures on the idyllic peninsula. *Modern Ruins* Lichty's extant work with sub/urban sprawl and juxtaposes it with the idealized landscape of the Classical ruin. In the body of

work, there is also the 400 B.C. Bodrum Ampitheatre behind chain link fence contrasted against an abandoned contemporary spa, giving an abject read of the projected image of the romanticized ruin, and in part, correlating it to narratives of global millennial sprawls.

Conclusion

Upon engaging this topic, I realize that there are many more artists that could be included, and that many more dialogues could be engaged. The threads of inquiry discussed herein are only a few of a complex skein of interaction for which an entire thesis could be written. Furthermore I would like to be self-reflexive and problematize my propositions and artistic correlations as possibly being coincidental or merely results of the human condition. Ascribing commonalities to large sets of works using just the parameters of cross-cultural habitation runs the risk of conceptual colonization. However, I would like to argue that although heterogenous, I believe that there are effects of cross-habitation that have created certain discourses in these artists work, and reflect the cross-pollination between our cultures, however directly or indirectly. The cultural differences between Turkey and North America represent a degree of alterity to one another that the impact of the other and the translation of experience is a transformative one. In this essay, I have considered the issues of translation, alterity, identity, the notion of home, and mythology as touchstones on a much larger conversation of commonality and difference. Global society and recent economic and political situations events are bringing the US and Turkey closer together. As curators like Cameron and the artists in this essay explore the transcultural space between our two regions, this cultural exchange will not become only useful, but necessary. It is my hope that this exploration yields useful insights into the trans-art of the dialogue of US and Turkish cultures, and such a dialogue will grow and bear much more fruit.

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PHANTOM LIMBS: AFFECT AND IDENTIFICATION IN VIRTUAL PERFORMANCE

PATRICK LICHTY

In the concept of a "phantom limb", an amputee relates feeling, often pain, from the absent limb. But in the era of ubiquitous mediation (the fin de millennium), embodied expression itself has become a site of contestation. What can be said for the veracity of a mode of expression when the traditionally conceived distinctive qualities of that medium are removed? What happens to embodied art when the body is removed?

In the concept of a "phantom limb", an amputee relates feeling, often pain, from the absent limb. The process of amputation delineates the borderline of presence, the liminality of separation, the phantom effect the feeling for that lost presence. Performance art inscribes space with presence, with flesh, bone, and sinew; wasn't it supposed to be a final authentic site of immediacy and authenticity in art following the dematerialization of the object in contemporary art after Formalism in the 1960's? But in the era of ubiquitous mediation (the fin de millennium), embodied expression itself has become a site of contestation. The body had become the repository for direct expression in art with the coming of Performance Art. With the recontextualization of seminal works by Marina Abramovic with her *Seven Easy Pieces* [1] the meanings of the works as immediate, site-specific happenings became circumspect. This was further compounded by artists Eva and Franco Mattes, self-proclaimed "haters" of Performance Art, who remediated other seminal works, including those of Abramovic in the online virtual world Second Life. What can be said for the veracity of a mode of expression when the traditionally conceived distinctive qualities of that medium are removed? What happens to embodied art when the body is removed?

Virtual performance art should not function, but it does. The process of draining the site of performance through decontextualization then disembodiment should have destroyed the event of meaning. Where there was blood, there are now only pixels. Where there was presence, there is only the feel of a mouse in the hand. When the avatar shoots the other with a gun, we still flinch. What are the qualities left that connect us to the when avatar when we sever the flesh from embodied performance? I posit that there are three aspects to performance that remain after the virtualization/removal of the body in the creation of virtual performance. These are affect, desire, and mirroring/identification in relation to the avatar. These correspond to the prepersonal, productive and neurological identifications with the proxy. This presentation will explore a phenomenology of affect, desire and identification in the virtual and discuss the importance of these qualities as intrinsic criteria of synthetic performance.

1: Affect
Brian Massumi, in *Parables for the virtual: movement, affect, sensation* speaks extensively on the autonomy of affect. "Affect is the virtual as point of view"[2 Massumi, 35], he says, relating to his assertion that the virtual begins with the event that is too immediate to be perceived, and thus elicits that event's autonomy from the body. What is happening in the site of virtual performance is the precognitive conversation of "the simultaneous participation of the virtual in the actual and the actual in the virtual, as one arises from and returns to the other." The virtual as site of immediacy begins in the moment of the imperceptible, opening the synesthetic space of autonomy (from the body) while retaining the intensity of the moment. Affect implies, "a participation of the senses in each other: the measure of a living

thing's potential interactions is its ability to transform the effects of one sensory mode into those of an-other." Can we say that this potentiality is the precursor to emotion, to identify with the potential of a living thing's interaction with a mise en scene (through an avatar?) One axis of virtual performance's efficacy is the disconnection of affect from the body as eliciting of synesthetic effect, suggestion that affect may have more to do with action and intensity, perhaps evoking desire, which brings us to Deleuze.

2: Desire

Second Life is an online 3D multi user virtual environment, or MUVE, that owes its existence to the aggregate contributions of tens of thousands of online participants, who construct the buildings, socialize and perform in virtual space. In *Anti-Oedipus,* Deleuze and Guattari posit that desire is not to be linked with the gaze, or signification, but with production in the social field. The avatar represents, by its very existence, an evident desiring-machine that, through its production of virtual capital in the form of artifacts, buildings, codes, and interactions, manifests reality through the consummation of desire via material and social expression. As affect and its translation into the virtual is opened by the preperceptive moment, it is the unconscious and the libido that are the engine of desire. But in their text, their deconstruction of desire signals the aggregate Body without Organs that assemblages of desiring machines, which then represent, "the nonhuman sex, the molecular machinic elements, their arrangements and their syntheses, without which there would be neither a human sex specifically determined in the large aggregates, not a human sexuality capable of investing these aggregates" [3 Anti-Oedipus, p. 294] It is this nonhuman sexuality of the desiring-machine, the Krokerian "sex without secretions"[4] that then creates an effusive concrete production in the virtual. From this, we can say that the production of the aggregate world of Second Life is a desiring-production in the virtual socius that is product of the deanthropomorphized libido. As such, it begins with the birth of the avatar, manifests in the production of the virtual world, and is consummated in the performative gesture of everything from the cocktail party to execution of code to virtual (machinic) sex. Therefore performance art in Second Life could be said to be the production-manifestation of desire made manifest in the virtual. And to playfully quote the Arthur and Marilouise Kroker, "How could be otherwise?" It appears that the desires of the machinic mirror the body to some extent and this is the next subject of our discussion. 3: The Mirror Cortex

We have discussed the issues of the affective and desire, but I would like to return to idea of the phantom limb metaphor and the identification with identification with the avatar. As there are times when a person with phantom limb disorder can be soothed through seeing a limb be massaged, there are theories that humans empathize with human-like forms through neurological empathy, Neuroscientist VS Ramachandran has popularized neurobiological research of the existence of "Gandhi Neurons"[5] or what he calls the mirror cortex. These neurons are thought to be the basis of many aspects of human existence, such as empathy, learning, and culture. Mirror neurons fire in sympathy with the observation of another person's action. One thing that is ironic that Ramachandran uses the metaphor of watching a virtual reality simulation of the other person's actions, and this brief aside is the opening for our discussion. To put forth the idea that we identify, empathize and project action or touch through the engagement of the mirror neurons, and the idea that we simulate action and touch though projection though perception is very important. To do so explains empathy for the other in a performance space, but in our case, the projection of the self upon proxies such as dolls or avatars. Where this is shocking is when we consider Ramachandran's example of soothing phantom limb pain by massaging another's limb by proxy. What I propose is that neural identification through the mirror neurons is a fundamental cognitive act mitigates performance, and also translates to proxies and poppets. For the next section of this essay, we will look at examples of virtual performance that will attempt to illustrate aspects of affect, desire, and mirroring.

Sites of Engagement: Affect

Saveme OH [6] is a Dutch virtual artist who works in invective and narcissistic grandeur reminiscent of the New Media artist formerly known as NN, who often dominated listserv traffic on lists like Nettime and 7-11[7]. Her art, as mentioned before, consists largely of narcissistic excess through the coloniza-tion of the space around her, whether it involves declaring herself "President" of Second Life or impos-ing herself verbally or visually into situations, often getting her banned. In reaction to bans, Saveme's reaction is frequently to stage an outcry about censorship. Her strategy is a cross between "trolling" (disruptive aggravation) and tactical intervention, but her tactics inflame an immediate affective re-sponse. This is due to the fact that Saveme's visual appearance often dominates an entire screen through use of huge "worn" devices that create an optical disruption that open the door for her virtual psychodrama. What is most important here is that her domination of a milieu creates a synesthetic dis-juncture where than can be no other focus than her gesture and the potentiality of action, engaging af-fective reaction (albeit frequently negative).

Another group of artists that have elicited an affective immediacy in virtual spaces is that of the perfor-mance group Second Front. Founded in 2006, Second Front are a dispersed set of individuals ranging from San Francisco to London who engage in NeoDadaist/Fluxus-based interventions in Second Life. For a piece entitled "Wall-ker Art Center"[8] (or *Dancing About Architecture)*, Second Front appeared with huge cement walls, disrupting the visual field, where they engaged animations to gyrate the structures erratically in space, creating an architectural performance. The result was a disorientation for many on-lookers, as the ephemeral walls swung around, appearing to hit the avatars, but passing through them. An anecdotal report during the performance related that the experience was jarring to the point where they had to "teleport" out of the space because of the visceral reaction, reifying Massumi's asser-tion of translation of sensation in the affective. Both studies depend on the virtual as point of view and utilize the immediacy of the visual to create effects that translate into the visceral. This bodiless visceral reaction brings us to the site of desire.

Sites of Engagement: Desire

It could be said that using the Deleuzian model of desire, manifestation of being in Second Life is self-sufficient for the description of efficacy of the avataric desiring machine as engine of production or signi-fier of the libido. To expand from Deleuze, desiring-production is not making love to become one, or two, but thousands. The fecundity of the Body Without Organs, literally or semiologically, is to unchain the repressed libido in revolutionary fashions that the flesh can never attain. This unfettering of the Freudian unconscious takes place in two pieces, Eva and Franco Mattes *I Can't Find Myself Either*[9]*,* and various incarnations of avatar Vaneeesa Blaylock's installations. In the first of these two, as part of their *Synthetic Performances* they suggest that the infinite gesture of becoming is to stay at home and play video games, like Second Life. In this piece, a bed with embedded sexual animations for is activated in the performance space. Eva and Franco's avatars gyrate on the bed, and soon other avatars join in the cyber-orgy. Soon the bed is packed, and the avataric bodies obscure one another to the point where the piece's name comes into play. No one can find themselves, but there they are. And, the gesture of the Body Without Organs on screen belie that the avatar is no one and yet everyone, the production of a null body implies the birth of all possible bodies in the virtual.

Another artist who explores the multiplicity of production in virtual space is that of Vaneesa Blaylock, whose name closely mimics that of performance installation artist Vaneeessa Beecroft. Her motto is that she is an individual, and so is she, suggesting a self-reflexive stance about her multiplicity. Much like Beecroft's installations of nude bodies in gallery spaces, Blaylock stages arrays of nude avatars in space under some sort of framing mechanism, Various pieces[10] explore general topics of identity and

cloning, the average parameters of avatars in Second Life, "the girl next door", and replication of form as production of desire. In each installation, Blaylock arranges the avatars as manifest desiring machines in the unfettered frame of the virtual, inferring that her production is but a sample of infinite permutations and endless emanation. The nude avatar, as signifier of basic sexual desire is here emptied and used as a proxy, a placeholder for our own projections of desire, but since they have been machinized and dehumanized, they stand for an infinite space of nullified machinic desire, and infinite fecund potential, potential being essential for affect. Vaneeesa's installations also engage the doppelganging the body in configurations like Beecroft's, which takes us to the idea of Mirroring.

Sites of Engagement: Mirror
Macarthur Foundation Director of Connie Yowell said at the 2007 Second Life Community Conference that the first move into the virtual is recreation of the real, called orienteering. Performance artists like Scott Kildall, and again, Eva and Franco Mattes have done "remediations", or restaging of classic performance art pieces. In Kildall's *Paradise Ahead* series of recreations[10] include Chris Burden's Shoot, in which he allowed himself to be shot in the arm in the gallery, or Yoko Ono's *Cut Piece*, in which she allowed her dress to be cut away a piece at a time. But these are not merely recreations, but empathic mirrors of the gallery, as Ramachandran might argue that we will still feel as Kildall's avatar fires the virtual rifle, there is a still a flinch when the other avatar is hit. This is not mere signification, if neurological mirroring applies to proxies of the body, then our feeling for the virtual phantom limb of the avatar is real.

The eponymously named AM Radio recreates pathos in the recreation of a trompe l'oeil of David's Death of Marat[11]. The original, which depicts the radical French journalist Jean Paul Marat dead in his bath after being murdered by Charlotte Corday is recreated sans the body of Marat, upon which the visitor clicks oupon the bath, and their avatar fills that position. Therefore the projection through the avatar is further extended into the David painting, specifically into the position of Marat. Here the interactor becomes the subject of, as Baudelaire mentioned, David's "drama… vivid in its pitiful horror". This scene 's abjection and the user's requirement is not isolated; its requirement to participate affectively projects the self into that horror and peace concisely.

Site of Engagement: Affect/Desire/Mirror
Although we have examined sites of engagement that have dealt with the unfolding of Massumian affect into the profusion of virtual desire to the projective identification of the mirror, there are many virtual works that address any and or all of these modes of engagement. Micha Cardenas and Elle Mehrand's *Technesexual*[12] performance engage all three loci of this discussion. *Technesexual* involves the two engaging in erotic acts in a physical space while equipped with biometric sensors. The output from these sensors is fed into Second Life through an interface using the programming language Pure Data, which is reflected in actions by their avatars in Second Life, which are projected in the performance space. As Cardenas and Mehrand play on stage, they engage the immediacy of the body and the affective lag of translation into Second Life, virtualizing their acts. Their unleashing of the libido into the machinic body creates a manifestation of desire-production in the virtual through gesture and translation of the physical into the virtual and the transmission of that experience to the online participants. And lastly, their doubled bodies, both in world and in the performance spaces powerfully create the projective connection between the two, and the connection of virtual space. Perhaps the introduction of live bodies into the milieu either negates or amplifies the argument for performance in the virtual, but from this author's perspective, *Technesexual*appears to consummate (metaphorically and literally), affect, desire, and projective identification, and is the pinnacle of the elements of our conversation.

Denouement
In this essay, I have sought to construct an argument for the understanding of affective engagement in the genre of virtual performance through the thought of Massumi, Deleuze & Guattari and Ramachandran as played out through the work of many artists. This is not to say that there not other artists who also fit this discussion, like Joseph DeLappe's Gandhi project[13] and Stephanie Rothenberg's work in virtual labor[14] and Elif Ayiter, Selavy Oh, and Max Moswitzer's collaborations in virtual textuality with Roy Ascott[15]. The choice of works in this essay are merely a brief archipelago designed to create an epistemic arc to explore the visceral connection to the virtual. There are far more examples to me touched on, and this presentation is designed as the opening note of an ongling conversation regarding virtual performance.

Conclusion:
By all rights, we should not care about virtual performance as performance art is intrinsically tied to the body as last bastion of creative authenticity. Upon severance of the flesh from the performative gesture, it would make sense that our affective relation for the virtual body should cease. But our phenomenology of virtual performance through affect, desire, and projection suggests otherwise; virtual action creates real responses. In this text, I have sought to explore the role of affect, desire and mirroring-identification with the avatar as evident site of engagement. Although the case for virtual performance's connection to the flesh through our desires, projections, and empathies, it is easy to hold these forms circumspect. Is virtual performance new enough that it constitutes a nostalgia for the flesh, and echoes of the body as phantom limb, or merely grown up poppet play? One could argue that this genre is a fetish for performative dollplay, but regardless, virtual performance contains a combination of echoes of the real and real affective response. This is seen from phenomenology to prepersonal cognition to neurology. Our affect for the avatar exists, and it appears to be acculturated and hardwired into our beings. But as genres such as MMO's and virtual environments like Second Life continue to mature, it will be curious as to whether virtual performance will be a momentary affectation or an emergent genre that merely reflects the virtual as a primary mode of human existence.

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ENVELLA: MAKING SPACE PERSONAL

Henry Lin

The paper describes enVella, a kinetic dress that moves when triggered by the detection of the wearer's fear or anxiety. The aim of this project was to investigate the detection of fear with biosensors, and to see whether an enveloping physical transformation can provide a sense of comfort to the wearer.

enVella open and close comparison, 2010, Mark Coleman, Emily Ip, Henry Lin, Alice Ling, Laurence Man, photographic media, Copyright 2010 Henry Lin.

INTRODUCTION

enVella is a kinetic dress which moves when triggered by the detection of the wearer's fear or anxiety. The upper portion of the dress is encircled with fans, which open and envelop the wearer if her body temperature and heart rate are both rising. The aim of this project was to investigate the detection of fear with biosensors, and to see whether an enveloping physical transformation can provide a sense of comfort to the wearer. The paper will begin with the inspiration behind enVella, discuss its design, and conclude with the technical aspects of the project.

INSPIRATION

enVella draws inspiration from the natural world specifically with regards to animals' reactions to fear and the idea of engendering feelings of safety in human beings. An experience everyone has in common is that of being in a mother's womb. In a warm, enveloped space, one feels safe, warm and protected as if one was inside the mother's womb. [3] Despite not offering any real protection, we instinctively huddle under a blanket when frightened.

enVella's motion was inspired by the frill-necked lizard which is capable of erecting a normally-concealed frill from around its neck. This physical transformation makes the lizard appear larger than it is, and so a less appealing prey. [4] By merging this reptilian defense mechanism and the soothing of envelopment, the hope was that this combination would produce a comforting psychological reaction in the wearer during anxious moments.

DESIGN

In an attempt to recreate the sensation of being enveloped inside the mother's womb and implementing the frilled-neck lizard's self-defense behaviour of increasing in size towards wearable technology, this adventurous application explores the concept of embodiment where the dress and wearer engages in a symbiotic relationship. In order for enVella to achieve it's full potential, the dress must be worn for it to react accordingly with the wearer's emotional state. Without a pulse, the dress cannot achieve its full potential and without the dress, the wearer will not be able to experience the safety, comfort and protection provided by enVella.

enVella is designed on a white cotton dress attached with four servo-controlled fans. Each fan is constructed of satin fabric folded in half multiple times, and held in place by heavy duty double- sided fusible interfacing. Wooden supports were added onto the ends of each fan to provide motor and anchor support. At the base of each fan, a servo attachment was glued. The fans are triggered by a combination of the two sensor inputs: a heart rate monitor and a temperature sensor. If the wearer's current heart rate and temperature is greater than a predefined average heart rate and body temperature, the fans will open – beginning at the chest then around the neck in a sequential manner (Fig 1). With the fans in their opened form, heart rate and temperature data continue to be relayed from the sensors to the microcontroller. If both heart rate and temperature return to normal after 20 seconds, the fans will close.

The core element of enVella was inspired by animals with distinctive self defense reactions such as the frilled-neck lizard. Through user studies, few design forms were determined as most effective at enveloping the wearer and embodying the idea of comfort and warmth. The four fans were strategically placed and programmed to optimize the enveloping experience. When a state of anxiety or fear is detected by the microcontroller, the fans will open in smooth succession. Because enVella is a dress designed to comfort the wearer, the decision to have the fans open was to create a sense of division between the wearer and the frightening, threatening entity. This invisible wall creates a psychological barrier between the two and thus alleviating some of the resultant fear. A gradual enclosure of the space around the wearer's visual field, rather than a sudden one, adds to the comforting quality of the motion. Whereas if the fans were to open rapidly, it would have an opposite effect on our intention of comforting the wearer.

TECHNICAL

Among the technical challenges present in enVella, detecting and identifying fear was the most difficult to justify through biosensors. One challenge was to find a suitable solution to distinguish fear from other strong emotions like anxiety and anger. Fear is generally differentiated from anxiety by the perception of a specific external threat. However, for our purposes, it was not possible to distinguish one from the other as anxiety and fear have almost identical physiological symptoms. Typical physiological responses to fear and anxiety elevated heart rate, increased sweating, and increased blood pressure. Both the input of heart rate and body temperature were chosen for the purpose of this project, as an indication to measure state of fear. Various heart rate monitor circuits have been developed with Arduino using different methods but the majority of implementations use the Polar RMCM01 Heart Rate module. The Polar Heart Rate Monitor Interface (HRMI) was selected given the added difficulty of working with the bare module. The multiple interfaces available in this new module make it very stable, flexible and easy to work with.

CONCLUSION

enVella project designers witness the success of the dress and how it achieves envelopment through the natural motion of fans. User feedbacks have been positive, with the majority stating they found the enveloping effect comforting. A few participants raised possible issues with the feasibility of a cloth dress offering sufficient protection, and concerns over providing comfort without actual protection. Participants also mentioned possible discomfort and unease that may arise from users who are claustrophobic. Through academic research, the team on designs inspired by nature and explored various forms before finalizing on fans to create temporary personal space. enVella is not only a dress but is also a concept to assess the research question of creating personal space in a state of fear.

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CREATIVE ZEN LEARNING SPACE AND COMMUNITY

JIUN-SHIAN LIN, CHI-HUNG TSAI, SU-CHU HSU, CHIA-WEN CHEN & YU-HSIUNG HUANG

We describe a creative Zen learning space built on interactive technology, digital art, and installation art, including three parts "zen_Sit," "zen_Move," and "zen_Circle." It allows any place, any time, ubiquitous Zen – with mindfulness and meditation exercises for concentration, sitting meditation, and walking meditation. It supports the beginning of a digitally-enhanced Zen community.

PREVIOUS WORK

As mentioned above, interactive multimedia technology has been used widely in a variety of artistic, educational, entertainment, and industrial applications. (Space limitations prevent us from giving a full survey.) Particularly important for developing our work have been the technologies of chat rooms, smart phones, and wireless sensor networks.

- Chat rooms: Our creative interactive meditation space uses chat rooms as a simple solution to scalability and mobility issues in zen_Move. Chat rooms are fairly widespread across the Internet and serve a broad range of entertainment and information dispersal applications. Some exemplary application fields are defense; [1] entertainment; [2] and educational study assistance. [3] Below, we show how we used chat room technology to create a communication mechanism across a sequence of computers in the zen_Move meditation environment.
- Smart phone remote control: Our creative interactive meditation space uses smart phones as both remote control devices and to present interfaces supporting "meditation anytime and anywhere" in zen_Move. Control applications using cellular telephones have become widespread, through ad hoc Bluetooth networking, [4] and as remote controls for a variety of appliances. [5]
- Wireless sensor networks: Wireless sensor networks (WSNs) have been widely deployed in a variety of applications including national defense, health care, environmental monitoring, industrial control, etc., [6,7] but only rarely have found use in fine arts. A major exception is Intelligent Interactive Museum [8] which used ZigBee wireless sensor networks, interactive technology, and content management systems to create a museum environment which dynamically adjusted content according to participants' gender and age. We used WSN technology in zen_Circle and zen_Sit.
Two notable applications of multimedia technology to support meditation are:
- The 2003 installation *ZENetic* Computer created by Japanese researchers Naoko Tosa and Seigow Matsuokam. *ZENetic* Computer transformed traditional meditation content into multimedia to teach meditation practices and guide participants to feel and learn meditation through computer systems. [9]
- *AltarNation* created by US artists Michelle Hlubinka and Jennifer Beaudin in the wake of the 9/11 terrorist attacks. The community created a multimedia prayer room in each member's home and networked them together. Members could share thoughts and emotions with other remote members and console each other by lighting memorial candles, praying, etc. [10]

In contrast to the above systems, our environments teach mindfulness exercises via interactive meditation environments with a focus on walking meditation; with the ultimate goal of helping participants approach the ideal of treating every moment as a meditative moment.

ZEN_MOVE

zen_Move is an interactive installation environment installed along a corridor at DDBC that allows participants to use ten touch-screen computers to engage in a mindfulness exercise. As Fig. 1 shows, zen_Move is public installation deployed in a linear design with visual effect. As participants move from screen to screen to follow the exercise, they are encouraged to pause and practice mindfulness exercises.

SYSTEM AND INTERACTION SCENARIO

zen_Move uses a long wooden box embedded with ten touch screen computers, wireless network cards and a cover permitting ventilation and access for maintenance. Using a chat room as a tool to support scalability and mobility, we have built a smart-phone version of the application that can be exercised in any location, but further, it remotely triggers the installation.

Participants attempt to move a "Zen ball" (the red dot) along the basic line showed in Fig. 2. The Zen ball is surrounded by a traditional calligraphic Zen symbol representing emptiness – a circle which is the touch sensing area. The participant interacts with the Zen ball using a finger. This involves a careful exercise in which the participant must guide the Zen ball with a finger along a base line at a uniform rate without deviating from the line. After extensive experimentation, we set a time limit for movement on a single screen at 25 seconds. We calculate a focus index (using a function determined by statistical analysis and experimentation) from the horizontal movement along the baseline and any vertical offset from the baseline. The focus index shows how smoothly and accurately the participants manipulate the Zen ball. Depending on the focus index the participant can move the Zen ball (red dot), the dot will "jump" to one or more screens.

- The basic mode involves dragging the Zen ball (red dot) along the base line within 25 seconds. The focus index is calculated and the ball is advanced to another screen based on that focus index. The exercises ends when the participant reaches the tenth screen; when this happens, a traditional low Buddhist chime sound is generated, acting as a reminder to the participant and to all in the area about mindfulness. Because posture, smooth movement, and careful attention are required to succeed in the basic mode of zen_Move, participants find that it heightens mindfulness.
- The mobile mode extends the basic mode so that a participant can practice the mindfulness exercise anywhere using a smart phone. The smart phone acts as a remote control displaying a single screen of the full installation at DDBC (which reacts in real-time) to the exercises being driven by the remote user. As observers see the Zen ball moving without any participant at the installation, they can infer that someone is performing the mindfulness exercise remotely. Fig. 3 shows a participant using the mobile mode.

ZEN_CIRCLE

zen_Circle is an interactive installation environment that uses wireless sensor networks to help guide participants as they engage in various types of walking meditation exercises on a large outdoor mandala fashioned in the shape of two embedded spirals. Fig. 4 shows this zen_Circle; the installation environment plays natural sounds and brahma music to give feedback to participants as they engage in walking

meditation. zen_Circle encourages participants to take time to walk and to integrate meditative prac-
tices actively in their everyday movements. zen_Circle is public art deployed in a circle shape design with
audio feedback to guide participants.

zen_Circle permits several types of meditation known as walking meditation, and uses wireless sensor
network technology to support interactive feedback. The zen_Circle interactive installation environment
encourages participants to take time to walk and think (or meditate) in face of a busy life. We believe
that this practice will encourage people to adjust the pace of their life, to relax in movement, and expe-
rience the benefits of this form of dynamic Zen.

WALKING MEDITATION

To understand zen_Circle, it is helpful to have a little background on walking meditation. While sitting
meditation is perhaps the most respected form of Zen meditation, ordinary circumstances often make it
difficult; and walking meditation is an alternative. The theory behind this type of meditation is that
movement can help stimulate insights and a meditative state.

Two types of walking meditation are supported by zen_Circle. One type is *jingxing*. This type of medita-
tion uses slow walking with specific posture suggestions.

A second type of walking meditation is *paoxiang* – this is a composite form of meditation that in-
cludes *jingxing*. Paoxiang, which literally means "walking incense," is a group exercise – several monks,
nuns, or lay people will walk in carefully coordinated sequence. Each participant must pay close atten-
tion to his or her movements at all times to avoid running into the person ahead, or creating a barrier
for the person behind. Walking is divided into different phases – a slow walking phase (*jingxing*), a fast
walking phase, and pausing phase. In classical technique, a meditation master guides the group by
shouting out the different phases; in zen_Circle, signaling is given using sounds played on wireless sen-
sor nodes attached to speakers.

SYSTEM AND INTERACTION SCENARIO

zen_Circle uses a double spiral laid out in the fashion of a large mandala (a traditional meditation tool
associated with several forms of Buddhism and other Eastern religions) with five sensor nodes as shown
in Fig. 4. In Buddhist thought, a mandala shows the cosmology of time and space. The zen_Circle interac-
tive installation environment supports two modes. A simple switch in the control node shifts between
basic jingxing and advanced paoxiang modes in the control node.

- *Jingxing* is the basic mode and supports a single participant. As the client sensor nodes detect that a par-
ticipant is passing, they play sounds. The first sensor plays bird song, corresponding to the Buddhist "air"
element. The second sensor plays the rustling sound of dry leaves, corresponding to the Buddhist
"earth" element. The fourth sensor plays insect sounds, corresponding to the Buddhist "fire" element.
The fifth sensor plays the sound of rushing water, corresponding to the Buddhist "water" element. The
third sensor node has a special role, corresponding to the Buddhist "emptiness" element. The partici-
pant is directed to pause and meditate when he or she reaches the center. If the participant's medita-
tion lasts longer than ten seconds, all the nodes receive a signal from the control node, and all the nodes
play synchronized brahma music for as long as the participant remains at the center of the installation.

Paoxiang is an advanced mode for participants who have extensive walking meditation experience. This mode is designed for multiple participants, who walk in synchronized fashion, focusing their mindfulness on their movements. To achieve synchronized movement (and avoid collisions) careful attention is required. In this mode, the first, second, fourth, and fifth nodes each play natural sounds for ten seconds when they are activated – if they are reactivated while the sound is playing they continue playing and reset their clocks to zero as they count to ten seconds. The characteristic *paoxiang* movements (rapid walking, *jingxing* slow walking, and pausing) are controlled by the third node, which generates the different control sounds randomly for random durations.

Paoxiang meditation in general, and particularly *paoxiang* in zen_Circle, teaches a form of unity of thought, since the actions of each participant reflect on the ability of the group to successfully complete the meditation exercise.

ZEN_SIT

zen_Sit is an interactive installation environment built in inside a room that includes extensive wireless sensor technology to monitor posture of participants through pressure sensors embedded in the meditation cushions used by the participants in sitting meditation. Fig. 5 shows zen_Sit. Information recorded by zen_Sit is displayed in a ceiling display that shows meditators with stable, even posture using a large circular rippling wave. The Zen master leading a sitting meditation session can thus immediately diagnose any meditators who lack good posture. All the status data are stored in sitting meditation database. Alternatively, the information can later be used to analyze various states in long meditation sessions.

SYSTEM AND INTERACTION SCENARIO

We use several pressure sensors embedded in the meditation cushion. We also integrated low-power wireless technology (Zigbee) to transmit pressure values from the cushion to the coordinator (a personal computer), forming a wireless sensor network. The coordinator processes input data from Zen meditation cushion and performs real-time statistical analysis on it to calculate a mindfulness index. The mindfulness index is visualized as a ripple flash animation projected on the ceiling. A more active ripple indicates a meditator for whom the pressure sensors indicate a deeper or more effective state of meditation. This allows the Zen master to easily monitor the status of the individual meditator participants. We also develop a database for zen_Sit to record each participant's Zen meditation level showed in Fig. 6. Through the interface of the Zen database, both teacher and participant can check the participant's practice history and meditation levels.

ZEN COMMUNITY

In addition to these interactive installation environments, we are currently building several others. There are more and more people immersed in our creative Zen learning space. The system gradually and naturally forms a meditation community. We have used our systems to collect a wide variety of data through our existing installations. Researchers at DDBC are interested in the possibility of collecting and using data to investigate physiological and behavioral aspects of meditation practices. While previous studies have been dealt with sitting meditation practices, less data is available for dynamic meditation, such as walking meditation. Since our data is collected by sensors in a natural fashion, in the course of

the ordinary operation of our interactive installation environments, it could be especially useful for study.

Zen is not a mystical religious activity but an efficient method of improving human physical and mental health. People can do Zen exercises easily in their daily life. Be inspired by the idea of carbon footprint from environmentalism, we propose the concept of "Zen footprint": an index which describes the amount of Zen exercise to maintain peaceful minds. People who have a higher Zen footprint index are likely to have more peaceful minds. In zen_Move we will add up the total number of steps to calculate the Zen footprint. Similarly, in *jinxing* mode in zen_Circle we add up the total number of minutes that participants pause and think in the central node; in *paoxiang* mode, we collect the total number of the circles of the participants walking in the mode; in zen_Sit, we collect the total number of minutes that participants sitting with meditationpractice.

In the future, we will integrate the smart phone system , the interactive installations and Google Map to build a Zen map to show the footprint in different places. Zen maps will offer real-time feedback that adds a geographic dimension to web e-learning systems.

CONCLUSION

This paper makes a number of novel contributions:

- It describes our creative interactive meditation space which is also an intelligent, invisible, informative and interactive space.
- It uses technology to motivate participants to engage in "ubiquitous Zen" where people can engage in walking meditation at any time in a wide variety of circumstances.
- It presents the conceptual design of these interactive installation environments, together with a discussion of how interactive multimedia can (somewhat paradoxically) engage participants in meditative and mindfulness practices.
- It includes a discussion of the actual building of these interactive installation environments. These environments are not merely conceptual designs or prototypes, but real, working systems that are actively used every day.
- It includes a discussion of the real-world engineering issues faced in supporting mobility and scalability in these interactive installation environments.

In contrast to many interactive multimedia systems, we have found that the environments comprising our creative interactive meditation space actually decrease distraction and help their participants relax and make achievements in mindfulness and relaxation. The installations also act to help suggest to participants that Zen practice is available at any time, any place. The zen_Move interactive installation environment is always available for one to pause and engage in a mindfulness exercise even through the smart phone interface. The zen_Circle interactive installation environment acts as a reminder that meditation can be integrated with one's movements – even as part of one's daily walks. The zen_Sit environment provides real-time feedback for sitting meditation allowing a Zen master to more effective guide the meditator participants. We also hope to realize the concept of Ubiquitous Zen in a variety of cultural contexts and to support mind-brain cultivation.

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EMBODIED SCHEMAS FOR CROSS-MODAL MAPPING IN THE DESIGN OF GESTURAL CONTROLLERS

Mark Linnane, Linda Doyle & Dermot Furlong

A conceptual framework for the design of intuitive gestural controllers for timbre manipulation from an Embodied Cognition perspective is proposed. This framework incorporates corporeal mimesis, affective/kinaesthetic dynamics, image schematic and conceptual metaphoric organization in order to speculate on possibilities in the design of mapping schemes between interface and synthesis algorithm.

Introduction

In contrast to traditional musical instruments, digital interfaces introduce an "arbitrary" component by encoding physical gesture as an electronic signal. This arbitrary component interrupts the natural, 'felt' sense of the interaction between performer and instrument and necessitates the introduction of control metaphors and mapping schemes that are not necessarily readily intelligible for non-technical users.

This paper focuses on the design of interfaces for the control of synthesized timbre. Several mapping strategies for control of synthesis have been proposed. However, it has been noted that empirical investigation of the "natural tendencies for multimodal mapping" is required in order to elaborate a generalizable set of cross-modal mappings. [1] We propose that the design of transparent, intuitive interfaces for timbre manipulation can be grounded in empirical analysis and subsequent artistic practice-based research focussed on cross-modal correlations between the user's embodied experience and a timbral perceptual domain. Gestural control is suggested as an appropriate paradigm in this context because it offers the possibility of affording intuitive control of sound via an intermediate 'embodied' mapping scheme based on 'embodied' characterizations of timbre and gesture.

Embodied Cognition offers a promising conceptual basis for this research. We suggest that structures common to cognition, multimodal perception and physical gesture can be identified. These correlations may then form the basis of a generalizable set of cross-modal mappings to be incorporated in the design of a gestural controller for timbral manipulation. This paper is a speculative outline of some possibilities for the application of embodied cognition in the design of gestural controllers for timbre manipulation.

Embodied Cognition

BACKGROUND

Embodied Cognition is an emerging research strand in a number of different disciplines that posits embodiment as profoundly constitutive of cognition. In general, Embodied Cognition analyses support the view of cognitive processes as creative, figurative actsstructured by the teleological interactions of embodied agents with their environments and cultures rather than as largely passive processes of repre-

sentation and calculation. [2] A central claim of Embodied Cognition is that cognition and action are inextricably linked in lived experience. [3] Significantly, studies suggest that the specific structures of an organisms perceptual apparatus contribute to a structuring of all cognitive processes, not just those specifically recruited in perception.

Embodied Cognition analyses reveal a number of common primal structures and processes in cognition. These are learned via the common human experience of having a physical body and interacting in physical and cultural environments. Affective/kinaesthetic dynamics, Sensorimotor Mimesis, Image Schemata and Conceptual Blending have been identified for empirical analysis in this study. Essentially, the research question here is, for example, are Image Schemata activated by judgments of timbral quality and by gesture production and recognition? Can such schema be reliably demonstrated empirically? If so, what correlations exist, if any, between schema activated by timbre and those activated by gesture?

IMAGE SCHEMATA

Image schemata are basic features in cognitive processing acquired in early childhood development. They are based on basic dynamic embodied patterns and they give structure to more abstract conceptual processes. They are non-propositional, pre-conceptual structures that have a role in organising mental representations into coherent, meaningful units. They have a basic logic and are implicated in the formation of new concepts. Significantly for this study, they are focussed on perceptual interactions, and bodily and linguistic experience in social and historical contexts and they are inherently meaningful because of this embodied grounding. They are neurally encoded. [4]

The following are three simple examples of Image Schemata. The Link Schema is a simple physical or metaphorical structure whereby one object is linked to, and constrained by, another according to a basic symmetrical logic. Examples are the concept of a causal "connection", or the physical act of connecting a laptop to its power source. The Container Schema has an Interior-Boundary-Exterior structure. It is based on the bodily experience of being a container and of being contained by something. The basic logic is that of the mutual exclusivity of interior and exterior and the necessity of being in one state or the other. The Source-Path-Goal Schema is based on bodily experiences such as throwing a ball. Other examples of Image Schemata as suggested by Johnson [5] are part-whole, centre-periphery, link, cycle, interaction, contact, pushing, balance, near-far, front-back and above-below.

An analysis of concepts of physical relation in the sentence, 'The book is on the desk' [3] illustrates the general form in which Image Schemata are implicated in the construction of meaning in linguistic expressions. Meaning here emerges by virtue of the fact that the Image Schemata activated by the linguistic expression are derived from a composite of neurally encoded embodied experiences such as being above, being in contact with, supporting, and so on. These experiences activate specific schemata which give meaning to the word 'on' in this expression. The experience of being 'above' yields an orientational schema; 'contact' yields a topological schema; and 'support', a force-dynamic schema. An important aspect of this process is that meaning does not arise through some kind of correlation between concept and objective 'fact', or by correlation of symbol and referent, but through a composite of activated schemata.

It is significant that several of these schemata have a structural identity with gestures or gestural components (e.g. source-path-goal schema, centre-periphery, above-below, pushing etc.). Johnson also presents analysis of image schemata across visual, kinesthetic and auditory modalities. [5] Image Schemata,

therefore, may offer a means of organizing gestural analysis in terms of the embodied structures of perception in other modalities.

CONCEPTUAL BLENDING

Lakoff and Johnson [6] argue that there are no literal definitions, only trans-domain mappings via metaphor. New concepts or categories are formed via the conceptual blending or mapping of a set of schemata from one domain to a target domain. For example, conceptual blending based on the Source-Path-Goal Schema yields complex causal patterns, such as that of ice changing state as it melts. Metaphorical conceptualization is, therefore, significantly constitutive of all thought. It is systematic, fundamental to language and thought and embodied. Such conceptual blends are implicated in cross-modal correlations such as judgments of timbre as being, for example, rounded, harsh, warm, heavy etc. It is important to note that gesture is fully characterizable within the framework of conceptual metaphoric mappings across modalities. [7]

SENSORIMOTOR MIMESIS

Sensorimotor Mimesis is any of several means by which humans imitate, consciously or unconsciously, covertly or overtly, an environmental or social stimulus. It is a crucial process in the psychological development of infants. It is often co-activated with other behaviors such as speaking, listening to music and working out logical problems. Mimesis is particularly significant because it is appears to be implicated in cognitive tasks such as understanding and in affective responses to stimuli. In particular, vocal mimesis seems to be an important part of the music listening experience. People have the tendency to move in sympathy with music and, it appears, that this behavior is fundamentally constitutive of our understanding of, and affective response to music.

AFFECTIVE/KINAESTHETIC DYNAMICS

There is a formal congruency between motion and emotion. The felt quality of emotion is grounded in demonstrable dynamic patterns of physical expression. This is a reciprocal dynamic, emotions are shaped by motor attitudes, just as physical movement expresses emotion. Empirical studies by Bull [8] demonstrate the inability of subjects to experience particular emotions while adopting postural attitudes considered to be antithetical. Emotional expression is a kinetic phenomenon that has spatiality, temporality, intensity, and manner of execution. Phenomenological bracketing has been used to elucidate the dynamic structure underlying these forms. *Tensional* quality is mediated by the felt effort of postural attitude. *Linear* quality is directional contour of movement. *Amplitudinal* quality is the amount of extensiveness or constrictiveness of a posture. *Projectional* quality is the manner is which energy is released.

Sensorimotor Mimesis, considered along with Affective/Kinaesthetic Dynamics give us a theoretical framework within which analyse corporeal responses to stimuli. Mimetic responses to music are, seemingly, of a piece with our affective, aesthetic response. Affective/Kinaesthetic dynamics offer a structure whereby affective response can be assessed.

Hypothesis: Embodied Schemas for Gestural Manipulation of Timbre

In light of the above, we suggest that responses to timbre stimuli may be characterized as mediated by corporeal mimetic engagement according to affective/kinaesthetic dynamic structures. Timbres 'feel' a certain way due to this corporeal engagement. We further suggest that judgments of difference or similarity between timbres is mediated by an Image Schematic/Metaphoric structuring of differing corporeal attitudes. We suggest that such mapping processes mediate meaningful 'navigation' of timbre space via physical gesture. This view is supported by the observation that natural linguistic descriptions of timbre tend to emphasize embodied, cross-modal mappings through the use of multi-modal, embodied descriptors.

We suggest that empirical analysis may show that identical Image Schemata are activated by motor, visual and auditory stimulation. Substantial trends in cross-modal association have already been demonstrated. [9] We speculate that common cognitive structures may be shown to account for these correlations and to account for the tendency to describe sound in terms of weight, force, speed, intensity, emotion, spatial position and orientation, containedness, gravity, density, amplitude, colour, order, chaos etc. Essentially, we maintain that identical Image Schemata structure perception across modalities, thus allowing for perceptions of close correlation between certain gestures or shapes for example and certain timbres.

Such correlations would present a grounded basis for mapping schemes in gestural interfaces for sound synthesis. We propose that an empirical study of gesture performance and timbre perception that attempts to find the basis for cross-modal mappings between each is the first step in the design of these mappings for synthesis interfaces.

Design Approach

We propose empirical analysis and subsequent artistic practice-based research in order to elucidate cross-modal patterns. Study 1 will take the form of a preliminary subjective study designed to assess Image Schema activation in listeners in response to audio presentations of synthesized timbres and also, to assess the methodology with a view to later tests. The intent here is to assess the viability of a methodology which assumes that the perception of timbre difference is structured according to Image Schematic principles. Some of the following schema will form the test set; Path, Source-Path-Goal, Center-Periphery, Compulsion, Attraction, Link, Scale, Equilibrium, Full-Empty, Near-Far, Mass-Count, Iteration, Above/Below, Vertical Orientation, Length (extended trajector), Rough-smooth/Bumpy-smooth.

Subjects will be presented with a set of synthesized timbres. These will be designed to include examples of pitched tones, percussive tones, instrument models and novel timbres. Each timbre example will be presented in pairs, once in an unmodified fashion then with one modification. Timbres will be modified in terms of some of the well-established factors known to be involved in timbre e.g. spectral envelope, harmonicity, spectral centroid, attack and decay envelopes.

A number of methods for assessing Image Schema activation are currently being considered. Subjects may be asked to supply linguistic descriptions of the presentations. The descriptions will be constrained to a limited set of options or to a defined metric and chosen in a an onscreen interface. Subjects may also be asked to select the most appropriate graphical representation of an Image Schematic structure that describes the relationship between pairs of presented timbres. Synthesis will be implemented in

Max/MSP as will the user interface and response data collection system. Data will be subjected to statistical analysis in order to identify trends, if any, in subject response.

Study 2 will incorporate gesture capture via inertial sensors and a pair of sensor-enabled gloves. These sensors will enable the tracking of the relative position of the arms and the amount of contraction/expansion in the arms. Subjects will asked to adopt whatever gesture or gestures they feel are appropriate responses to timbre stimuli as presented in the pilot study. Subjects will also be asked to perform gestures in response to linguistic and pictorial presentations of image schema as detailed above. This test will yield some measure of the corporeal mimetic response to timbre presentations in that it will provide some data on the Linear, Amplitudinal and Projectional qualities of the affective/kinaesthetic response. It will also establish whether it is plausible to assess schema activation in gesture production.

Study 3 will be a test of prototype mappings. If Tests 1 and 2 yield clear data, then there may be correlations between kinaesthetic and schematic activations in the case of both timbre and gesture that can form the basis of the design of systems in a phase of artistic practice-based tests focussing on art installation and music performance contexts.

Conclusion

Embodied Cognition is an area of cognitive science that focusses on perception, cognition and action as profoundly shaped by the human experience of having a body and living in a physical environment and in a culture. It suggests an alternative approach that complements current initiatives in the design of interactive technologies and gestural controllers. Embodied Cognition offers a novel way to analyse the complex interactions between user and technology in terms of the fundamental categories of embodied existence. These categories are involved in organizing perceptual phenomena into coherent, meaningful units and are implicated in the formation of new concepts. In turn, the design of meaningful controllers depends upon empirical knowledge of the fundamental categories whereby human beings interact with and understand their environment. In using these structures as a conceptual basis, it may be possible to identify correlations between gesture and phenomena, such as timbre, in other modalities. Such correlations are the necessary building blocks of a grounded cross-modal mapping schema on which to base the design of controllers that allow for meaningful gestural interaction with sound.

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SECURE INSECURITY - PATTERNS OF TERROR

Robert B. Lisek

Is there a common structure of modern wars, which remains constant in the various wars? What is the relationship between terrorism, modern war and globalization? What is the order of war and terrorist attacks? There are common and predictable patterns to the way in which people are making a war, which go beyond the specific time and place.
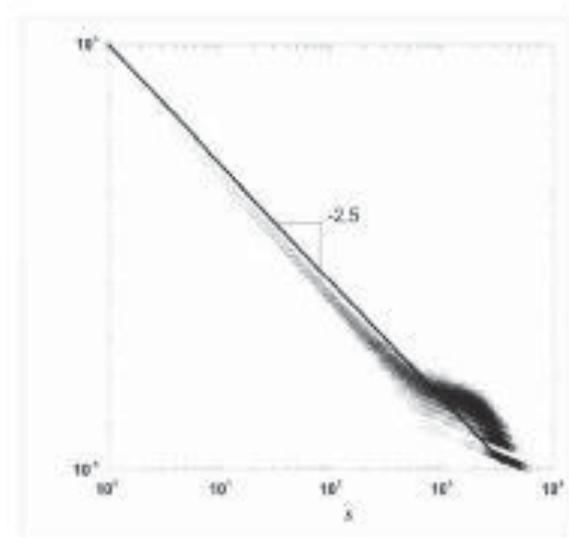
Fig 1. diagram of war, alpha= 2,5"

Fig 2. pattern of war
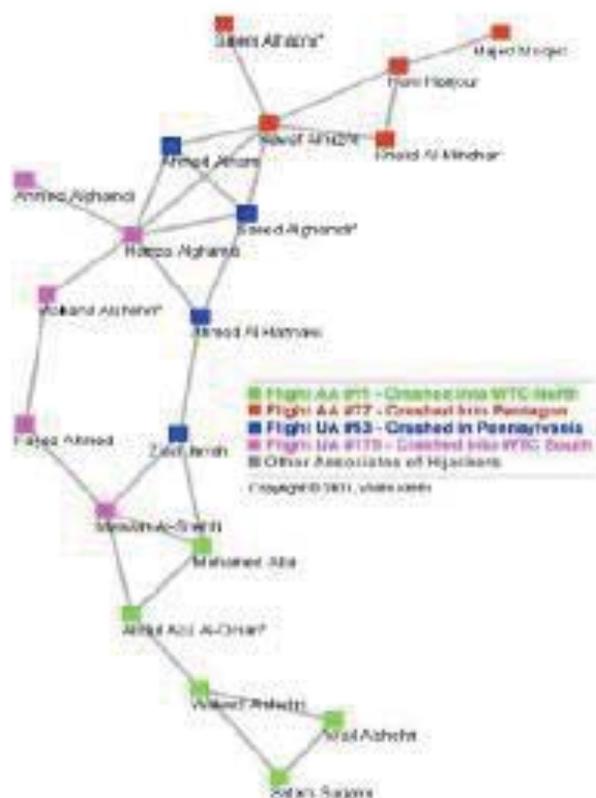
Fig 3. 9/11 terrorists network

There are common and predictable patterns to the way in which people are making a war, which go beyond the specific time and place. We find patterns in a variety of modern conflicts. These patterns are very similar to a distribution of victims of terrorist attacks. These patterns repeat itself constantly beyond differences in geography, ethnicity, religion and ideology.

What is a perfect terrorist cell? i.e. such cell whose structure is most difficult to destroy and disintegrate? How important is the security policy in the formation and development of modern terrorism?

Classically, it is assumed that terrorism is something from the outside, but a deeper study shows that it's something that the system does to itself. Contemporary terrorism is closely related to and generated by the security policy. From our point of view, the right approach is firstly to understand the nature of this global regulation. There's no terrorism coming from the outside. It's something that the system does to itself. Terror acts are seen as mutations and temporary deregulations of the system.

What is the relationship between security and the state? Security is a fundamental principle of the state and a main criterion of political legitimization. Security vs. discipline and law as instruments of governance. On one side, we have hard power structure based on discipline, differentiation and blockade, isolating power and closing the territories and on the second side: security policy associated with globalization, intervening and controlling processes, the security associated with liberalism because security may

only work in the context of transfer of persons and goods. The division proposed by Foucault and Agamben on the hard law and the dynamic activities of the security policy is an artificial assumption. These two areas are closely related, complementary and provide a medium for each other, e.g. processes related to the commodification of human life forcing changes in security policy or law acts, can be quickly changed by power elite. The increasing dynamism and complexity of social space and violent forms of bio-capital make this binary figure of thinking inadequate.

1. CHAOS OF INFORMATION AND OPEN INTELLIGENCE

We live in an accelerated transfer of data and chaos of information. In the media we see the news from Iraq, Afghanistan, Sierra Leone, or terrorist attacks but the conflicts appear to be very difficult to understand.

On the other hand we see how organizations like NSA suck millions of data about citizens from FB, twitter, etc. [open intelligence] by using the company Visible Technologies. Why not do the same? Apply similar methods and build your own software to analyze huge amounts of data for better understanding reality, war, conflicts and terrorism. Of course, you will not get such data from the Pentagon. So you need to find another way to obtain the data. These data are in streams of news that you eat. The whole noise around us actually has information. There are also open network database collecting data about terrorism. You can also use crawlers to obtain data from the Internet: publications of investigation journalists, bloggers, etc. If you can catch enough of these streams of information you can begin to understand terrorism and war.

2. THE SELECTION OF SOURCES. DATA SOURCES FOR TERRORIST EVENTS

The important thing is the selection and filtering of data. The first thing you should do is to collect data. Checking hundreds of different sources of information - from reports of NGO's to newspapers and cable news. Then, these raw data must be filtered. Next you extract key bits of information to build a database. This database contains times of attacks, location, size and type of weapon used.

It's all in the streams of information that we consume every day; you just must know how to select it. You can also use crawlers to obtain the data, see my project on Crash 2.0 concerning plane crash in Smolensk, where the Polish president was killed.

3. PATTERNS OF TERROR

When you have created the database you can search for patterns. What do we see for example when we look at the size distribution of attacks? What does it tell us? This can be done to get the following diagram for the sample data. On the horizontal axis, there is a number of people killed in the attack or the size of the attack and on the vertical axis you have a number of the attacks. This distribution was made for the war in Iraq. [4] It is a precise mathematical way of the distribution of attacks in this conflict and what happened here is quite surprising. The slope of the line is centred on the same values of Alpha, which is 2.5. Why is a conflict, such as the one in Iraq an invariant? Why is there an order in the war? Is it any special in Iraq? But when you look at a few more conflicts (Colombia, Afghanistan, Senegal) you can see the same pattern. These wars are different, with different religious groups, various political and various socio-economic problems but the underlying basic patterns are the same. (Figure01)

The similar pattern appeared, when I've made research for the terrorist attacks. The slope of the line is centred on the same values of Alpha, which is 2.5. We can also generate an equation that could predict likelihood of attacks. The probability of an attack killing X people is equal to a constant times the size of the attack, raised to the power minus Alpha where Alpha is the slope of the line on the diagram. (Figure 02)

Why these different conflicts and a series of terrorist attacks have the same patterns? One explanation is that the pattern describes general human behaviour: that insurgents are changing over time and adapt to the situation. If you do not behave in a certain way in the fight against much stronger opponents you will lose. Therefore, any insurgent force you choose, every conflict, which is in progress, it will look like on this diagram.

Alpha is a structure. It has a stable condition in 2.5. This is the image of war, when it is continued.

4. ABSOLUTE TERRORIST CELL

What is the absolute terrorist cell? What is the structure of indestructible terrorist cells? How to represent cells and how to study them?

Gordon Woo, a Catastrophe Consultant for the company Risk Management Solutions, has suggested modelling terrorist cells as graphs or networks - as collections of points or nodes connected by lines. [7] The nodes represent individual terrorists, and a line is drawn between two nodes if the two individuals have a direct communications link. In Krebs 2002, one finds graphs of the alleged September 11 hijackers. Of course a graph can represent any sort of social network, not just terrorists; for instance, your network of friends etc. [Figure03]. The task of law enforcement is to remove nodes from a graph representing a terrorist cell by capturing or killing members of that cell so that its organizational structure is disrupted. Woo suggests modelling this idea mathematically by asking the following question: How many nodes must you remove from the graph before it becomes disconnected (that is, before it separates into two or more pieces)?

However, modelling the terrorist cells as graphs ignores an important aspect of their structure, namely their hierarchy, and the fact that they are composed of leaders (decision makers, authors of attack plans, etc.) and of followers (couriers, soldiers, etc.). The structure is needed. A partially ordered set, or poset, is such a structure, and lattice theory is the branch of mathematics that deals with such structures. Below, we will delve into posets in greater detail, but first we give a brief overview. Our approach is based on the order theory. [6] A terrorist cell is a group of people, weapons, explosives, machines, or even information, which organizes itself to act as a single unit. The new model is that terrorist plans and decisions are formulated by the nodes at the top of the organization chart or poset (the leaders or maximal nodes); these plans and directives are transmitted down via the edges to the nodes at the bottom (the foot soldiers or minimal nodes), who presumably execute those plans.

Focusing on cutsets is trivial. [2] We do not merely want to break up terrorist networks into disconnected (non-communicating) parts. We also want to cut the leaders off from the followers. If we do that, then we can reasonably claim to have neutralized the network. A cutset is a collection of nodes that intersect every maximal chain. [Figure 05]

However, this approach does not take into account the fact that terrorist cells are continually transformed. So we need something more than posets, we need morphisms that serve as tools for transformation of posets. In other words, the problem is how to insert a dynamics into this static software world.You need to use morphisms. We can understand the dynamics of terrorist cells by using order preserving mappings, fixed points and retracts.

5. POLITICAL, SOCIAL AND PHILOSOPHICAL ASPECTS

What are the social causes and context of the emergence of terrorism?

The primary is feedback between the policy of security and terror. Security is a fundamental principle of state and main criterion of political legitimization. Security vs. discipline and law, as the instruments of governance. On one side we have hard power structure based on discipline, differentiation and blockade, isolating power and closing the territories and on the second side: security policy associated with globalization, intervening and controlling processes, the security associated with liberalism, because security may only work in the context of transfer of persons and goods. [1] The division proposed by Foucault and Agamben on the hard law and the dynamic activities of the security policy is an artificial assumption. These two areas are closely related, complementary and provide a medium for each other, e.g. processes related to the commodification of human life forcing changes in security policy or law acts, can be quickly changed by power elite. The increasing dynamism and complexity of social space and violent forms of bio-capital make this binary figure of thinking inadequate.

Disinformation and secrecy. The difference between the open and the secret implies a hierarchy, the first rule of power. On this difference, the structures called the state are being built. Limiting access to information leads to the emergence of different social classes. Security state is an engine of violence. Acts of terror and disaster are the lifeblood of political actions. That is why they are provoked and stimulated by the power elite. Security requires constant reference to the state of emergency. The quest for security leads to a global worldwide war. You have to change this way of thinking: reject the concept of security as a fundamental principle of state and test new models and constellations of power. The task of politics is to understand the conditions that lead to terror and destruction, rather than control these phenomena, as already occurred. Eternal swing between two extremes: security without freedom and freedom without security. The classic conflict between the ideals of security and freedom: two values that are necessary for a dignified and tolerable human condition, but extremely difficult to reconcile, takes on new forms.

Bio-exchange. The idea of "life" is considered to be included in the domain of technology, both for economic profits and for security reasons. Bio-economy. Biotechnologic artefacts, such as the database of the genome or the bio-chip are a special case of the configuration of knowledge production and bio-economy. These artefacts are a symptom of the commodification of life. The terrorist act is a knot in which a large number of social processes intersect. Meta-capital. Everything is partially interchangeable, as everything is connected. The relationship between the Capital and the Code becomes unsolvable. Is every code a capital? Is all the capital a code? Life becomes a currency of the genetic code. The code provided for trade, works as a social marker, as a new form of capital.

Another important cause of terrorism is an acceleration of flows and globalization. We live in societies where complexity and rate of flow of information, goods and people are constantly increasing by the

use of automation. It generates new social problems. Just as the increasing of metabolic functions of society such as the production and distribution have led to economic globalization, automation of information processing leads to the globalization of human cognitive abilities and decision-making mechanisms.

This results in a growing separation between the power (i.e.: the ability of doing things) and politics (i.e.: the possibility to decide which cases to settle). A few decades ago, they lasted seemingly inseparable connection, living in a state-nations construct. Now they live in the separate spaces: power in the space flows, politics in the space of places. Currently, the existing political institutions, invented in the course of two centuries of modern nations and states, are not relevant just as the tools of collective action for solving global problems like terrorism. Political action is not keeping up with the already globalized finance, industry, exploitation of natural resources, trade, migration of people and information, terrorism, trade of weapon and drugs.

The flow of people and building of ghettos. Not all individuals and groups have agreed to become a part of such a global system. Some individuals, nations or groups of countries do not want to be "integrated" in the transnational social superorganism.

The problem is mass migrations of people banished from homeland, people of "unnecessary" destitute. Ethnic, linguistic or religious diasporas in closed ghettos and crowded in close proximity. Selected districts in large cities serve as dustbins for the problems created by global powers.

Another problem is that this kind of technological progress increases the gap between the rich and the poor, and especially between those who have access to information and those who do not. The result is the emergence of a "subclass" of people excluded from the benefits of the flow. Today, the average income per capital richest country, Qatar, is 428 times greater than in the poorest country, Zimbabwe. [3] The richest fifth of the world appropriates 74% of the planet's annual income, while the poorest fifth has to settle for 2%. The first victim of growing division is democracy, where getting things for survival will become the main objective of the struggles and wars between different classes and groups.

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TOWARD COMBINATORIAL COMPUTER SCIENCE

Robert B. Lisek

The primary goal of this article is to focus on the dynamics and processes of creation and transformation of organisms, structures and social organizations. A development of communication networks has caused research on systems that can function as 'neural system' for social organism. However, these earlier models remain on the level of metaphor. Our approach is more formal and uses mathematical tools.

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1. Acceleration and 'global mind'

Connectivity, bandwidth and the size of resources grow. The increasing flow of information will create a true neural system of society in the future. Anarchy in the Internet proves its potential. The first step is to create a new Internet that learns new associations between data or concepts. Until now, a creation of links is done by hands, by authors of the documents, who determine what other documents are relevant to their text. This process is very inefficient. Search engines are still very archaic and could only partially alleviate this problem. We need 'thinking' Internet, which reinforces connections between documents

that are often used together and weakened between rarely used documents. 'Thinking' in means of using a dynamic network of connections for solving problems or responding to questions.

Based on AGI research and Internet extensions, progress will accelerate when a higher than human intelligence emerges. Large fast computer networks connected with human users can "wake up" as superhuman intelligent entities. We can create superhuman artificial intelligences in the next thirty years. Shortly after that, the era of human will end.

2. Portable knowledge development environment

If we want to create a real "neural system" of modern societies and transform the present society into the global mind, we need a good framework - portable knowledge development environment. We are looking for fundamental insight concerning human mind and its relation to the world, not only on a metaphorical level, but also as a strict formal framework. The main features of the framework:

Creativity: rapid construction, comparison and transformation of different structures with local rules and global behaviour

Flexibility: ability to support multiple tasks and representations

Soundness: Rooted in a solid mathematical basis. We use labelled, weighted, partially ordered sets (reflexive, transitive and antisymmetric) - propose them as base for a canonical framework for representation of knowledge and semantic information.

Self-reference: the structure must be able to relate to itself.

Inference and Data Mining: inferring new information from earlier data. Hyperset transformation and data mining methods (e.g. sequence analysis, network analysis, latent semantic analysis, and other statistical tools) to uncover hidden patterns and structural relations.

Diagram GUI: empirical tests as the way to find the appropriate mechanisms, guide this process by visual insight and graph manipulation.

The Development Framework would enable to build new structures, compare them in detail and then observe them in action. My general intention is to build systems, which have local rules, and then to observe their global behaviour. The environment would enable comparison of how changes in local systems will affect their global behaviour. I'm interested in gaining further insight into how to clarify the notion of transition from the local to the global, and how various elements come together and apart in the evolutionary dance.

As a result, we are interested in creating a software, which will be able to handle a great many different problems quicker and more effectively than man. Here, I'm presenting a conceptual framework for the development of a ‚class' of intelligent systems. I emphasise on a ‚class', rather than a single system. A system is intelligent not because of what it can do, but because of what it can learn to do. An intelligent system adapts itself to its environment and works with incomplete knowledge and resources. More precisely, the system has a set time and is always ready for new tasks, processing them in real time and learning from its own experience.

3. Retracts

We study systems in relation to their abstract properties, such as structure and organization. In our approach, it is essential to use the theory of ordered sets and fixed points of morphisms. In [1] we present state of knowledge in this field and the results based on new results related to retracts. We draw attention to the methods of representation, manipulation and measurement of partially ordered sets (reflexive, transitive, antisymetric relations). Retracts and fixed points are central for the recursion and computability. Fixed points are important because they accurately characterize solutions of recursive definitions. It is convenient to describe the function using recursion, especially in programming languages. The problem is whether the functions are well defined. The idea is a method of successive approximations. The process of approximation provides fixed points, which are solutions of recursive equations.

Framework should be based on hyperposets - weighted labelled partially ordered sets. They allow the use of n-ary ordered relations represented as hyperedges – such edges that connect n nodes simultaneously. Hyperposets allow the building of hierarchies, ontologies and semantic networks. Posets are a subclass hyperposets. In hyperposets you can connect components in many different ways. Self-reference is possible, you can write an equation $f = f(f)$ with mathematical consistency.

A function $f : P \rightarrow P$ is order-preserving if, for all $p, q \in P$, $p =< q$ implies $f(p) =< f(q)$. A subset $Q \subseteq P$ is a retract if there exists an order-preserving map $f : P \rightarrow Q$ such that $f(q) = q$ for all $q \in Q$; the map f is a retraction. An element $p \in P$ is a fixed point of a function $f : P \rightarrow P$ if $p = f(p)$. The poset P has the fixed point property if every order-preserving map on P has a fixed point. A poset has the fixed point property if and only if every retract does .

4. Creation and transformation of organisms, structures and social groups.

4.1 We need formulas that explain how organisms mutate and propagate. Not only as in cellular automata or in genetic programming, but general and basic equations and new formalisms that allow self-reference, which is crucial for describing conscious systems. This means systems, that are able to "think themselves", to understand its limitations, create its own rules and modify their goals and methods. We also need simple equations to measure transformation and spreading. The key thing is to understand the evolution, the way in which new organisms are created and transformed. New structures are created by mutations and functions. For example, point mutations: remove an element (node) or insert a new element (or group of elements).

The most simple way of defining metrics in structure space is the number of point mutations required to transition from one organism to another, from one social organization to another. This is the general idea, but sometimes we need a more subtle way to define the distance of mutations, as - log2 probability that one organism is created from another by single mutation or retraction.

4.2 Self-production.

We refer to older tradition - cybernetics and systems theory. Although some old cybernetic models are based on central, hierarchical structure, new methods emphasize self-organization, autonomy, decentralization and interaction of many factors. Several models have been developed that can be used both for organisms and social systems: Miller (1978) - living systems theory, Matura and Varela (1980, 1992) - theory of autopoiesis, Powers (1973, 1989) - perceptual control theory and Turchin (1977) - metasystem transition theory. In this approach, both social and biological organisms can be seen as special cases of more general category - "life" or "autopoietic system". Autopoietic (greek word for "self-production") system consists of a network of processes that recursively produce their own components and separate itself from environment. For example: living cells can be characterized as a complex network of chemical processes, which constantly mutate and produce molecules necessary for the functioning of cells. Reproduction is often seen as a function for defining "life". However copying without autopoiesis, which can be described more accurately as the replication, does not mean life: some crystals and viruses can replicate without life. We can talk about autopoesis of societies where physical components of society can be described as its human members and their achievements (buildings, cars, roads, computers, books, etc.). Each of these components is produced by a combination of other elements from system.

4.3 The problem of the border. In the original definition of autopoiesis a fact is added, that the autopoietic system should produce its own borders or spatial or topological separation of system from the environment. In contrast to biological organisms, there is no clear boundary in social systems. For example, the state can produce most of its basic elements internally but it also needs to import some components (people, artefacts) and expertise from outside. This means that borders in social system are fuzzy.

4.4 Dynamics and spreading. Morphisms Processor

The most important is the transformation of structures. Morphisms are transformations of ordered sets. A topological structure of the network (weight of links and priority distribution) is changed through the use of morphism. We define a new concept: the energy of morphism. The energy of the morphism of an order set is a scale-invariant of morphism: function from morphism to rational numbers. The energy of set O is the infinitum of energy of the set of all the morphisms of the order set of type O. The type and canonical form of an order set is based on a number of irreducible elements. Intuitively, the connection between the complexity of the morphism and its energy is simple: the more complicated morphism, the higher the energy.

These kinds of studies have many applications in creation of Artificial General Intelligence and finding solutions for problems associated with the emergence of complex, combinatorial objects and large data sets.

5. Automatic Programming

5.1 Automatic programming is a strong field from the very beginnings of the AI. PSI project at Stanford [2], which constructed a LISP, seems to be an important point of classical automatic programming. The automatic programming is "AI complete" in the sense that it requires general knowledge to understand what program/user wants to achieve (without determining details in a programming language). Artificial General Intelligence (AGI) is connected with 'unlimited' ability to learn. Framework must be experimental, cognitive architecture, which learns by modifying and extending itself, including developing an ability to learn (better learning). Let's assume that learning is treated as programming: learning is designing a new algorithm. Learning as an ability to write programs. Learning as a general knowledge of the world is

to build a model that is able to predict the consequences of events or activities. In this perspective, general program learner is a program that writes programs. It is a program that has to invent both the algorithms and representations. Such programs can easily operate on each other and produce other programs, much in the way that molecules can react and produce other molecules. For human programmers, the programs become more complex, it makes sense to develop new languages in order. This regularity also holds for AI systems. Unlimited learning system will be a system that invents new programming languages.

5.3 Architecture and machines based on partially ordered sets

LISP introduced abstract syntax tree (AST) as a base type of data and automatic memory management method. It was also probably the first functional programming language. PLANER, PROLOG and a variety of systems have introduced automated theorem proving, now widely used in most modern languages. The objects oriented semantics of many modern languages, derives from the architecture of systems from the 70s'. Currently, we need to create a new class of languages in which a base type of data will be partially ordered set. Ordered sets are richer structures than chains and trees used in all languages and computing machines that we know. At the same time posets are structures that we can strictly control. Therefore, building a new architecture and computers based on posets would be an important step towards the implementation of AGI and global mind idea.

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AVATAR MANIFESTO REDUX

Gregory Little

In this presentation, "*Avatar Manifesto Redux*", I will bring specific trajectories of the 1999 essay "*An Avatar Manifesto*" to bear on some examples of the current state of avatar research and construction.

"*The truth was that he was entirely dissatisfied with the image of his own face, yet the river, continuously changing under the continuously changing light, and promising so much to Narcissus, nurtured an inexhaustible hope in him, and hopes: the hope that he would be satisfied, and beautiful enough, as an image, a face and a being, to be able to be loved by a truly beautiful being.*

But the river itself was the most beautiful of all the beings he had ever beheld." [1]

_Delmore Schwartz, Last and Lost Poems

In 1989, after taking a test drive in "Reality Built for Two", a virtual reality simulator built by Jaron Lanier and VPL Research, I began to speculate upon how we might appear to one another in Multi-user Virtual Environments (MUVEs). The potential for choosing non-consensual, mutable, or hybrid self-representations led me to create a series of images called 'identity constructions', to design prototypes of identity creation interfaces, and to write speculative theory about the ramifications of this process. The decade hosted the emergence of the World Wide Web and Virtual Reality Modeling Language (VRML). Online spaces like *AlphaWorld*™, *WorldChat*™, and *WorldsAway*™ combined MUDs with 3d virtual worlds. The popularity of Neil Stephenson's novel *Snow Crash* brought the term avatar into public acceptance, and a plethora of cinematic efforts beginning with Disney's *Tron* (1982) including *Lawnmower Man*, *Brainstorm*,*Until the End of the World* and the television mini-series *Wild Palms* warned us of the dangers of our inevitable virtual futures. These fictions lost their momentum as the web increasingly became a space for the exchange of goods and services, for surveillance and mapping of consumption. As our enthusiasm and patience for MUVEs and real-time 3D peaked mid decade, it became clear to me that the most significant property of the avatar was the freeing of personal identity from mapable relationships to consistency and social consensus. I wrote that the use of the avatar in on-line shared environments had the potential to become a revolutionary polymorphic trope as the human driver could choose to be unhampered by issues of class, race, gender, beauty, or age in how they represented themselves in MUVEs. The avatar could became a potential site of resistance, a trickster figure, a viral glitch in the flow of online commerce.

In 1999 I published "An Avatar Manifesto", an essay that posited a historical and theoretical definition of the avatar, contextualized the avatar among other types of representation, and articulated a set of poetic strategies for building avatars intended to resist the inevitable construction of virtual space as a new utopian shopping mall. The essay referenced Donna Haraway's "Cyborg Manifesto" of 1986 and used Artaud's trope, 'The Body w/o Organs' as a point of reference for the construction and articulation of representations of the self within digital, virtual space. In the current essay, "Avatar Manifesto Redux" I will revisit the definition of the avatar, and bring specific trajectories of the the avatar to bear on current state of avatar research and construction. I find at least four recurring varients on the avatar to be of interest: the profile, the portrait, the tool, and the double.

WHAT IS AN AVATAR?

Avatars are online, virtual constructions that both represent and act as a tool for a user in shared virtual spaces. As is widely understood, the origins of the term lie in Hindu philosophy: AVATARA-Sanskrit.; ava-'down', tarati-'he goes, passes beyond' literally, 'a descent', a conception described in the *Bhagavad gita*, 4th Teaching, 1-8 where Krishna confides: "when goodness grows weak, when evil increases, I make myself a body," [2] or, an alternative translation: "Whenever righteousness wanes and unright-eousness increases I send myself forth." The use of the term avatar to represent the self or user in the context of shared on-line Internet environments first occurs in the early 1980's with the development of LucasFilms's *Habitat* project and later came to popular consciousness with the success of the novel *Snow Crash*, where avatars are the digital representations of the inhabitants of the 'MetaVerse'. The past two decades have been marked by our pre-occupation with 'sending ourselves forth' into parallel worlds of signification.

THE PROFILE:

Today the most prevalent on-line representation of the self is the user profile*,* as found on social net-working sites like: *LinkedIn, Friendster, MySpace, Twitter, Google Profile, Badoo, Bebo, Jaiku,* and *Face-book™*. User profiles are often information dense and provide tremendous involvement on the users part for tweaking and refining.

As Christine Rosen states in "Virtual Friendship and the New Narcissism," users of social networking sites are committed to self-exposure. The impulse to collect as many 'friends' as possible on a social net-working page is as much an expression of the need for status as it is the need for friendship.

"The creation and conspicuous consumption of intimate details and images of one's own and others' lives is the main activity in the online social networking world." [3]

This constant self-monitoring and profile tweaking can be understood as classic Narcissism playing out on a massive social scale. Sherry Turkle has posited in "Always-on/Always-on-you" that our current, per-sonally/personality-presentation technologies, especially social networks and smart phones, take self-monitoring to a new level. "We try to keep up with our lives as they are presented to us by a new disci-plining technology, our new "relational artifacts." [4] As most of us spend a great deal of time construct-ing, monitoring, updating, and editing our various profiles, it seems that the purpose of theprofile is, fol-lowing Turkle's logic, to literally make the self into a relational artifact; to expose the self in all its monot-onous uniqueness, of conventional individuality, of distinctive sameness, and to make the self available for monitoring by others. Earlier examples of this level of self-exposure include Jennifer Rigleys lifecast "JenniCam" (1996-2003), and Eva and Franco Mattes "Life Sharing" (2000) where the artists turn their personal computers into open source servers. Profile browsing is another form of monitoring and "data mining", a one-way action and voluntary voyeurism as we passively scan another's personal archive without their lived presence or knowledge. *Facebook™*is largely not face to face, our profiles are not temporaly or spatially co-present with the profile of the other.

Indeed, our profiles are the organizing principle of these sites. Our profiles are mined not only by other users by the sites themselves, forming what Edward Castronova has called the "coding authority." [5] The coding authority uses the data from this mining to construct psycho-geographic 'spaces.' In the process the sites shift from organization via metaphors of place, to organization of and navigation

through anthropomorphized data spaces structured around personality attributes: for example, likes, interests, preferences, histories, comments, friends, occupations, or avocations. Such geographies are frequently rooted in constructions that are non-consensual and often deracinated. This data-mining by the coding authority in endogenic, and non-ludic spaces like *Facebook™*contributes to a redefinition of the function of community, of portrait, and avatar. Each becomes a relational artifact, a tool for self-monitoring, a personal panopticon. As we gaze into our screens, shaping our protean selves; the river gazes back and records our every gesture.

THE TOOL:

Edward Castronova, in his "Theory of the Avatar" posits that we, or more precisely, our minds 'drive' our avatar representations in a variety of spaces, both real and virtual.

"When visiting a virtual world, one treats the avatar in that world like a vehicle of the self, a car that your mind is driving." [6]

Castronova posits that the avatar is essentially a body that represents a mind; that the body can be real or virtual...in other words, we always occupy an avatar, whether in real life on earth, or *Second Life™*, whether a flesh and blood body or a body of pixels and light. For Castronova the driver of the avatar is the mind, the earthly body is not the seat of the mind, of sensation, breath, of life itself; but merely an avatar we can choose not to inhabit, a tool in our toolbox. Castronova writes that we make our choice of tool dependent upon what we want to accomplish in a particular world, and that we make this choice according to three vectors: x is the fixed non-physical characteristics of the agent, v is the changeable avatar attributes, and z is the changeable world attributes. Our choice is dependent upon economy and utility, on which tool or representation will work best in the chosen world according to the perimeters of the vectors xvz as defined above. The ramifications of this definition are useful and insightful, but I must disagree with his definition of the avatar. Such an idealist view of the nature of mind is useful to Castronova's theory. We can all imagine Matrix-like futures where all sensation is virtualized; the corporeal body hangs in a closet, and the brain is in a jar. This view is not tenable. Rather, I support a materialist view of the relationship between mind and body which holds that the mind is a largely physical entity and that mental states are largely derivative of physical ones. Regardless of whether we are in SL or RL the corporeal body is required to sense and process either world. We use our sense organs whether located or co-located. Despite of our level of immersion in a virtual world we are constantly "poked" by the physical expressions of the real world, of biological processes and of needs of our bodies. Although the "driver" and "vehicle" relationship is a useful description, which draws from the prefix 'cyber' (as in cybernetics), meaning 'to steer', the avatar is not the automobile. The avatar is a highly unique form because it involves an ontological pairing, a contradictory hybridity. The avatar is both the driver and the driven, the lived representation composed both of flesh and light, an 'I' that makes a body. The avatar is a 'viractual' object; the contradiction between the virtual and the real is merged at the avatar's core. Castronova weaves an argument that the proper choice of the avatar can, and I agree, have utility and initiate positive change in our lived experience. I must simply add to vector x (the fixed non-physical characteristics of the agent) that the fixed physical characteristics of the agent mold the equation. The translation of live body and lived experience into a simple rasterized image is too lossy a translation to be useful. Liveness, the temporal co-presence of the lived body transmitting data and the simultaneous expression of that data as virtual representation (where duration is the same for the real and the virtual) is a definitive property of the avatar. The avatar joins the a computed representation with the presence of a lived body transmitting data, right now.

PORTRAIT:

The 38,100,000 hits returned when googling 'avatar portrait' is testimony to the ubiquity of the association of avatars with portraits (and the popularity of Cameron's *Avatar*). The internet is filled with avatar portrait generators, galleries of avatar portraits, services to create custom avatar portraits, artists willing to paint canvases of your avatar, even those claiming the ability to represent the aura of your avatar. As I wrote in 1999:

"the population of avatars could come to include the history of portraiture in painting, photography, and sculpture, as a projection or passing through of once living individuals into the virtual, timeless space of representation, metaphor, and mimesis." [7]

In "Life and Its Double," [8] (2007) the art critic and curator Domenico Quaranta, while discussing the work of Eva and Franco Mattes, writes of the status of the avatar as a portrait, and seeks to define avatar portraits as a new genre within the canon of Art History. Indeed it is a very appealing construct as I also believe that the avatar is a new, definitively unique genre of portraiture. However I cannot fully endorse Quaranta's construction of its significance or meaning as outlined in his essay "Life and its Double." A distinction must be made between the portrait of an avatar, which is not in and of itself an avatar; and the avatar defined as a portrait. Quaranta outlines multiple arguments for the avatar as a new genre of portraiture while discussing portraits of avatars. Avatar as portrait is in my estimation a far more interesting candidate for a new genre in Art History than portraits of avatars. As I shall argue, avatars expand and redefine our notions of image, representation, liveness, self, and identity.

The collapsing of the definitions of avatar and portrait is useful to characterize the avatar in extant art historical classifications, but the insistence that the Mattes portraits of the avatars exhibited in-world in "Ars Virtua" are of the "same substance as their subjects" [9] is in my view incorrect. As argued above, the avatar is more than "in-world" pixels or image, the avatar is both "in" and "out of world", it is driven in real-time by a corporeal person in a real, single location. Philip Rosedale, the creator of *Second Life™*, places emphasis on embodiment when he defines avatar as "the representation of your chosen embodied appearance to other people in a virtual world." [10]

To use Castronova's description, the Mattes' portraits of avatars are no longer being driven, they are now parked or abandoned avatars. Although like avatars they are representations of agents or users, they must not be confused with avatars, they are now portraits in the traditional sense, and like all such representations disconnected in time and space from their referents, the real-world human acting in real-time from a specific single location.

Each of the ideas about avatars that I address above deny, compromise, or underplay the existence of the real-time user as a condition of the avatar. As noted above, Joseph Nechvatal writes that the paradoxical condition of a viractual object fuses the computed representation and the uncomputed corporeal, therefore to define the avatar as a viractual object "tends to contradict some central techno cliches of our time." [11] It is the condition of duality in the avatar, the parenting of the representation of the self to a real-life user in real-time that defines the avatar's unique ontology and distinguishes it from other forms of representation.

The avatar has proven to be a far more unique construct than I realized when I wrote "A Manifesto for Avatars" twelve years ago. Unlike most forms in telematic culture, e.g. the profile, the avatar does not

lack a Benjaminian 'aura' The driven avatar is not lacking in "its presence in time and space, its unique existence in a place where it happens to be," that is to say, it has what Benjamin called "authenticity," or, an "aura." Because the nature of an avatar is viractual; its methodology is essentially performative, involving the real-time transmission, through image, text, and gesture, of the simultaneous lived experience of its driver/user/agent. Any attempt to archive an avatar must include not only a library of visual representations, but a dataset of gestures, sounds, texts, and algorithms as well as information about the corporeal uncomputed body. Data-mining by the coding authority could provide this archive, and it should be open-source. When one encounters another avatar in a MUVE space like *Second Life™*, we must do so with a full knowledge that, like a psychological double, we are being presented with an uncanny condition that is both familiar and unknown, both revealing and hidden. There is a lived but hidden presence behind the avatar's back, ontologically and spatially separate but temporaly and intentionally bound. This corporeal force, like the beloved river for Narcissus, is the origin of signification. Like the psychological or literary double the origin of the expressive power of the avatar lies in paradox and in fusing of opposites, in the condition Freud called the 'uncanny.' For Freud the uncanny was a province of aesthetics.

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In this presentation, "*Avatar Manifesto Redux*", I will bring specific trajectories of the 1999 essay "*An Avatar Manifesto*" to bear on some examples of the current state of avatar research and construction.

 "The truth was that he was entirely dissatisfied with the image of his own face, yet the river, continuously changing under the continuously changing light, and promising so much to Narcissus, nurtured an

inexhaustible hope in him, and hopes: the hope that he would be satisfied, and beautiful enough, as an image, a face and a being, to be able to be loved by a truly beautiful being.

But the river itself was the most beautiful of all the beings he had ever beheld." [1]

Delmore Schwartz, *Last and Lost Poems*

In 1989, after taking a test drive in "Reality Built for Two", a virtual reality simulator built by Jaron Lanier and VPL Research, I began to speculate upon how we might appear to one another in Multi-user Virtual Environments (MUVEs). The potential for choosing non-consensual, mutable, or hybrid self-representations led me to create a series of images called 'identity constructions', to design prototypes of identity creation interfaces, and to write speculative theory about the ramifications of this process. The decade hosted the emergence of the World Wide Web and Virtual Reality Modeling Language (VRML). Online spaces like *AlphaWorld*™, *WorldChat*™, and *WorldsAway*™ combined MUDs with 3d virtual worlds. The popularity of Neil Stephenson's novel *Snow Crash* brought the term avatar into public acceptance, and a plethora of cinematic efforts beginning with Disney's *Tron* (1982) including *Lawnmower Man*, *Brainstorm*,*Until the End of the World* and the television mini-series *Wild Palms* warned us of the dangers of our inevitable virtual futures. These fictions lost their momentum as the web increasingly became a space for the exchange of goods and services, for surveillance and mapping of consumption. As our enthusiasm and patience for MUVEs and real-time 3D peaked mid decade, it became clear to me that the most significant property of the avatar was the freeing of personal identity from mapable relationships to consistency and social consensus. I wrote that the use of the avatar in on-line shared environments had the potential to become a revolutionary polymorphic trope as the human driver could choose to be unhampered by issues of class, race, gender, beauty, or age in how they represented themselves in MUVEs. The avatar could became a potential site of resistance, a trickster figure, a viral glitch in the flow of online commerce.

In 1999 I published "An Avatar Manifesto", an essay that posited a historical and theoretical definition of the avatar, contextualized the avatar among other types of representation, and articulated a set of poetic strategies for building avatars intended to resist the inevitable construction of virtual space as a new utopian shopping mall. The essay referenced Donna Haraway's "Cyborg Manifesto" of 1986 and used Artaud's trope, 'The Body w/o Organs' as a point of reference for the construction and articulation of representations of the self within digital, virtual space. In the current essay, "Avatar Manifesto Redux" I will revisit the definition of the avatar, and bring specific trajectories of the the avatar to bear on current state of avatar research and construction. I find at least four recurring varients on the avatar to be of interest: the profile, the portrait, the tool, and the double.

WHAT IS AN AVATAR?

Avatars are online, virtual constructions that both represent and act as a tool for a user in shared virtual spaces. As is widely understood, the origins of the term lie in Hindu philosophy: AVATARA-Sanskrit.; ava-'down', tarati-'he goes, passes beyond' literally, 'a descent', a conception described in the *Bhagavad gita*, 4th Teaching, 1-8 where Krishna confides: "when goodness grows weak, when evil increases, I make myself a body," [2] or, an alternative translation: "Whenever righteousness wanes and unrighteousness increases I send myself forth." The use of the term avatar to represent the self or user in the context of shared on-line Internet environments first occurs in the early 1980's with the development of LucasFilms's *Habitat* project and later came to popular consciousness with the success of the novel *Snow*

Crash, where avatars are the digital representations of the inhabitants of the 'MetaVerse'. The past two decades have been marked by our pre-occupation with 'sending ourselves forth' into parallel worlds of signification.

THE PROFILE:

Today the most prevalent on-line representation of the self is the user profile*,* as found on social networking sites like: *LinkedIn, Friendster, MySpace, Twitter, Google Profile, Badoo, Bebo, Jaiku,* and *Facebook™*. User profiles are often information dense and provide tremendous involvement on the users part for tweaking and refining.

As Christine Rosen states in "Virtual Friendship and the New Narcissism," users of social networking sites are committed to self-exposure. The impulse to collect as many 'friends' as possible on a social networking page is as much an expression of the need for status as it is the need for friendship.

"The creation and conspicuous consumption of intimate details and images of one's own and others' lives is the main activity in the online social networking world." [3]

This constant self-monitoring and profile tweaking can be understood as classic Narcissism playing out on a massive social scale. Sherry Turkle has posited in "Always-on/Always-on-you" that our current, personally/personality-presentation technologies, especially social networks and smart phones, take self-monitoring to a new level. "We try to keep up with our lives as they are presented to us by a new disciplining technology, our new "relational artifacts." [4] As most of us spend a great deal of time constructing, monitoring, updating, and editing our various profiles, it seems that the purpose of theprofile is, following Turkle's logic, to literally make the self into a relational artifact; to expose the self in all its monotonous uniqueness, of conventional individuality, of distinctive sameness, and to make the self available for monitoring by others. Earlier examples of this level of self-exposure include Jennifer Rigleys lifecast "JenniCam" (1996-2003), and Eva and Franco Mattes "Life Sharing" (2000) where the artists turn their personal computers into open source servers. Profile browsing is another form of monitoring and "data mining", a one-way action and voluntary voyeurism as we passively scan another's personal archive without their lived presence or knowledge. *Facebook™*is largely not face to face, our profiles are not temporaly or spatially co-present with the profile of the other.

Indeed, our profiles are the organizing principle of these sites. Our profiles are mined not only by other users by the sites themselves, forming what Edward Castronova has called the "coding authority." [5] The coding authority uses the data from this mining to construct psycho-geographic 'spaces.' In the process the sites shift from organization via metaphors of place, to organization of and navigation through anthropomorphized data spaces structured around personality attributes: for example, likes, interests, preferences, histories, comments, friends, occupations, or avocations. Such geographies are frequently rooted in constructions that are non-consensual and often deracinated. This data-mining by the coding authority in endogenic, and non-ludic spaces like *Facebook™*contributes to a redefinition of the function of community, of portrait, and avatar. Each becomes a relational artifact, a tool for self-monitoring, a personal panopticon. As we gaze into our screens, shaping our protean selves; the river gazes back and records our every gesture.

THE TOOL:

Edward Castronova, in his "Theory of the Avatar" posits that we, or more precisely, our minds 'drive' our avatar representations in a variety of spaces, both real and virtual.

"When visiting a virtual world, one treats the avatar in that world like a vehicle of the self, a car that your mind is driving." [6]

Castronova posits that the avatar is essentially a body that represents a mind; that the body can be real or virtual...in other words, we always occupy an avatar, whether in real life on earth, or *Second Life™*, whether a flesh and blood body or a body of pixels and light. For Castronova the driver of the avatar is the mind, the earthly body is not the seat of the mind, of sensation, breath, of life itself; but merely an avatar we can choose not to inhabit, a tool in our toolbox. Castronova writes that we make our choice of tool dependent upon what we want to accomplish in a particular world, and that we make this choice according to three vectors: x is the fixed non-physical characteristics of the agent, v is the changeable avatar attributes, and z is the changeable world attributes. Our choice is dependent upon economy and utility, on which tool or representation will work best in the chosen world according to the perimeters of the vectors xvz as defined above. The ramifications of this definition are useful and insightful, but I must disagree with his definition of the avatar. Such an idealist view of the nature of mind is useful to Castronova's theory. We can all imagine Matrix-like futures where all sensation is virtualized; the corporeal body hangs in a closet, and the brain is in a jar. This view is not tenable. Rather, I support a materialist view of the relationship between mind and body which holds that the mind is a largely physical entity and that mental states are largely derivative of physical ones. Regardless of whether we are in SL or RL the corporeal body is required to sense and process either world. We use our sense organs whether located or co-located. Despite of our level of immersion in a virtual world we are constantly "poked" by the physical expressions of the real world, of biological processes and of needs of our bodies. Although the "driver" and "vehicle" relationship is a useful description, which draws from the prefix 'cyber' (as in cybernetics), meaning 'to steer', the avatar is not the automobile. The avatar is a highly unique form because it involves an ontological pairing, a contradictory hybridity. The avatar is both the driver and the driven, the lived representation composed both of flesh and light, an 'I' that makes a body. The avatar is a 'viractual' object; the contradiction between the virtual and the real is merged at the avatar's core. Castronova weaves an argument that the proper choice of the avatar can, and I agree, have utility and initiate positive change in our lived experience. I must simply add to vector x (the fixed non-physical characteristics of the agent) that the fixed physical characteristics of the agent mold the equation. The translation of live body and lived experience into a simple rasterized image is too lossy a translation to be useful. Liveness, the temporal co-presence of the lived body transmitting data and the simultaneous expression of that data as virtual representation (where duration is the same for the real and the virtual) is a definitive property of the avatar. The avatar joins the a computed representation with the presence of a lived body transmitting data, right now.

PORTRAIT:

The 38,100,000 hits returned when googling 'avatar portrait' is testimony to the ubiquity of the association of avatars with portraits (and the popularity of Cameron's*Avatar*). The internet is filled with avatar portrait generators, galleries of avatar portraits, services to create custom avatar portraits, artists willing to paint canvases of your avatar, even those claiming the ability to represent the aura of your avatar. As Iwrote in 1999:

"the population of avatars could come to include the history of portraiture in painting, photography, and sculpture, as a projection or passing through of once living individuals into the virtual, timeless space of representation, metaphor, and mimesis." [7]

In "Life and Its Double," [8] (2007) the art critic and curator Domenico Quaranta, while discussing the work of Eva and Franco Mattes, writes of the status of the avatar as a portrait, and seeks to define avatar portraits as a new genre within the canon of Art History. Indeed it is a very appealing construct as I also believe that the avatar is a new, definitively unique genre of portraiture. However I cannot fully endorse Quaranta's construction of its significance or meaning as outlined in his essay "Life and its Double." A distinction must be made between the portrait of an avatar, which is not in and of itself an avatar; and the avatar defined as a portrait. Quaranta outlines multiple arguments for the avatar as a new genre of portraiture while discussing portraits of avatars. Avatar as portrait is in my estimation a far more interesting candidate for a new genre in Art History than portraits of avatars. As I shall argue, avatars expand and redefine our notions of image, representation, liveness, self, and identity.

The collapsing of the definitions of avatar and portrait is useful to characterize the avatar in extant art historical classifications, but the insistence that the Mattes portraits of the avatars exhibited in-world in "Ars Virtua" are of the "same substance as their subjects" [9] is in my view incorrect. As argued above, the avatar is more than "in-world" pixels or image, the avatar is both "in" and "out of world", it is driven in real-time by a corporeal person in a real, single location. Philip Rosedale, the creator of *Second Life™*, places emphasis on embodiment when he defines avatar as "the representation of your chosen embodied appearance to other people in a virtual world." [10]

To use Castronova's description, the Mattes' portraits of avatars are no longer being driven, they are now parked or abandoned avatars. Although like avatars they are representations of agents or users, they must not be confused with avatars, they are now portraits in the traditional sense, and like all such representations disconnected in time and space from their referents, the real-world human acting in real-time from a specific single location.

Each of the ideas about avatars that I address above deny, compromise, or underplay the existence of the real-time user as a condition of the avatar. As noted above, Joseph Nechvatal writes that the paradoxical condition of a viractual object fuses the computed representation and the uncomputed corporeal, therefore to define the avatar as a viractual object "tends to contradict some central techno cliches of our time." [11] It is the condition of duality in the avatar, the parenting of the representation of the self to a real-life user in real-time that defines the avatar's unique ontology and distinguishes it from other forms of representation.

The avatar has proven to be a far more unique construct than I realized when I wrote "A Manifesto for Avatars" twelve years ago. Unlike most forms in telematic culture, e.g. the profile, the avatar does not lack a Benjaminian 'aura' The driven avatar is not lacking in "its presence in time and space, its unique existence in a place where it happens to be," that is to say, it has what Benjamin called "authenticity," or, an "aura." Because the nature of an avatar is viractual; its methodology is essentially performative, involving the real-time transmission, through image, text, and gesture, of the simultaneous lived experience of its driver/user/agent. Any attempt to archive an avatar must include not only a library of visual representations, but a dataset of gestures, sounds, texts, and algorithms as well as information about the corporeal uncomputed body. Data-mining by the coding authority could provide this archive, and it should be open-source. When one encounters another avatar in a MUVE space like *Second Life™*, we

must do so with a full knowledge that, like a psychological double, we are being presented with an uncanny condition that is both familiar and unknown, both revealing and hidden. There is a lived but hidden presence behind the avatar's back, ontologically and spatially separate but temporaly and intentionally bound. This corporeal force, like the beloved river for Narcissus, is the origin of signification. Like the psychological or literary double the origin of the expressive power of the avatar lies in paradox and in fusing of opposites, in the condition Freud called the 'uncanny.' For Freud the uncanny was a province of aesthetics.

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HACKERSPACES: FROM ELECTRICAL TO CULTURAL RESISTANCE

Ricardo Lobo

Hackerspaces are community-driven spaces where people gather to socialize, experiment, learn and develop projects with technology. Over the past four years, these spaces have seen a remarkable growth in number and visibility. In this paper, we examine how the practice of hackerspaces can be understood as a form of cultural resistance by analyzing some views and attitudes towards the economy, education, society and politics.

Introduction

The purpose of this paper is to contribute to the study of this global movement of spaces and communities around the globe where people create and experiment with technology, known as hackerspaces. It is a phenomenon that in recent years has shown a considerable expansion. Despite that fact, hackerspaces are still largely underresearched.

Our research interest grew out of the field work we've been doing in Audiência Zero. Audiência Zero is a Portuguese cultural organization responsible for a network of spaces of creation and experimentation with technology that in recent years has re-defined itself largely under the influence of the hackerspace model. Our ultimate interest is to investigate the actual and potential impacts of the hackerspace movement in the social, political, economic and cultural spheres.

Mitch Altman, founder of NoiseBridge, once said, in passing, that the future of everything is on the hackerspace. A highly colored statement of course, but the idea that the hackerspace is an innovative and dynamic concept with much to offer to society at large is something that we believe deserves attention.

Hackerspaces are local communities who share a global culture, and are a direct descendant of the hacker culture. Hackers manifest their culture through very specific practices and values. This hackerspace culture is in many ways, as we shall see, contrary to the cultural discourse of dominant political, social and economic structures.

Nevertheless, hackerspaces are not closed organizations, they are in permanent contact with society, always interested in showing what they do and explain why they do it. This form of relationship with the outside world, makes hackerspaces values and practices publicly known. This, in turn, might influence the way other people see, think and behave. This form of cultural resistance is what we are going to address in this paper.

What is a Hackerspace?

Hackers are the first to point out that there aren't two hackerspaces alike (Schneeweisz 2009). The main reason for this has to do with the fact that hackerspaces are the direct product of the communities that

created them. Regular discussions about the definition of hackerspace have occurred in the community, but there isn't an agreed, compact definition of hackerspace so far (Moilanen 2010).

Nonetheless, we will provide a tentative definition of hackerspace, that we believe will suffice for the purpose of this paper. We will then elaborate a little on the definition in order to adequately explain the mains elements.

For us a hackerspace is an open, community-driven space with shared resources, where people with common interests, learn, experiment and develop projects, through an organizational model based on peer-learning, collaboration and knowledge sharing.

A hackerspace needs a physical space for members to meet and work. Here is where the resources are located, where the activities take place. Usually these spaces are rented. The rent and all the operational costs are paid by members fees. Ideally members will have 24/7 access to the space which means that each member has to have a key.

Around the space a community settles and grow. The community is responsible for financing and managing the space and the resources, usually through elected bodies. This community is, in many cases, open, by which we mean: receptive to new members, organize activities in which non-members can participate and build ties with outside people and organizations.

The people who create the community around a hackerspace have common interests, that's why they gather, cooperate and maintain a hackerspace. The interests of these hackers can be quite varied, but fairly typical is the interest in technology, science and art.

Those interests determine the resources available in hackerspaces, but other factors are important too, like money and available space. Examples of shared resources that are commonly found in hackerspaces are: Internet access, electronic equipment, workshop tools and prototyping machines (3D printer, CNC).

The community exists because its members share resources and common interests which usually materialize in experiments and projects, this means hackerspaces are spaces of experimentation and development, not just socialization.

In the community there is a rooted practice of information sharing and collaboration. Members with different levels of knowledge and different backgrounds are available and willing to share what they know with others. This is one of the biggest selling points of hackerspaces, a community of people from various fields, with very good skills and available to help whenever necessary.

So these elements are very relevant to the definition of a hackerspace: space, community, common interests, resources, collaboration, creating, experimenting and sharing. Some of these elements relate to physical resources; other to the activities that occur there; and finally, to the values and practices embodied. This multidimensional reality is one of the reasons that make defining a hackerspace a difficult task. A hackerspace in not just a space for hackers, a hackerspace is the combination of all those elements.

Hackerspaces and Hacker Culture

It is not uncommon to begin the history of hackerspaces in Germany in 1981 with the founding of Chaos Computer Club by Wau Holland or to try to find ancestors in the U.S. by referencing projects like the New Hack City, the L0pth and others (Schneeweisz 2009). Nonetheless, the first examples of hackerspaces as we now know them, were founded in the mid 90's in Germany, and these were the c-base in Berlin and C4 in Cologne.

These spaces, according to Nick Farr (2009), took a decisive step, they opened up to society, and started an open relationship that proved "...Hackers could be perfectly open about their work, organize officially, gain recognition from the government and respect from the public by living and applying the Hacker ethic in their efforts."

The novelty of spaces like C-base, C4 and the spaces they inspired, is their relationship with society at large and the public visibility and dissemination of hacker culture, which is, ultimately, the importance of the hackerspace (Farr 2009).

Hacker culture dates back to the fifties and sixties and over the decades has been evolving through different generations. Steven Levy (2010) in his book Hackers: Heroes of the Computer Revolution gives a detailed account of the birth of the hacker culture and its history. Levy is most famous for his formulation of the hacker ethic, a particularly important piece of hacker culture.

This hacker ethic among other aspects was based on freedom, access and circulation of information and knowledge, distrust of authority, promotion of decentralization and the belief that computers can create a better world (Levy 2010).

The recent history of hackerspaces has a pivotal development around 2007. In this year, dozens of American hackers made a visit to some German and Austrian hackerspaces, with the purpose of importing the hackerspace model to the U.S. This expedition resulted, ultimately, in the founding of some famous hackerspaces, including NoiseBridge (San Francisco), HacDC (Washington), NYC Resistor (New York) and to what Nick Farr (2009) calls the third wave of hackerspaces.

After that, the number of hackerspaces grew quickly and consistently considering the numbers available on hackerspaces.org, which is the most complete information source there is about the phenomenon. In the beginning of 2007 there were something like 30 to 40 hackerspaces, today, as of this writing, July 2011, there are 480 active hackerspaces all over the world, with special incidence in Europe and the USA (Hackerspaces.org 2011).

Cultural Resistance

The most common conception of resistance in social theory is the emancipatory opposition to domination (Hoy 2005, 2). The word by itself can mean exactly the opposite too, it can mean, the resistance of domination to emancipatory efforts. In this sense resistance is just an opposition of a force to another (Hoy 2005, 2).

In the context of this paper we are using resistance in the first sense, the most common one, in the sense of opposition to domination. Furthermore, the resistance we address here is what can be called

cultural resistance and has been described by Stephen Duncombe (2002, 5) as "culture that is used, consciously or unconsciously, effectively or not, to resist and/or change the dominant political, economic and/or social structure."

The issues we are about to describe and discuss, are examples of the way hackerspaces and, the hacker culture they represent, resist the dominant political, economic and social structure. Despite the fact of claiming political agnosticism (Schneeweisz 2009), hackerspaces influence the cultural discourse, by creating living spaces with a shared culture that is at odds with the dominant models. This act can be seen as a political act.

Cultural resistance, as Ducombe (2002, 6) remembers, can be thought of as political resistance, since cultural resistance is mainly a rewriting of a cultural discourse, "a shared set of symbols and meanings, that we all abide by", which some argue is essentially what politics is.

In this section we will present some examples of shared values and common practices in the hackerspace movement. With this we'll try to show what exactly is this hackerspace culture and in what way it resists the dominant structures.

COMMUNITY

As discussed previously, community is inherent in the concept of hackerspace. For us, as well as other authors (Moilanen 2010), hackerspaces act as a third space, a space that people go to as a place between home (first place) and work (second place). These third places serve to satisfy essential needs of socialization that are felt strongly and increasingly in contemporary societies (Oldenburg 1999).

This aspect of hackerspaces is one of the possible explanations for the success and expansion of the concept worldwide. Hackerspaces are like sanctuaries in a society that is losing the community reference. The importance of community is widely recognized in reports made by members of hackerspaces. Mitch Altman, for example, said, quoted by Dylan Tweney (2009), "in our society there's a real dearth of community (...) [at hackerspaces], people get a little taste of that community and they just want more."

GIFT ECONOMY

Underlying the concept of hackerspace we also have the concept of sharing. Sharing space, sharing tools, but most important knowledge, information and time. If we analyze the behavior of members in hackerspaces we see that there is a culture of sharing that underpins all the activity and goes beyond the members themselves, opening up to visitors and the outside world.

In hackerspaces skilled members share with the newcomers their knowledge so that they to can pass the knowledge onto others, and so forth. This is done without any warranty or agreement that the person that helps will in the future be helped in return. This, however, does not paralyze the free exchange in hackerspaces. This economy works because there is confidence that others will do the right thing when the time comes.

Hackerspaces are an example of a gift economy, an economy where several goods and services, namely information, knowledge and time are transferred without an explicit specification about future rewards. This contrasts with both market and barter economies.

This gift giving practice goes beyond the immediate community, is how they relate to the world. Due to this, hackerspaces are especially found off open source and creative commons. What is not surprising since they are all gift economies and derive from the same culture.

MAKER SOCIETY

We live in a consumer society where the need to buy new things is all around us. Companies carefully plan ways to encourage consumers to buy new products, even when the old ones are still fully functional, in what became known as planned obsolescence. Consumption patterns are increasingly part of the way people perceive themselves (Featherstone 2007).

But not so much in hackerspaces. Karin Kosina (2009) of Metalab, one of the most well-know European hackerspaces, says that Hackerspaces are saying to the world "Stop being a consumer! Start to be a creator!"

D.I.Y. (do-it-yourself) culture is deeply rooted in hackerspaces. Why buy something when you can make it? But many times the motivation to make something is not financial. As Karin Kosina (2009) states "there is an incredible joy in building something with your own hands, of saying, 'I made this', and unfortunately most people in our society today have forgotten it, have never had it, and we want to give this back to the world". To make something instead of buying it gives the creator a sense of accomplishment, increased confidence and power.

At the same time open source digital fabrication projects, such as the RepRap or the Makerbot (born in NYC Resistor, and extremely popular in hackerspaces), which allow people to print real plastic objects based on designs they can make on a computer, changes the relationship between production and consumption.

To re-use old hardware is common in hackerspaces too. Hackerspaces receive and seek computers, controllers, synthesizers, electronic equipment, among other things, which individuals, businesses and universities no longer use. When the equipment is still functional, it can be used for their initial function, when they are impossible to fix, they are dismantled and become a source of raw material for new projects.

To re-use and re-purpose is crucial to have a working knowledge, it's necessary to understand how something really works. This need to know, this insatiable curiosity is crucial in defining what a hacker is, as Bre Pettis, founder of NYC Resistor, puts it, "...we break things to understand how they work, share whatever we've learned and make stuff with whatever we can find." (Schneeweisz 2009).

It's necessary to keep in mind that hackers work primarily with technology, and that technology is one of the more important motors behind human development. About this, Jens Ohlig, famous for the Design Patterns for Hackerspaces, says "is a very radical thing to take technology and use it in a way that is utterly non-economic (...) take the thing that may shape our future out of the economic sphere and control it" (Schneeweisz 2009).

This perspective of re-use, of production for self consumption, of being aware of the importance of controlling the technologies that shape our future does not fit well with the capitalist system, and companies would like to keep people in the state of eternal and passive consumption. Their profits depend on it. That's why they create restrictions, such as seals, to prevent products from being opened, studied and improved. And hackers just hate that.

EDUCATION

This is a field where hackerspaces are especially seen as innovative and as potential contributors to the discussion of future improvements. With the traditional model of education under attack, for not being able to teach what's necessary to succeed in the modern world, hackerspaces with their informal structure seem at least a good complement.

There are several ways people learn in hackerspaces, like workshops, lectures and presentations, but also by collaborating with each other and researching.

Hackerspaces present a learning model that is based on peer-learning and in project-based learning. Members of hackerspaces learn from each other in a horizontal format, where today one teaches and tomorrow one learns.

Also in hackerspaces people learn by doing, usually in a context of a project they want to do. This approach has a specific advantage because one does not only learns something, but learns how to learn.

To be in a place where knowledge is valued, where knowledge is applied, where people feel good about learning, sharing, collaborating, researching and making things is the most decisive factor in creating the right atmosphere for personal development.

With these examples, and more could be presented, what we tried to do was to show the contribution made by hackerspaces to the cultural discourse. These are just some of the issues and we can see that they apply to many fields.

There is a way of seeing the modern world that resists the dominant models. Many people are unaware of these alternative ways of thinking and doing. In hackerspaces there is a critical view of the economy, society, education, among other things.

We can say that, essentially, there is a understanding of what is to be human in the contemporary world. The hackers themselves are aware of this, Karin Kosina (2009) puts it this way "Hackerspaces are physical places for people to get together and tinker with technology, to learn new skills, to share their knowledge, to explore new ways of living together as a society. This is what being human is ultimately all about, creating knowledge and sharing knowledge."

This is what we consider to be an attempt to rewrite the cultural discourse trough practice, trough a living example.

Conclusion

Hacker culture is alive and well in hackerspaces. We know that many aspects of this culture are not new. The novelty, here, is that hackerspaces are expanding the influence of this culture trough open and public spaces that are not cut from mainstream culture. And they keep growing all around us.

We have seen that the values and practices of hackerspaces show that their members have, in a more or less conscious way, critical insights into the functioning of society, economy and education. This vision is not expressed through participation in political parties or movements but rather by creating spaces where this vision can be realized.

These spaces are not closed structures, hidden, constructed to perpetuate the purity of their values. They are, on the contrary, open structures in contact and constant dialogue with society. This makes the values and practices of hackerspaces known and available to society, showing that there are still alternatives to the dominant cultural discourse.

This is the way that hackerspaces resist. The extent to which this form of cultural resistance is more effective than political activism is something that can be put into question. The way we may judge their effect is through engaging topics like the future of education, intellectual property rights, consumer society, new forms of political participation. These are questions in which the experience of hackerspaces can be used to shed a different light on the subject. But for that to happen further research on hackerspaces has to be done.

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The third skin – a medium or a mess(age)?

Eckehart Loidolt

Starting with samples derived from the history of architecture illustrating the key topics of buildings as 'the third skin' of mankind the presentation then jumps into main several questions for building envelopes such as protection, function, energy and meaning, facing several different contexts of today.

Opening a second stream of arguments, the statement dives into the wide field of 'architecture parlante' elaborating on sense or non-sense of narrative elements in architecture by balancing out their pros and cons. Ever since buildings have been experienced by passers-by through their façades which are physically defining public space, their genuine expression has been an important issue, though it has not always been treated carefully enough.

After bare Modernism and exuberant Postmodernism new tools and materials were entering the domain of building expression. Leaving aside the glittering world of commercial advertisement as well as the 'night-beauties' illuminated by artificial light when electricity entered the cities in the last century new forms of building-related, adoptive media communication get illustrated.

Looking at the exciting allures of present media-façades the inevitable question of content is introduced and exploited. Are we able yet to talk about new and reliable models of social interaction defining a media space or do we only face a variety of electronic attractions blurring the meaning of public space?

Pointing out durability and beauty as key issues for the longevity and life-span of building solutions the glittering media appearance in architecture is reflected upon critically. In this context the wide range of moveable functional parts in building envelopes researched on and gathered into the 'Move'-book at Prof. Michael Schumacher's department at the Leibniz University in Hannover (D) is illustrated as genuine means of today's architecture.

AESTHETIC AGENTS: EXPERIMENTS IN SWARM PAINTING

Justin Love, Philippe Pasquier, Brian Wyvill, Steve Gibson & George Tzanetakis

We introduce a swarm-based multi-agent system that produces expressive imagery through the use of multiple digital images. At birth, agents in our system are assigned a digital image that represents their *aesthetic ideal*. When groups of agents with different aesthetic ideals occupy the same canvas, a new image emerges through the convergence of their conflicting aesthetic goals.
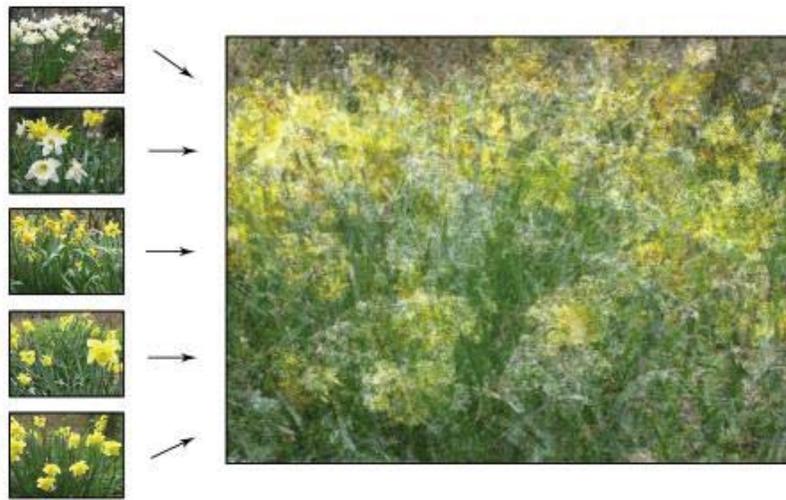
Fig. 1. 'Aesthetic ideals' (left images) for five different groups of Aesthetic Agents and the output (right image) their interaction produces.
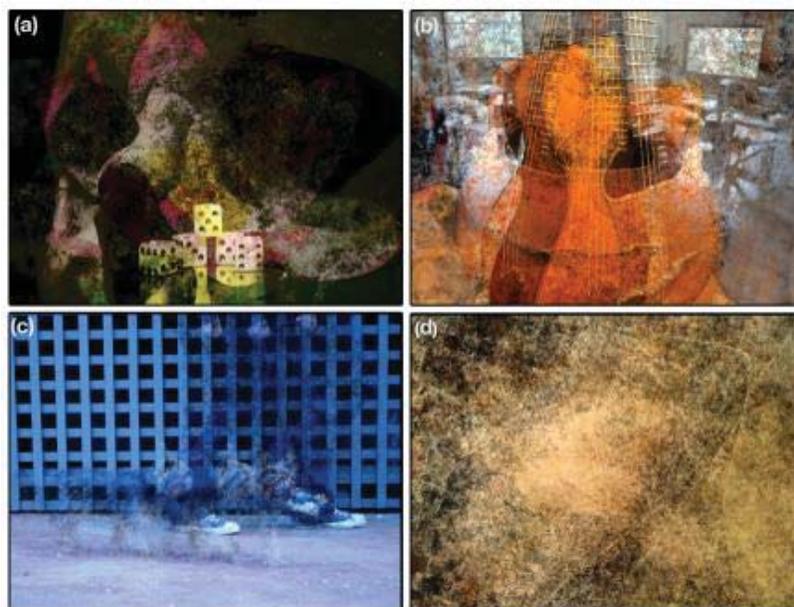
Fig. 2. Examples of (a) Montage, (b) Cubist, (c) Futurist, and (d) Abstract Expressionist inspired swarm paintings.

Our system uses autonomous agents to model swarm intelligence for the purpose of non-photorealistic rendering – a category of research we will refer to as Swarm Painting.

NON-PHOTOREALISTIC RENDERING (NPR)

Where traditional computer graphics has focused on photorealism, NPR looks to artistic styles such as painting, drawing, animated cartoons, and technical illustration as inspiration. In addition to its expressive qualities, NPR can offer more effective means of communication than photorealism by adopting techniques long used by artists e.g. emphasizing important details and omitting extraneous ones. [1]

AUTONOMOUS AGENTS

An agent can be defined as "anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors." [2] An autonomous agent is an agent that can operate independently and is capable of controlling its actions and internal state. Agents can be grouped into two general categories: cognitive agents and reactive agents.

Cognitive agents have an explicit symbolic understanding of their environment and can be seen as an extension of symbolic AI techniques. An example of a cognitive or intentional model is BDI-architecture. In a BDI-based model the beliefs, desires, and intentions of an agent forms the basis of their reasoning process. [3]

Reactive agents are specified by their behaviour i.e. how they react to perceived stimuli in their environment. In a reactive agent model, rules map perceived input to effectual output that is generally executed immediately. Purely reactive agents have no internal history or long term plans, but choose their next action solely upon the current perceived situation.

Each model has its advantages: cognitive models provide more powerful and general methods for problem solving; reactive models are faster and capable of producing complex emergent behaviour from simple sets of rules. [4]

SWARM INTELLIGENCE

Individually, social insects such as ants and termites appear to behave in a simple, almost random fashion. However, when a colony's collective behaviour is examined complex and seemingly intelligent global behaviours emerge. Initially, it was assumed that the insects were either communicating in an undiscovered fashion or that each individual had some kind of internal representation of a global plan. However, research in the biological sciences has determined that the behaviour is in fact the result of individuals working autonomously with only local information. [5]

One way that collective intelligence can emerge is through stigmeric interaction. Stigmergic interaction refers to spontaneous, indirect coordination between individuals that occurs when the effect of an individual on the environment can influence the actions of others. [6] An example of this is the pheromone

trail that an ant creates on the way back to the nest after it has found food. The pheromone trail attracts other ants who reinforce the trail with their own pheromones. Pheromones fade over time so once a food source is exhausted the trail to it disappears. This seemingly simple heuristic is so effective that it has been utilized to solve a number of combinatorial optimization (CO) problems, including the well know traveling salesman problem.

Swarm-based algorithms have a number of properties that make them successful at solving certain types of problems. They are versatile – the same algorithm can be applied with minimal changes to solve similar problems, robust – they keep functioning when parts are locally damaged, and population-based – positive feedback leads to autocatalytic or 'snowball' effects. [7]

SWARM PAINTING

Swarm Painting refers to swarm-based multi-agent systems in which a group of software- or hardware-based 'painter agents' move and deposit paint or change pixel colour values on a real or digital canvas. Swarm painting can be divided into two main categories: colour-based swarm painting and image-based swarm painting.

Colour-based
To date the majority of Swarm Painting systems have adopted a colour-based painting approach. In a colour-based approach, agents paint a blank digital canvas with pre-determined or randomly chosen colours. The majority of colour-based swarm painting researchers utilize an 'ant and pheromone' model. In this model, a colony of virtual ants move and deposit paint on a canvas based on the distribution of virtual pheromones.

Image-based
Another approach to swarm painting is to use an existing digital image as a reference for painting. The use of image files for NPR is a subfield within NPR called non-photorealistic rendering from photographs (NPRP).

The concept of using a digital image as a habitat for a colony of virtual ants was first published by Ramos at the 2nd International Workshop on Ant Algorithms (ANTS 2000). [8] In Ramos' model, the grey level intensity of pixels in a digital image creates a pheromone map that virtual ants are attracted to. Ants deposit paint as they move and the trails they leave form a sketch-like image that contains salient features of the original image. Ramos' primary interest was in image processing and not the creation of artistic works. In fact, the majority of research utilizing digital images as a habitat for swarm-based multi-agent systems has been concerned with non-artistic image processing tasks such as image segmentation, feature extraction, and pattern recognition.

Aesthetic Agents

Our system expands on previous research by using multiple images in conjunction with a swarm-based MAS for NPRP. Although our system references digital images for colour information it does not treat them as a habitat or environment. Instead, agents in our system are assigned a digital image that represents their aesthetic ideal. Accordingly, we refer to them as Aesthetic Agents.

On the surface, the behaviour of Aesthetic Agents does not seem to be stigmergic since the aesthetic ideal that agents are assigned can be seen as a global goal. However, the existence of multiple competing global plans produces images that are not the goal of any individual agent. Therefore, images produced by our system are the emergent result of local interactions since agents are not aware of each others goals or the image that will result from their interactions.

Aesthetic Agents are born in a toroidal digital canvas i.e. a 32-bit ARGB (Alpha Red Green Blue) bitmap image. Agents occupy a single pixel within the digital canvas and are invisible i.e. only their effect on the digital canvas is seen. When an agent is born it is assigned a 32-bit ARGB bitmap image that represents its aesthetic ideal. Aesthetic Agents are both reactive and autonomous. They are capable of 'sensing' the colour value of the pixel they occupy and those immediately surrounding them (Moore's Neighbourhood) and can modify the value of the pixel they occupy.

Agents modify pixels through the interpolation of the RGB components in the pixel they occupy in the digital canvas *c(x, y)* with the pixel at the same location in the agent's aesthetic ideal *i(x, y)*. The amount of interpolation is based on a preset interpolation variable between the value 0.0 and 1.0 where 0.0 is equal to the first number, 0.1 is very near the first number, 0.5 is half-way between, etc. For example, if the interpolation variable is 0.1 (10%), the RGB colour value at *c(x, y)* is (0, 0, 0) and the RGB value at *i(x, y)* is (100, 50, 200) then the pixel at *c(x, y)* will be changed to (10, 5, 20) by the agent.

To initialize our system we create *n* agents, where *n* is the number of input images, and assign each agent one of the images as its aesthetic ideal. Only one agent for each aesthetic ideal is required since the offspring of agents are assigned the same aesthetic ideal as their parent. In our experiments we spawned our initial agents either in the centre of the digital canvas, *c(width/2, height/2)*, or at random locations *c(random(width), random(height))*. For each iteration of the system, agents perform the following actions: Sense Colour & Move, Express Aesthetic Ideal (Modify Pixel) and Reproduce.

Experiments in Swarm Painting

We used our system to explore a number of concepts and techniques from a number of Modern Art Movements.

MONTAGE

Since our system uses multiple images the most obvious visual technique to explore was montage. Montage (French for 'putting together') is a composition made up of multiple images. The technique played an important role in many Modern Art movements including Bauhaus, Dada, Constructivism, Surrealism, and Pop Art. To create a montage we simply take n images and assign each one to a different group of Aesthetic Agents. *Figure 2(a)* shows a montage made of an image of a skull, a lotus flower, and dice.

IMPRESSIONISM

Impressionism was a late 19th century art movement based on the work of a group of mostly Paris-based artists including Monet, Pissarro, Manet, Sisley, and Renoir. Some of the characteristics of Impressionist paintings include small, visible brush strokes, an emphasis on light and colour over line, a focus

on the overall visual effect instead of details, and a relaxed boundary between the subject and background. To explore these techniques we set different pictures of the same subject matter as the aesthetic ideals to different groups of Aesthetic Agents. Our intention was to try to combine similar elements of the same subject matter into an abstracted form. *Figure 1* shows an example in which five groups of agents are given five different images of daffodils.

CUBISM

Cubism was an art movement in the early 20th century pioneered by Picasso and Braque. In Cubist artworks subjects are deconstructed and re-assembled in an abstracted form that often depict the subject from a multitude of viewpoints. To explore this technique we took photographs of the same subject from different angles and assigned the different perspectives as aesthetic ideals to different groups of Aesthetic Agents. *Figure 2(b)* shows the result of this technique and the increasingly abstract effect created as more angles and images are added.

FUTURISM

Futurism was an artistic and social movement founded in Italy in the early 20th century by Filippo Tommaso Marinetti. The Futurists admired speed, technology, youth and violence, the car, the airplane and the industrial city – all that represented the technological triumph of humanity over nature. To the Futurists we lived in a world of constant motion, an idea that manifested in their painting manifesto:

On account of the persistency of an image upon the retina, moving objects constantly multiply themselves; their form changes like rapid vibrations, in their mad career. Thus a running horse has not four legs, but twenty, and their movements are triangular.

To explore this Futurist concept we took successive images of a subject in motion and set the images as the aesthetic ideals for different groups of Aesthetic Agents. See *Figure 2(c)* for an example of this technique.

ABSTRACT EXPRESSIONISM

Abstract Expressionism was a post-World War II art movement that is characterized by spontaneity, emotional intensity, and an anti-figurative abstract aesthetic. It was the first American movement to achieve global influence and was largely responsible for shifting the centre of the Western art world from Paris to New York City. Some notable painters of this style include: Jackson Pollock, Willem de Kooning, Mark Tobey, Mark Rothko, and Barnett Newman. Since we had discovered that increasing the number of competing aesthetic ideals in our system leads to increased abstraction we simply needed to use more images to create completely abstracted imagery. We found in general that around ten images is sufficient to remove all of the figurative details from a set of input images. *Figure 2(d)* shows an abstracted image made by assigning ten different images of a reclining nude figure to ten different groups of aesthetic agents.

The above examples demonstrate the importance of image selection to achieve a particular effect with

our system. Although, some of the effects (e.g. Abstract Expressionism) can create interesting results from random image input, others like Montage require more mindful selection to achieve good results e.g. have figurative elements remain intact and still readable.

Conclusions and Future Work

In this paper we expanded upon previous research that utilized swarm-based multi-agent systems for NPRP through our use of multiple images. We successfully implemented a system that is easy to implement, versatile, and capable of producing novel, high quality artistic renderings. In doing so we demonstrated the power of biologically inspired models and metaphors to create new forms of artist expression. Furthermore, the simple implementation and effective results produced by our system makes a compelling argument for more research using swarm-based multi-agent systems for non-photorealistic rending.

We created our system using a swarm-based MAS, but we are certain that similar results could be produced using another programming methodology. Which begs the question, why use a swarm-based MAS methodology? To answer this we will adopt McCarthy's justification of intentional systems that "although a certain approach may not be required – it can be useful when it helps us to understand and think about systems where a mechanistic explanation is difficult or impossible". As computer systems become increasingly complex we will need more powerful abstractions and metaphors to explain their operation. This is particularly true in the case of modelling emergent phenomenon.

The dynamic nature of our swarm painting system makes it easily extensible to interactive applications. At the time of this writing we are working on a series of interactive installations in which agents are born and populations dynamically change based on input from real-world physical sensors.

In the future we would like to endow our agents with more more biologically inspired attributes and behaviours. More complex movement, feeding, and reproduction strategies will be investigated. In addition, we can extend our current model of an 'aesthetic ideal' to go beyond the colour values of pixels in a target image. Future agent's aesthetic ideal could be be based on other visual elements such as contrast, brightness, and saturation or an agent could have a geometric bias towards creating certain shapes. To explore our system we used a number of Modern Art movements as inspiration for our experiments. Future work will explore the innate and unique qualities of our system. Finally, we would like to create Aesthetic Agents that inhabit a 3D world. Groups of agents could be given different 3D models as their aesthetic ideal to create emergent sculptures. Other Aesthetic Agents could add living textures to the 3D forms.

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UBICOMPUTACIONAL ART: URBAN ENVIRONMENT AND EMERGENT NARRATIVES

TIAGO LUCENA

This paper explores the art in Post Desktop Era and we propose the term Ubicomputational Art with a new field in Cyberarts for study of junction between Art + ubiquitous computing. The ability of urban environments to add information is also exploited in the art in some collaborative practices. We intend showing some mob applications created like an artwork that allow the user tell stories about place in a new open narrative porpoise.

// UBIQUITOUS LIFE CREATING ONE UBICOMPUTACIONAL ART.

Mobile computing, pervasive and ubiquitous computing are the phases that computing platforms are suffering and will change the how we perceive, share and create information.

The ability of urban environments to add information is exploited in the art in some collaborative practices how construction of maps, mobilization (flash mobs) and interventions in virtual metropolis. We started our journey between this relations: city/mobile technologies by participating in some Collaborative Cartographies, flash mobs and wireless or mobile games or location-based games. All these categories use the technical infrastructure of computer and social networks at the intersection of space virtual and physical. In this field of research, we include our interesting to emergent narratives topics remapping the space of the city by adding new layers of data/information.

This research growing up a new collaborative space of LART _ Art and Technoscience Laboratory (coordinate by Dra. Diana Domingues) in intersection between Art and Software Engineering, Automative, Eletronic, Energy at Universidade de Brasília/ Gama campus. A new space opened at Gama Campus where engineers works together artists in a transdisciplinary methodology pointed by Ivan Domingues, philosopher (2005).

The research about cities environments and arts started in the topic of Arts plus ubiquitous computing systems. We propose the term of Ubicomputacional Art, with a new Field in cyberarts for study of junction between Art + ubiquitous computing. The term of "ubiquitous computing" was proposed by scientist Mark Weiser, in 1991, to designate a profound change in computing platforms. These changes inaugurate other models of computing, where computers are effectively integrated into the environments in all daily practices beyond the uses and behaviors desktop metaphors machines. Weiser used the word ubiquitous, (which means something that is or can be in everywhere, omnipresent) to describe a kind of "computing without computers" (WEISER, 1995). "In his telling, desktop machines per se would largely disappear, as the tiny, cheap microprocessors that powered them faded into the built environment. But computation would flourish, becoming intimately intertwined with the stuff of everyday life" (GREEN-FIELD, 2006, p. 11).

The Ubicomp dawning as a phenomenon in informatics researches e undoubtedly will bring changes in how we deal with things day by day. The data contained in virtualized and Cloud Computing, the mobility of wireless devices and interconnections between things through a structure many networks are

other important features such research and have been observed by us in studies concerning the Mobile Art and the Locative Media Arts (Lucena, 2009). We continue this research, raising the possibility that the matter now in the Art Ubicomputational is not only the "mobility" (as it exists in events before the creation of cell phone and its appropriation in art), or wireless connection equipment (laptop, mobile, palm tops) as we suggested before, but the "invisibility" of them. For Weiser "Even the most powerful notebook computer, with access to a worldwide information network, still focuses attention on a single box. By analogy with writing, carrying a super laptop is like owning just one very important book". (1991, p.20). Thus, we approached the Ubiquitous Computing to understand a new art form that rearranges the forms of connection, access to information and the concepts of portability and mobility.

We believe that with these new computing platforms (which includes transparent interfaces, mobile and portable devices , sentient objects and tangible bits) inaugurates a new phase of art. The term Ubicomputational Art is not just the sum of art with ubiquitous systems but also a new mode that is born and a new paradigm for thinking about the relation of art, science and technology.

//ARTS + COMPUTERS

The uses of computational platforms in arts is contemporany with the emergence of electronic computers in the 1950s. The brazilian artist, Waldemar Cordeiro, was one of the pioneers in this kind of art. The computational art works with computational algorithms, which are commands given by the developers to machines that perform the calculations. These productions sought to exploit the potential in the creation of worlds and synthetic images, the possibility of interaction (at different levels of man-machine), the contacts and dialogues established through human-machine interfaces.

The creative process of creation in Computational Art found himself constantly linked with the arrives of graphic interfaces, which somehow facilitated the work of the artist. The tolls of the computer has opened new kinds of art works and share this works for people using networks. The digitization of data, display screens and the ability to interact with them have added significant changes in the artistic process. We are in diverse experiences, accompanied by persons connected away from us, due in large part, interfaces and technological mediations that put us in the same (cyber)space. In this perspective we followed many telepresence, remote actions and at distance art practices. Indeed with the arising of telematic infrastructure the artists trying to connect the so long places as possible. Now, the artists is looking to the space of connection opened by mobile phones, notebooks and other portables devices to see something and tell about places near where they are.

With the artistic practices that use the ubiquitous computing, it has been clarified so that the means of production change significantly the results of the stylistic art. We propose a look at these events and artistic products, emphasizing the elements that differ from the Computer Art or Code Art. Anyway we have to propose new theories to explain this production in contemporary art. Then follow the directions of Manovich (2001), that to understand the logic behind the new media came of Computer Science.

For us, this new platforms for interaction between man-man and man-machines, has opened new pratices of creation in art using the potential of collaborative works in virtual networks.

// BEYOND THE MOBILITY

The use of cell phones in every daily pratices is reconfigure our daily experience, putting us in constant contact with friends, family and work´s topics. The fact that we can be

connected with everyone, anywhere and hours (not to mention the places where the systems telecommunications cover), makes it possible for us different ways of organizing everyday life. The relations characterized by the ubiquitous network grows in spheres of family, social relationships, work, social services, entertainment, based on selective network (Castells, Qiu; Ardevol and SEY, 2007, p. 126).

The cell phone is today the best example to illustrate how computers came to desk to habit our pockets. This movement is important to create the good conditions for ubiquitous computing in a pervasive world. We believe that mobile phones will act as the remote-control of the others objects placed in our homes, in a dialogue between machines. With the m2m communication, Humans will also interact, conscientaly or inconscientaly, with a data space around us, machines will transfer information. "Cyberspace is in everywhere" said William Gibson (2007).

Apparently invisible, computers are "populating" the homes, offices, streets in smart environments, pockets and in many other portable technologies. Reserved in rooms in 50s, computers today keep the relation: many computers for one person. Now the computer and the room are the same thing.

In dealing with the computer in the Post-desktop Era will not do so only through the manipulation of data through the screens of monitors. The mouse and keyboard still stand between man and machine. In Ubicomp, computing will become so intuitive and transparent that its interface will deal with data without having the awareness of such action. The computer "disappear" and goes to the "peripheries".

Weiser points out that the disappearance is a fundamental consequence not only of technology but also of human psychology. When we look at a street, the author quotes, information just evil deeds "without consciously performing the act of reading." This feature has been called various names (compiling, tacit dimension, visual invariants, horizon and ready-to-hand) by computer scientists, psychologists and philosophers. We prefer to use the term of John Seely Brown of PARC that calls such as the quality of being in the "periphery".

Works in art, that work in these lines of investigation illustrated by Rheingold (2002) could be also include as expoents of Ubicomputacional Art, :

1. Information in places;
2. Smart Room: ambient that feel the presence of the person and answer for it;
3. Digital Cities: urban places are able to add digital information in places to help people to walk, to access information about places, services, new practices of e-government, m-government;
4. Sentient Objects: add information and communication ability in physical objects;
5. Tangible Bits: manipulating virtual world by physical objects and
6. Wearable Computing.

The ability of urban environments to add information is exploited in the art in some collaborative practices how construction of maps, mobilization (flash mobs) and interventions in virtual metropolis. Colaborative Cartographies, flash mobs and wireless or mobile games or location-based games use the technical infrastructure of computer and social networks at the intersection of space virtual and physical. In

this field of research, we include our interesting to emergent narratives topics and the concept of the Urban Mixed Realities worked by Rod McCall (2008) and his group.

The readings on the relationship, between physical and virtual space, is also important the concept of Cybrid (Hybrid + cyberspace), proposed by architect Peter Anders (1999).We follow Diana Domingues (2008, p. 6) when she says that the "qualities the environment using a mix of computers and interfaces that take action in co-existing in space and material digital space, in physical space and data space. "For us, the focus of the research of artists and scientists in the ubiquitous world is in the mix of technologies to places. These include so many devices cell phones, palm, notebook computers) and vehicles (SMS, GPS, MMS, e-mail) "that are no longer limited to rooms and offices with fixed equipment, put the computer the periphery by the possibility of locate and to be located. Are the mobile and locative technologies that alter sense of place, time, space "(p. 5).

As background to our work we can localize some location-based games and wireless mobile games. The proposal to link to content in places began deposed our interest in investigating other examples in history of the arts. It read in this relationship between art and the city the work of international Situationists and various other interventions / performances that call poetically attention to the places.

// THE MOB APPLICATION: TAKING THE URBAN SPACE AS A SHARED SPACE FOR PEOPLE TELL STORIES

The user-generated content is configured as a trend in the use of digital communications technologies and information. There are several sites, computational tools and platforms that allow users to create, share and comment on content created by other users.

The participation reaches high levels with the incorporation of mobile phones the computer network. Armed with mobile devices, which can be compared to laptops, people have the sense of presence and enhanced participation by means of tools that allow you to upload any content to the cyberspace from anywhere. The mass self communication (Castells, 2006) are the concept related to production decentralized, and no generalized "mediators."

No less interesting was followed by the incorporation of art and media that also allow the viewer's participation in the process of artistic enjoyment. Something that had already been appointed from a participatory art movement, with various demonstrations that used sensors, cameras and objects to the viewer to touch, feel the art-experience. The interactive art, opened especially after the use of computational resources from the 60's, puts the viewer and the work as a spectator to participate in building the image, the creation of audio effects in a variety of experiences and conditions: multimedia installations, webart, gameart among others. With the rise of cellular proposes a kind of Art in Mobile Media, which has received other names as Mobile Art and Art in locative media. More precisely in the use of mobile devices, many of these demonstrations did not invite the viewer to only trigger pre-recorded images and sounds, but to send images and sounds created by themselves providing geolocated data, being "followed" and "follow" other users in finding information.

Relations characterized by the ubiquitous network are given in the spheres of family, social relationships, work, social services, entertainment, based on selective network (Castells, Qiu; Ardevol and SEY, 2007, p. 126). In art, think about the marriage between participation of users sharing experiences and experiences with the constant connection and mobile afforded by telematic networks. Thus, the aim of

this report is to present the process of creating a mobile application called AQI! The Project Emergents Narratives in Urban Mixed Life: Creating computing platform (mobile app + site) to create / count stories about cities was born of questions and seeks to participation and interaction of users in generating subjective content for mobile interfaces and tools that facilitate sharing information. It has as its central objective the construction of a platform, composed of mobile application AQI! plus site, for individuals to create, share and visualize stories. A geolocated story where the user lives. The project is open to the creative use of stories and lets users fiction are also created. They are user-generated content in ownership of tools that can be exploited in building social communities and networks. The stories are visible encouraging participation and collaboration with another user. The content published may be text, image or video.

The mobile application AQI!, developed as part of this project was built on the Android platform in the Java language and uses the Google Maps Android API, which displays the same geolocated data displayed on the website. The design is user-centered, to create a comfortable interface for any operator (Saffer, 2010). The data are retrieved in XML and HTML server using HTTP. The application also lets you send data directly to the server. By suffirng on the Web, other users can participate using the website created to access and creation of content. The website was developed in PHP and JavaScript, using Apache webserver and PostgreSQL as the database manager. In addition to providing the public information about the project, enables the visualization of geolocated data by Google Maps API and provides an interface to these data for use in mobile app.

This creation of "worlds counted" and stories that encompass the context and the use of mobile phones to tell stories, tries to generate narratives by people in diverse locations, furniture, has as reference "Free the Monsters of Manchester." The project consists of a "campaign political action" by the monsters who lived in the area covered by the City of Manchester long ago, in the industrial revolution but are now "Trapped beneath the tall buildings made of bricks and stones and cement." Manchester residents are invited to take part in the campaign, choosing a place in Manchester, wondering what kind of monster would ever have lived there, and putting the monster in place using the system Anywhereblogs. Users are reminded that: "Monsters are released as soon as you conjure" (Wilson and Hales, 2008). Once a monster is imagined and written about He was found by the people, then it exists and is as real as any part of Manchester. The monsters released are tagged on Google Maps.

In the spatial movements of mobile phones across the cities realizes that the connectivity of the device itself replaces the stereotype of the Internet connected to the PC front, sedentary at home. Some examples in mobile art the displacement of virtual character is only performed with an equivalent shift in space physical performed by the user / player. So these games do not even require only physical movement of the players they are also tools to meet people, make eye contact with others and the appropriation of examples urban fabric as a board.

The same principle is proposed in the AQI! the creative use of GPS, which allows the application accurately identifies the approximate location where it is found. Thus, when designing narratives in the urban environment, to enable urban environments to make available information. The use of virtual maps and geo-located platforms (GPS) allow become "discoverable" the viewer and creator of the narrative. In addition, another important precedent was with the workshop given in the city of Passo Fundo - RS, called Narrative cybrids, mobility technologies and urban life mixed coordinated by Diana Domingues. Where workshop instructors were allowed to think and create stories that emerged in the exchange of SMS, MMS walks in the streets and in meetings with local residents and city in the

State. An interesting quality of the AQi! is given the possibility that people can, and create stories, report the problems of their city, dissemination on the world wide web and collaborating with others in the construction stories. AQI is one mobile application for Android based devices versions 1.6 or higher. Models equipped with GPS and compass. Connected to Internet through the network 3G or wireless plans. It is intended for any user interested in share some event of his life in a particular location or create a story about a particular place, showing new possibilities to the relation between urban spaces and opened narratives. Users can create their stories through the use of the web, and from the phone itself. Stories are shared and open to collaboration with other users. In addition, anyone can comment, quote and build together with others in a process collaborative writing stories.

Integrating arts experiences and biomedic engineering at Brasilia University, acting in LART we proposed the collaborative project called CidadePathia (something like Pathos of the City). This conceptual project will be a intelligent system in u-health (ubiquitous health) that select some biological data from citizens from Brasilia. The system select some data from users using biomedical sensors and mobile phones, this information will be upload to one map that allow people, urbanists and health professionals to see where and when some diseases appear. Of course, combining some of these biomedical data we can know if the citizens are stress, calm or having heartbreaks. For now, is just one project that follow the ideas from AQI! In this kind of integration between intimate or documental stories with urban space.

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DANCING CODE, SHAKE YOUR PARAMETERS

Alessandro Ludovico

Humans have a unique ability to build formal languages. We use them to both communicate among us, but also to communicate with the machines we assemble. Computer programming languages and natural languages are both formal languages. Nonetheless they stay at the antipodes: one is close to our anthropological way of communicating and the other is close to how the inner machine logic works.

Fig 1. Mez Breeze, mezangelle example.

Fig 2. Open Framework logo.

Fig 3. Dance position with dance notation (Benesh)

Humans have a unique ability to build formal languages. We use them to both communicate among us, but also to communicate with the machines we assemble. Computer programming languages and natural languages are both formal languages. Nonetheless they stay at the antipodes: one is close to our anthropological way of communicating and the other is close to how the inner machine logic works. But, they both instantly establish an understandable abstract environment to describe processes. Their point of contact is centered in the way we're able to write programming language code closer to our natural language (English is the universally adopted one) transversally modifying the way we formulate what we'd like the machine to do, and so generating a significant output. This formulation is a hybrid territory where pure language, explicit dynamic structures and simple to complex formulas collide. Loops, cycles that run depending on value-driven decisions are outputting computed meanings. Words and numbers, meaningfully sequenced are directing the formation of a text, a drawing, a picture, a sound, a movie, or a combination of all the above, with the programmer acting as an open scriptwriter and the user acting as a temporary director and spectator at the same time. These two actors (the programmer and the user) have an invisible and time-delayed relationship that is defined through the programming code, and the same code embodies the many adapted and twisted senses mutating the natural language. This is the territory where historically "software art" steps in. Playing with language and its power to generate impressive output thanks to its ability to use a readable formal language, that is potentially generating infinite sense (as the natural language does).

1. SOFTWARE ART, USING FORMAL LANGUAGES AS ART

Software art ancestors have been retrieved in the seventies, among the artists ascribed to the conceptual and performance art movements. And that now sounds quite plain to see, as they were art movements dealing with language at their core. Particularly "Draw a straight line and follow it" is one of the celebrated conceptual artworks by the composer La Monte Young. It's a small masterpiece as it can be seen as a music score, a piece of visual art, a poetic text, a performance. [1] "This piece can be called a seminal piece of software art because its instruction is formal" Florian Cramer and Ulrike Gabriel claimed in their seminal "Software Art" essay in 2001. [2] Technically it can be defined as a loop, more

precisely an infinite loop that generates a proper half-line, with a fixed origin and a straight direction with no end. It's a concept expressed in natural language, but it perfectly describes the structure of a typical computer programming loop (do something infinitely or until something else happens). Its endlessness has an intrinsic dynamic that is a peculiar software characteristic: dynamically designing a process and enabling the dynamics precisely generated by the software itself. The code becomes than a script infinitely variable as the natural language is. And code becomes a pure linguistic performance, in this perspective. In recent years artist Mary-Anne Breeze has epitomized this approach. She created the "mezangelle", a language composed with hybrid words (conceptually close to the portmanteau words invented by Lewis Carroll). [3] Moreover in mezangelle the words are not only condensed but they also recombine language, stacking multiple layers of meanings into single phrases. This is accomplished hybridizing formal code and informal speech into a condensed textual space (like, for example in "[vec]Tor[n]Space_[di]Stancing"). She cut forms, conventions, phonetic spelling, abbreviations and slang used in the internet culture at large and grafts them onto regular words in a still readable way. These alterations don't follow fixed syntactic or grammar rules but more a very coherent "style" that is instantly recognizable. The poetry and the discourse she composes are an ever changing morphological synthesis of different formal languages into a variable one that embodies the tremendous potential and dynamism of them combined in a different way every time she writes a new text. That's why the initial dilemma of how to categorize art made with software (involving telematic networks or not) has been generally solved sorting it as "performance," that meant to preserve its essential dynamism. In fact considering software as a performance means to acknowledge its linguistic properties, including having a beginning, (at least potentially) an end, and a process that goes on between the two. Moreover it means also to definitively recognize the strategic role of the instructional code and its literary gesture, involving scripting entities and events that form the process. The result is always formal, being it natural language, code or a hybrid one, but it's nevertheless written in a universal and unambiguous language.

2. DANCING CODE

Software can be then defined, with no doubts, as a dynamic process. It can describe an infinite type of processes in a formal language making the computer calculating the output, basing on some input. Now let's consider the dance practice as a process. Especially popular type of dance is often quite formalized through a recognizable code that anybody can follow. There are a few notation systems for describing dance, but none of them are acknowledged as a major standard, and universally acknowledged. The best known are the Labanotation and the Benesh Notation [4] and they use abstract symbols to specify the position of body parts, their direction and the speed of movements. Every notation system has developed its own array of symbols and syntax to generate a shared formal language to express the "set of postural and motion rules to define how the execution of the movement is to be applied." [5] The finite sequences of these symbols are describing an animated sequence of a body performing a choreography with its own embedded narrative. Here the space, where the body is moving, has to be precisely described and the used codes are rendering the space's different peculiarities in a symbolic way. Nevertheless the whole sequence of a notated choreography is a code that functions in a very similar way a software program does. It needs the body as the input and it generates an output of a whole animation of movements in space. Dance is then animating the body through a code and it expresses the smoothness of transition between the start and the end of an event, with all the dynamics in between. Seen through an anthropological perspective, the "code" of dancing practices (feet and body positions, and the sequence of movements) has been historically spread through an oral tradition that in the 20th century has eventually become viral. The description of entities and their movements has been assumed to be learnt by heart (almost in its literal sense), to be then stored and transmitted

eventually with variations. It has been a social process with dynamics similar to what FLOSS (free/libre/open source software) programming is nowadays: acquiring a code, using it, eventually modifying it and vastly sharing it. So it'd not be any accident if computer programming, FLOSS, dancing and social aspects would collide in some ways.

3. PROGRAMMING ANIMATION IS A WRITING (MOVING) PROCESS

So can we consider "computer animation" (the process of programming the movement of different objects on the screen) a form of choreography? Probably yes. Programming animation on a screen is definitely similar to notating or coding a dance choreography. Nonetheless in computer animation the human body is abstracted into any kind of programmable forms, and the space is a virtual three-dimensional one, visualized in the two-dimensional screen. Computer animation can be then considered as an "abstracted dance", since the principles of movement in space remain the same, generally including the physical law we obey to in physical reality. But it retains some specific characteristics of "dance", for example being based on harmonic movements that are expressed through a timeline and strategically positioned in the virtual space, with a peculiar narrative. Beyond that, programming computer animation is an activity that implies some computer programming skills, or being able to describe processes in a computer language code. If historically it has been made in programming code that was very close to the machine logic, one of its major popular shifts has been accomplished in the nineties with the Adobe Shockwave [6] platform. Making animations in Shockwave (with the historical characteristic of being viewable for the first time within any web page through a standard plug-in) involved learning the script proprietary programming language called Lingo. [7] Despite that, a substantial wave of animations was produced in the first wave of the web, and for cd-rom supports as well. In the years two thousands the awareness of the FLOSS (free/libre/open source software) community produced new types of platforms, including openFrameworks, [8] founded by Zachary Lieberman, [9] that were able to move this coding practice to another level of social interaction. Lieberman noted that he spent his childhood in a printshop. That made him aware that a printing machine, indeed a powerful machine to produce content on a medium, is not something that can be easily owned by a single person, because is too expensive and definitively too heavy. It has to be eventually shared, capitalizing, both socially and economically, on the small community that can be formed around it. He learned as a kid that sharing content producing platforms and skills was the key to improve knowledge and produce beautiful products.

Lieberman engagement with computers and code led him to program animations, and teaching how to do that, in a peculiar way. He considers it a social process, more than a mere technical or educational one. That is evident in his personal research developed working with magicians, in order to help them integrate digital technologies in their public performances. Magic has different distinctive characteristics. It involves deception, because it involves distracting our attention and senses from what is being manipulated. There are also strict rules as, for example, that visual tricks are usually never unveiled, except among the practitioners. But magic involves fascination, and especially being in the mood to let ourselves be fascinated. Still magic is also something experienced in public, and it's an emotional experience. Once shared, it can be a terrific medium of communication for its perceptual involvement, and somehow it's already exploited in communication to wake up the spectator's attention. But again it is a language skill. And it means to share a common language. Once the people involved are comfortable with a language and a grammar they can communicate, collaborate, share and build systems together. Somehow that almost literally means to bring life to code. If anthropologically building machines that seem to be "live" means to us to construct something with its own moving autonomy, for our senses building a system that contains autonomous entities that follow their "code"

to act, is one of the closest situations where to consider that system as a "live" one. Generating this kind of artificial life is close to our instinct that pushes us to build sophisticated machines that resemble our behaviors. Programming code becomes then the esperanto for building autonomous systems that can rely on the beauty and "magic" of animated objects, unifying a small community around its efforts of creation and simulation of "systems."

4. PROGRAMMING LANGUAGES CAN BE SOCIAL INTERFACES

Language is our most used social interface, but under the proper condition, a programming language can be a social interface too. In the case of openFrameworks, the code, developed under proper FLOSS conditions, becomes social for various reasons. First it relies on an active community that supports it and guarantees its technical update and management. Moreover, when dealing with animation, it deals with an activity that can be "socially" processed as dance historically has been done. Finally quoting Lieberman "we're moving away from objects, we're building systems." The dynamic environments built in open platforms like openFrameworks are shared and constitute micro-worlds that include the internal relationship, as small virtual communities. The process of building them can reflect the social communities outside these environments and reflect them both in the functioning models applied and in building and sharing them through the developing community. There are interesting social consequences for these practices. One is how language (any hybrid one can make by computer code and natural language) can build dynamic social systems and compelling animations beyond enabling a simple communication. And another one, even more important, is the crucial awareness that a temporary or fixed community can build a system, sharing it and using it, or improving it at will. Designing systems collaboratively can then change the communication we usually use. Staying free under these conditions we can become a multitude of test beds on how we can change ourselves and our cultural neighborhood.

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THE FLUCTUATING BORDER BETWEEN ARCHITECTURE AND THE BODY IN SHIVER

Colleen Ludwig

Shiver is an immersive, interactive environment that uses physiological and psychological aspects of skin as visual metaphors and sensory mechanisms. The edge between body and space forms an ever-present, fluctuating borderland. My research on skin biology and the phenomenology of space results in a work that engages the body surface, activates the senses, and brings the body into direct relationship with its environment.
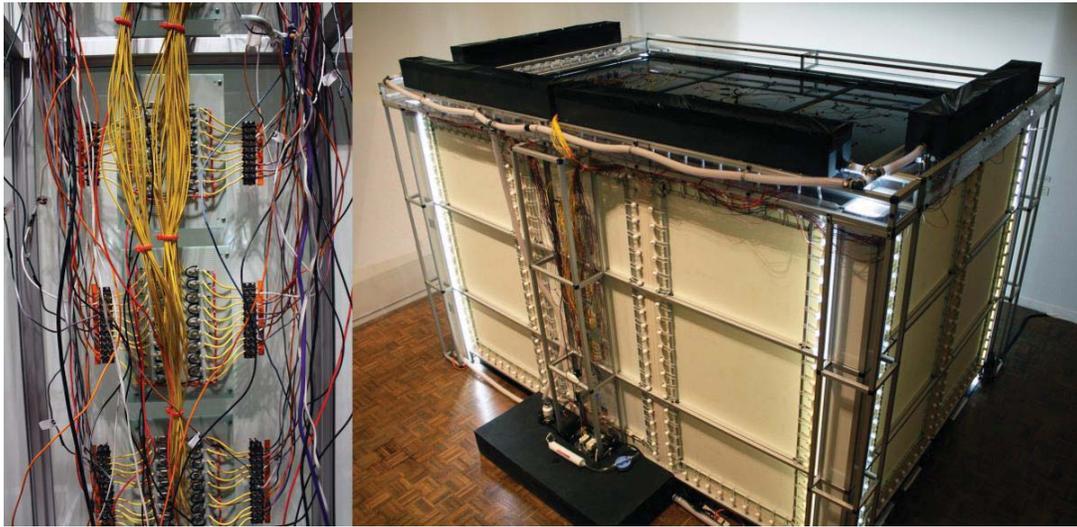
Fig 1. Shiver, exterior and detail, 2011, Colleen Ludwig, aluminum framework, fabric, plumbing, electronics and programming, 10' x 14' by 12.5'. Photographs by Colleen Ludwig.

Fig 2. Shiver, interior and detail, 2011, Colleen Ludwig, aluminum framework, fabric, plumbing, electronics and programming, 10' x 14' by 12.5'.

Shiver is an immersive, interactive environment, that integrates programming, electronics and a recirculating water system into a pre-fabricated, architectural framework with specially treated fabric walls. The resulting room is filled with cascading water flows, which develop organic patterns and conjure an impression of compassionate space. *Shiver* is a meditative place for mindful sensing of the body as it integrates itself into the surrounding environment. I created this artwork to poetically articulate the fluctuating border between architecture and the body. It is the first room in a series called *Elemental Bodies*. Each of these rooms set conditions which ask participants to experience their skin as a mediating border between viscera and atmosphere. [1]

Upon entering the artwork, visitors activate trickling flows of water. A sensor matrix in the ceiling tracks people as they explore the room. That data is used by microprocessor software to move the vertical water flows along the walls in response to a visitor's position. Individual streams naturally form curvy rivulets that cling to, and creep along, minor topographies in the water-resistant fabric walls. The patterns are similar to what is seen on wet human skin. Due to surface tension and capillary action, the flows bulge and contract slightly, giving them a shivering effect.

Groups of contiguous water streams form *nodes*, which grow from a central stream to widths of 3, 5, or 7 streams. Nodes get bigger as you approach a wall and smaller as you withdraw, creating the illusion of water emerging from, and receding into, the wall membrane. Multiple kinetic responses of the water flows in *Shiver* encourage participants to walk slowly and change vantage points, in order to cause the room to react in different ways. Although the exterior is heavily equipped with mechanical contraptions, the water formations enliven the interior space and bring primary focus to the organic. The effect can be both soothing and unnerving, as the beautiful, watery forms invade a space we expect to be dry and neutral. The invitation to touch the flows is implied, but not stated. This adds tension, as each viewer must weigh the desire to touch the water with possible unintended consequences, including wetness, surprises, altering the water paths or breaking the piece.

The physiological and psychological aspects of *skin* are used in *Shiver* as both visual metaphors and sensory mechanisms. Visitors are encouraged to examine their agency in constructing boundaries between themselves and their immediate environment. The space between a visitor's body and the room's skin is excited by the swelling, shrinking and shifting water flows. These changes shift people's perceptions of the scale, moisture and heaviness of the installation space. The title of the piece, *Shiver*, refers to skin response to light touch, air movement or close proximity to another living being. As visitors walk around the room, the rivulets are programmed to move symbiotically along the walls. A non-verbal conversation emerges, and the room itself appears to be highly empathetic. My desire is for viewers to return that perceived empathy through their movement in the space. This haptic feedback loop creates a sense of physical intimacy, within a space that functions as if it is a sentient organism.

In the *Elemental Bodies* series, my premise is that the edge between body and space forms a fluctuating borderland that is always present. The viscera of the physical body is encased by skin, but the senses extend the border of the corporeal self. This boundary varies in accord with physiological, psychological and environmental changes. Skin shields our interior workings and makes them mysterious, but also acts as a profound mediator between our inner and outer world. *Shiver* is meant to heighten awareness of such negotiation.

My perspective on skin has been reinforced by studying its biological and structural functions. These are described and analyzed in non-clinical language in *The Body's Edge: Our Cultural Obsession with Skin*,

written by pathologist Marc Lappé. [2] He compares our common perceptions to biological reality: "Until recently," he says:

"we have tended to think of the skin as…a watertight covering that enfolds ourselves and our organs and keeps them separate from the world out there. We visualize the skin in purely Euclidian terms, as a two-dimensional sheet that envelops us in a kind of perpetual Saran Wrap. …In actuality…the skin is a highly convoluted, vulnerable, three-dimensional landscape. [It] has valleys, ridges, and folds, much as does the earth's surface. And, like the earth, it is shot through with pores, holes and channels that greatly increase its surface area and make it anything but a smooth, two-dimensional surface." [3]

 Lappé continues:

"The skin is actually designed to permit a constant flow of insensible [unmeasurable] water percolating upward from its deeper layers. …This water resistance but not waterproofness of the skin is due to the coexistence of two different pathways. …These pathways take the form of molecular sieves that inter-penetrate the skin much as wormholes pass through ancient wood. …These channels are positioned un-derneath the skin like the honeycomb of a beehive. This structure provides tiny interstices where…slightly salty water constantly percolates upward to the skin surface through the underlying der-mis, much as a plant receives replenishment from its roots." [4]

In the collection of clinical essays, *Biophysical Properties of the Skin*, author J.R. Kanagy opens his chap-ter on water absorption with a declaration: "The relation between water and skin is one of the most im-portant phenomena of life on this earth." [5] He explains that most body water is bound in gels of con-nective tissue and cell bodies. "Water is, in a sense, skeletal in that the physical properties of…tendon, ligament, bone and the tough connective-tissue structures…are altered very appreciably by both in-creases and decreases in this content of bound water." [6] In an essay on electrical properties of skin from the same book, Dr. Robert Edelberg writes: "In addition to its role in thermoregulation and water-balance, the skin is also a tactile sensory organ, and its mechanical characteristics greatly influence the nature of the neural pattern which occurs where it makes contact with an object." [7]

While *Shiver* doesn't schematically represent skin, its architectural presence and water interactivity in-vite comparison to these biological descriptions. Lappé, Kanagy and Edelberg's observations reveal a framework for skin that is architectural in nature and intrinsically linked to water. In *Shiver,* the struc-tural and sensing systems are two physically integrated layers located outside and inside the wall mem-brane. In concert, they offer an experience of *ourselves-in-space* and construct a loose representation of sensing. The beautiful, refreshing presence of water in *Shiver* reflects Lappé's assertion that: "Our sense of psychic well-being is inextricably linked with our skin." [8]

Edelberg's statement regarding touch evokes the use of our hands, but our primary touching experience is through the skin as a whole, by far the largest organ in our body. Skin pushes against the exterior world, touching air or clothing at every single point on our surface. Our skin's contact with space is criti-cal to forming our experience of space. Skin enables us to gauge the size and ambiance of the environ-ment. It reveals details of our location through temperature, humidity, electrical charge and air move-ment. Skin sensing is a major component of the intuition mechanism, and helps us predict interactions with other living beings through subtle perception of factors such as heat, tension, fear, conductivity and health. Together with the eye, skin allows us to comprehend our surroundings without directly using our hands to touch them. In addition, skin's high degree of permeability causes us to be in constant inter-change with our domain, contributing to metabolism, immunology, temperature regulation, absorption

and health. Skin is multi-purpose, resilient and interweaves us with our immediate environment. We meld with space. Our boundary is not an edge. It is an atmosphere.

My ideas about the role of space in human experience are further defined by architect and theorist Juhani Pallasmaa in his 1996 book, *Eyes of the Skin: Architecture and the Senses*. [9] Pallasmaa outlines an architectural history that is dominated by "ocular-centrism" and calls for design that is "multi-sensory" and "puts the body at the centre." He places touch at the core of that mission. "Touch is the sensory mode that integrates our experience of the world with that of ourselves. "[M]y body remembers who I am and where I am located in the world." [10] Citing noted anthropologist Ashley Montagu's book, *Touching, The Human Significance of Skin* [11], Pallasmaa notes:

"All the senses, including vision, are extensions of the tactile sense; the senses are specialisations of skin tissue, and all sensory experiences are modes of touching and thus related to tactility. Our contact with the world takes place at the boundary line of the self through specialized parts of our enveloping membrane."

 He poetically compares sight and touch: "The eye is the organ of distance and separation, whereas touch is the sense of nearness, intimacy and affection. The eye surveys, controls and investigates, whereas touch approaches and caresses." For Pallasmaa, "Architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses." [12]

Shiver is meant to open the senses to the expanse of the room. As we move through physical space, our awareness wanders as we attune ourselves with touch, sound and sight. Electrical conductivity and heat radiate off the skin like an aura. Involuntarily, we exercise an innate ability to modulate our senses in order to become more responsive or more isolated from our immediate environment. We may self-protectively shut down our awareness – subconsciously, but with purpose - in order to avoid unpleasant sensations. Physiological and psychological pain are sometimes more feared than actually felt, and may provide us with a great deal of self-information, if we are willing to pay attention. Adding to our confusion about the value and need for sensation are recent commercial technologies, which encourage us to distrust our senses and rely on personal, electronic devices for presumed accuracy about the natural world. The mobile app preempts our skin's natural ability to know that the weather is changing. We fill gaps of time by scrolling through our smart phones, fascinated by their responsiveness to touch while ignoring or discounting our own abilities to experience sensation through our skin.

For Pallasmaa, the room takes on sentience simply by its existence. "A work of art functions as another person, with whom one unconsciously converses. When confronting a work of art we project our emotions and feelings on to the work. A curious exchange takes place; we lend the work our emotions, whereas the work lends us its authority and aura. Eventually, we meet ourselves in the work." [13]

For the construction of *Shiver*, it was important to me to contain the water phenomena within a room-sized space to amplify the relationship between a visitor's skin and the wall membrane. A *room* is broadly defined in the dictionary as, "a space that can be occupied," [14] and this applies to skin as much as to space. A room becomes the casing of your casing – containing, mirroring and doubling *all-of-you*. It has its own atmosphere, which determines what you will wear and permits or denies the effect of air movement on skin. The size and texture of a room defines your body language and the scale of your gestures. Its layout and furnishings dictate the extent of your impact by describing your range, movement, vocal magnitude and timbre. For most of us, the idea of *who-you-will-be-today* is created in rooms, as we navigate questions of social position, authority, formality and vulnerability.

Shiver was created to be a temple of compassion. It will not ignore or overlook you, but pours with sensation. One could argue that *Shiver* has the visual representation of the body flipped inside out. Images of guts, spine, nerve-endings and muscle are depicted by the circuitry, wiring, valves and exoskeleton of the room. Inside, the clean, smooth walls create an impression of the skin surface. This delineation between the convoluted outside and minimalist inside of the room is meant to separate *structure* from *experience*. Exterior technology evokes biology, but also references psychological filters such as memory, presupposition and wishful thinking – mechanisms we construct to mediate our experience of the world. The spare, monochromatic interior allows for a meditation on pure biological sensation without context, just as the water flows create their serpentine forms without obvious topography.

Although technology in *Shiver* is visible, it remains mysterious, and one's understanding of personal agency becomes slippery. The room's reactions to viewer movement can sometimes be anticipated, but at other times may frustrate or surprise. While many interactive artworks use a mirroring strategy to form the relationship between the viewer and the work, *Shiver* is somewhat less predictable. Leading, following and joining are additional tactics for engaging with this work. The level of intimacy with the room is akin to that shared with parents, lovers, close friends and self. You have to work, as with your human intimates, to comprehend the messages passing back and forth. This dyadic relationship with the visitor may eventually lead to a perception that the room is being sneaky, teasing or flirtatious. The water flows on the wall membrane express a feeling of being *turned on*, wet and shivering in anticipation. [15] The sturdy architectural presence of the room softens, and you become conscious of the physical volume of your body and the space within the room. Ultimately, you experience a perception that the room has a consciousness of its own. Comments from visitors to *Shiver* provide evidence that my intentions are realized: "It taught me a valuable lesson about slowing down and listening," "It has secrets, some it will share, some it won't" and "It is like foreplay. You try one thing and if that doesn't work, you have to try something else."

Organic elements in the four works planned for the *Elemental Bodies* series include water, air movement, heat, magnetism and tingling. Each element has a distinct way of engaging the body surface, activating the senses, bringing the body into direct relationship with its environment, and to the forefront of consciousness. The connection between our inner and outer ecosystems is made palpable. Lappé says: "In a strange way, we identify our skin with our innermost selves." [16] The works in "Elemental Bodies" restate the value of skin as a sensor that gauges conditions and acts as a harbinger for intuitive knowing.

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THE MUSICAL SCORE: THE SYSTEM AND THE INTERPRETER

Thor Magnusson

This paper introduces live coding as a new path in the evolution of the musical score. Whilst being the perfect vehicle for the performance of algorithmic music, it also transforms the compositional process itself into a live event, where play and generativity become essential. Live coding is presented as a highly technologized artistic practice, often embracing graphical elements and language syntaxes foreign to standard programming languages.
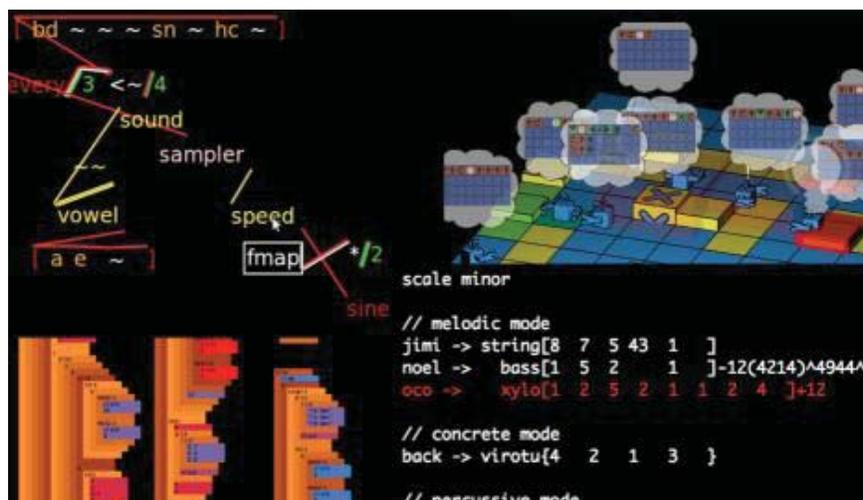
Fig 1. Four different live coding environment displayed clockwise: Texture by Alex McLean, Al-Jazari by Dave Griffiths, ixi lang by Thor Magnusson and Scheme Bricks by Dave Griffiths.

Fig 2. A screenshot of ixi lang in action. Various agents are playing their instruments with scores. In addition the matrix window shows another mode of ixi lang coding.

It is a fact that in the evolution of instrumental music the performing musician has been condemned more and more to converting increasingly complicated scores into tones. Musicians became a sort of machine substitute, and finally there no longer remained any room for "free decision", for interpretation in the best sense of the word.[10]

Opening the Musical Score

The musical score has always been in constant evolution. The score implements the idea of encoding music such that it can be stored, disseminated, and performed at later occasions. Initially the score served as recording device, but it quickly became a tool for thinking music at a more complex level, serving as an extension of the composer's cognitive capacity. The idea of looking at the score as a technology that has had dramatic effects on music corroborates with the findings of scholars who study the difference between oral and literal cultures. [9] Concomitantly, any history of the musical score will demonstrate the increase of sophistication in the control composers assert over performers. Whereas in early medieval and renaissance scores large parts of the music were improvisations, the 20th century score became highly specific, where explicit and increasingly nuanced instructions were given about pitch, loudness, rhythm and articulation.

In the late 19th century, systems using loom punch cards in order to encode music for machine playback (e.g., in pianolas and other musical automata) became popular and this development of automatic music took a leap in the 20th century with the commercial use of audio recording. As a response, and in an opposing spirit to this machine representation of music, composers began exploring new systems for composition, where graphical scores and textual instructions became more prominent. Related to these developments, the score was increasingly understood as describing gestural information for the performer, rather than being descriptions of pitch organised in time. The works composed in the first half of the 20th century for prepared piano, e.g., Villa-Lobos's *Chorus no. 8* (1925) or John Cage's *Bacchanale* (1940), are good examples of this shift.

A further evolution took place in the 20th century's conception of the musical score. With works such as Stockhausen's *Plus-Minus* (1963), Pouissieur's *Scambi* (1957), or Cardew's *Treatise* (1963-67), we gain the notion of what Umberto Eco calls the "open work" and the "work in movement", where the form of the composition itself "consists of unplanned or physically incomplete structural units" [5]. In these pieces performers are given a chance to improvise and interpret the score, such that the work has much wider expressive scope. In the words of Stockhausen from the same text as the initial quote:

But fit is noteworthy that the same composers who had called electronic music to life, *parallel* to this work in the years since 1956-57, published compositions which present the performing musician with a completely new responsibility. [...] in this new instrumental music the performer is granted fields for free, spontaneous decisions, to which machines are not amenable. [10]

The motive of this article is not to analyse how machines have evolved since Stockhausen wrote this text. What is of interest is how, in Eco's definition of the open work, it is clear that the openness under discussion is not a passive interpretation of the piece, but rather an active engagement where the structural elements of the work are manipulated by the performer or the listener. The open work is therefore a system that enables the interpreter to actively engage with the score itself, reinterpret it and appropriate it to the context in which it is performed. In a way, a feedback loop has been introduced between

the performer and the score; an idea that (strongly amplified) becomes a central feature of live coding performances.

The musical score is a system of instructions: abstractions that represent musical gestures for the interpreter of the score. From this perspective it does not differ much from the instructions inscribed in software that generates music. In fact, there is no intrinsic difference in writing music in the traditional staff notation or as software code. The question is rather what kind of interpreter the music is written for and what logic is applied for non-deterministic decisions, if those are used in the piece. As a matter of fact, the computer can easily read staff notation and the human instrumentalist can perform music by reading computer code. This paper will look further at the question of the interpreter, but also how live coding systems, particularly as they emphasise the performance elements of musical coding, can be seen as musical compositions in their own right.

Interpreting Code: The Appeal of Software Art

In the last decade software art has become a prominent field where musicians, designers, programmers, and artists of various art forms explore the potential of the computer to execute their art. Traditionally, software art has focused both on the formal structure of code, following the modernist tradition, and engaged with society and politics where software serves as a cultural critique. [4] Since its inception, software art has shown that writing code can be just as gratifying artistically as painting on canvas or dancing on stage (see www.runme.org). Indeed, the ubiquity of computational algorithms in our daily life has given birth to a new research field called software studies, which engages with the role of software from a cultural theoretical perspective. [6] Software art might be a subordinate field of this research programme, but the question remains if the category of software art is merely a transitional one, due to the omnipresence of software in all types of art and the general realisation by artists that generative features can add value to their work.

Artists have become attracted to software. In the art after Fluxus – which emphasised process, audience participation, and performance as algorithmic instructions – practitioners have become intrigued by the potential of delegating some of their creative decisions to algorithmic processes, which can be based on, for example, stochastic models, environmental variables (such as weather, animal behaviour or human interaction), or artificial intelligence and artificial life. Computational creativity, the idea of writing systems that produce novel solutions to 'problems' such as creating art, has proven appealing. [2] In this field, various generative music systems have been created with impressive results, and in the world of painting one might consider the work of Harold Cohen, with his robotic painter Aaron, as a strong candidate (http://crca.ucsd.edu/~hcohen/). More recently, this idea of creative delegation to non-human processes is strongly explored in bio-art where biological systems are used as parts of the aesthetic process that create, or indeed *are,* the artwork. (see for example the work of Andy Gracie at www.hostprods.com or the activities of Symbiotica at www.symbiotica.uwa.edu.au)

Although software art is often exhibited in galleries, its natural habitat is on the internet where software can run in the user's browser or be downloaded as standalone applications. Much software art retrieves data from online servers, strengthening the dependency on the networked grid and relating strongly to another strand of computer based artistic practice called net art. [1] The software is an artistic product, like a book or a film, to be enjoyed and interacted with by the user. It is a system of abstractions that can present any artistic media, but at the core is the artistic expression whose *material*can be any medium, multimedia or code itself, but whose *form* is necessarily encoded as software code. Often the

software is of a generative nature, rendering new versions of the piece, each time it is executed. Here the software operates as a score or a script that is interpreted by the machine. Indeed, in many programming languages, the primary system that executes the code is called the *interpreter,* resonating with how musical scores can be seen as abstract instructions performed by the human interpreter, the instrumentalist.

Live Coding as Delegation of Intention

Musical live coding, [3] [11] arguably a subordinate field of software art, is different in this sense as it requires the human to perform the work. In order to be able to write code as a performance act, the programming language has to be at a level allowing the live coder to quickly write the musical algorithms in an improvisational way. Few audience members would endure the manner in which compiled languages are written, for example. This has resulted in a practice where the live coder "composes" a system outlining beforehand the musical constraints. This, in many ways, is akin to composing music, in particular the 20th century open work scores (as analysed by Eco) that typically break out of traditional notation, for example by using graphical encodings. Creating a live coding system can therefore be seen as a compositional activity although, of course, the boundary between a composition and an instrument are never clear in computer music.

In live coding, the system can be seen as carrying out the role of the musical score, performed by the live coder. This performance is based on a strong practice of engaging with the score by writing instructions for the *language* interpreter. We therefore have a twofold layer of interpreting, one where the human interprets the piece (which here is seen as the live coding language itself) and another where the language interpreter interprets the human performance. Between the live coding system and the interpretation of the computer, a space is created in which the live coder improvises, composing in real-time through writing code, in a style of performance that requires a journey back to the baroque period if we want to find a strong parallel (an activity then called *extemporisation*).

From this perspective, one can frame the live coder as a delegator akin to the artificial life or biological systems mentioned above. If the live coding system is seen as a musical piece itself, the performing live coder becomes the interpreter of that piece, rendering variations of its generative potential.

It should be noted that live coding does not have to involve computers at all. Nick Collins has, for example, done various experiments with live coding of human performances where he has worked with choreographers, dancers and music improvisers in writing instructions that can be algorithmically executed. Collins defines live coding as an activity that necessarily includes a reflexive element, stating that the "more profound live coding must confront the running algorithm." [3] If we accept this strong definition of live coding – and Collis does acknowledge that many live coding performances do not live up to this promise – it is clear that live coding introduces a new form in musical practice that actually requires performers to exercise their free will during performance and rewrite the score (the running algorithm) ad hoc.

Three Live Coding Systems

The live coding systems I have in mind in this article are typically custom made and unique expressions of their authors. Although one can live code with any interpreted language, such as Python or Scheme,

the typical live coding system is built *upon* such a language, creating a higher-level abstraction that effectively becomes the scope in which the performer works. The questions of affordances and constraints in creative systems become pertinent here, since the constraints of a system often yield strongly creative output. [8]

Alex McLean is currently working on a live coding system called Texture where one writes textual instructions for the interpreter, but this text is of spatial nature where location and proximity define the meaning of the words and their functions within the main synthesis or musical graph. The aesthetics of this programming language reminds us of concrete poetry, whereas the functionality resembles a mixture of Pure Data and SuperCollider, which are both audio programming languages used in live coding. The environment is impregnated with common computer music terms of oscillators and filters, and mathematical functions are presented with common symbols in addition to lines that define the relationships between the signal graph objects.

My own ixi lang is a highly constraint system built on top of SuperCollider. The idea here is to create a performance framework enabling me to write quick code that results in the formation in a musical piece in few seconds. The more I play with this system, the more I get the feeling that the system itself is a musical score that I play differently each time I perform it. If ixi lang is a piece of work in itself, a performance using it becomes like a variation of its expressive potential. I should note that, unlike Adrian Ward with his Auto Illustrator software art piece (www.signwave.com), I do not consider myself a co-author of the music made with ixi lang. As a musical score, the ixi lang exist at a meta-level above direct instructions. The software was released two years ago and it has been very inspiring to see how other people use the system. Surveys, user testing and interviews have confirmed that users of this system enjoy the inbuilt constraints and report that this can yield creative results. [7]

Nick Collins, a long time live coder, has recently created a live coding app for the iOS operating system. The application has a simple user interface, consisting of the letters in the TOPLAP (an organisation concerned with live coding - see toplap.org) name that can be dragged around the screen to program a virtual machine for sound synthesis. The patterns of these letters become the instruction set for the interpreter to generate audio, typically a quite noisy but interesting output. This app is a good example of an open work in the form of a software, presented as a live coding system where the end-user performs the piece, in a manner envisioned by Pousseur when he composed his work Scambi. This work also shows the potential of creating live coding systems aimed for distribution and active interpretation by the performer/listener.

It has to be noted though that live coding systems are very diverse, from high level languages to lower level systems, from graphical representation of code to textual, and using diverse types of input devices, although the computer keyboard might be the most common device. The definition in this paper of live coding systems presented as types of musical scores might be less appropriate for more general audio programming frameworks like Impromptu, ChucK or SuperCollider. The three systems discussed in this article should be seen as open work scores existing at the meta-level, thus giving the performer a wide scope for expressive freedom.

Conclusion

This article has focused on live coding systems as a development in the history of the musical score. The live coder has to practise the important skills, but the system enables the performance to be highly improvisational, in ways that relate back to medieval and baroque music, but contrary to how the late 19th and 20th century music tradition formalised the musical score and performance (with few exceptions). The paper has drawn these parallels with older music and systems of representing it, but also contextualised live coding as a practice that relates to new types of musical scores originating from the mid 20th century. Additionally, the technological framing of these types of works, strongly engaging with the history of machine music and its encodings, afford new ways of relating to the performer, the listener and the social setting in which musical pieces are presented. Live coding is therefore an offspring of two strong traditions involving the formalisation and encoding of music, often for machine realisation, on the one hand, and the open work resisting traditional forms of encoding, on the other.

Generative (or algorithmic) music is currently undergoing renaissance with novel live coding practices and explorations of algorithms as part of the digital musical instrument design. There is wider understanding of the fact that when our media become processor based, we are in an ideal position to write non-linear scores for new instruments that can contain generative algorithms as core of their sound engine. The days are gone when music has to be encoded or recorded onto linear formats. When the mp3 has been superseded by the app, prolific opportunities present themselves for writing novel music, including musical scores.

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SYMPTOMATIC ARCHITECTURES. SPATIAL ASPECTS OF DIGITAL EXPERIENCE.

Angeliki Malakasioti & Spiros Papadopoulos

The research attempts to introduce a series of conceptual analogies that describe the spatial qualities of cyberspace through the mental state of its users. This happens through the introduction of some altered kinds of architectures; some architectonic scenarios that are referred as 'symptomatic' architectures, since they are discovered through a process of diagnosis of the mental and psychological experiences of the internet user.

Call It Space

When, in the course of a digital era, the term 'cyberspace' is infiltrated through continuous technological scenarios, space is no longer seen as the mere background of events. It becomes the foreground of every single human experience of ubiquitous digitality – an aspect of 'life processing' mechanism inherent in each computer generated/mediated environment.
Space, not in its physicality – materiality is attempted to be traversed – but in its contingent aspects of its abstract forms; call it imaginary – call it mental – call it digital – call it space born out of noetic ingredients mixed together in a synthetic recipe of personal, electronic experience; experiential referents of oneself's head-on collisions with cyberspatial promises – or premises –born out of contemporary reality.

And then, experience is binary distilled, imagination blown up and space germinated. Spatial sprouting is taking place in the totality of personal mental functions, in the unnamable morphing of thoughts, actions and translations. All amalgamated into the digital environment as multiple shades of sole inhabitations; inhabitations of divergent personas, disordered players, inertially echoic avatars and telepresent 'switch-on switch-off' lives.

Symptoms Elicited

These situations, these parts-of-the-whole, as bi(y)t(e)s of information, either code generated or humanely derivative, constitute the symptoms of digital experience. Symptoms to be felt, lived and catapulted into the process of intimate space translation.

Spatial experience is a symptom – what is given to the 'observer,' what is manifested and constituted as an essential phenomenon. Its principles are not ones of sovereignty and termination, since its nature refers to the single, but not absolute, formation of a disorder abstract. Symptom is a piece of an incomplete pathology, an unfulfilled actualization of a solid state. It constitutes an inseparable relationship, "a primary stratum of the indissociably signifier and signified." [1] This connection between 'symptom and disorder,' as the diptych 'experience and digital space,' indicates the signaling and translation of what exists, but not the absolute depiction. Digital experience is like a symptom, a mental phenomenon outlining a kind of space which will become uniquely personal and noeticly invented.

Improvising Pathologies

Digital space evokes fragmentation and fluidity, thus, fragments constitute the compositional elements of contemporary, cyberspatial endeavor. Mental qualities become the playground field of digital experience, due to the challenging immateriality of space. Therefore, space is correspondingly constructed parallel to the composition of individual mental states – states altered, distorted, and inspiringly disrupted, as if parts of a dis-incriminated pathology.

Thus, the symptom is not the pathology itself, in the same way that "the map is not the territory." [2] Symptom is a form of mental representation of an event, a phenomenon inherent in a unique spatial narrative. Only a set of symptoms can potentially constitute a disorder, therefore digital experience can be regarded as a natural and dynamic, mental state.

CorpoRealize

Each symptomatic indicator is a signifying spatial phenomenon. It is enticed by multiple scenarios, brought to life, and then, is manifested as a phenomenon waiting to be 'realized.' But every symptom is a form of space realization, which in terms of digital immateriality can become the corpus of the disembodied mind; or the notion of the absent body that is re-present-ed through this altered state of consciousness. "In every symptom, there is, so to speak, the whisper of a direction, the hint of a path;" [3] this 'direction driven' report composes a kind of diagnostic awareness, that discloses a mentally constructed space; a fragmented, and rather demystified, space – a symptomatic architecture.

Dis + Sociare

The digital observer must invent a new, altered diagnostic tool [4] – a handbook of the mental, symptom-like, digital phenomena. Symptoms are juxtaposed to self scenarios in digital environments, both filtered through spatiality issues and architectural derivatives.

The most complex and multifaceted view of dissociation refers to the act of separating, breaking, disuniting or decomposing; or put simply, the act of removing from association. Digital inhabitation is direct referent of identity formation or role-playing conditions. A bunch of dislocated selves are invented and acted out, transferring characteristics of, both existent and non-existent, personalities. Dissociative space is generated and thus, it is considered on the basis of experience that includes alterations, disruptions or, sometimes, mutations and breakdowns of the individual's structures concerning memory, perception or consciousness.

This space is discontinuous and divergent – all of these qualities placed as experiential composites of what can be described as an "ocean of leaky selves." [5] Contrary to the deviant sense of 'leakage' and the diffusing quality of the 'ocean,' contemporary identity proves a surprisingly congruous outline; all these inconsistencies of self decentralizations and role constructions can formulate the delineation of its whole image, a portrait made of a plethora of selves merged into one and sole (id)entity.

Verge on

Digital encounters include liminality; and liminal encounters include a decision of transference or an unconscious act. Personal sense of flow is sometimes affected by disruptions of perception, that verge on the limits of differentiated states. A whole new space full of inertial qualities is constructed and then, is offered for inhabitation and interaction; a space that lies between two states of consciousness or two ways of existence. Inhabiting a threshold is an essential element of digital experience; a threshold as a bipolar mechanism – one that leaves the biological body behind, while moving towards an immaterial digital environment, or one of departure, while 'logging out' towards the physical world. In both ends, experiential fragments are transferred and a threshold mechanism is manifested in the two directions. Inertia acts as a spatial metaphor, and outlines issues of resistant, direction-shifted and perpetually fluctuating space.

Echopraxia

Digital space does not have a shadow, but digital actions do. For every digital event there is the respective cyberspatial echo born out of the individual's, volitional or not, act; an act, like an echoic 'praxis,' resembling the ideo-verbal, psychotic symptom of 'echopraxia.' [6] This kind of continuously constructed echoic space consists of all the cybernetic material that constitutes what is called 'digital shadow' or 'footprint' – the totality of information that is produced and stored in digital space.

Every user is estimated to produce a unique 'history,' namely incredible amounts of informational shadow by every single movement in cyberspace. This shadow, just like a kind of electronic dust, gathers up and follows oneself, resembling a 'hypermnesia disordered' state – an extended and unusual aggregation of mental elements. An unconscious sum of mental constructions which, combined with the conscious ones (dissociated spaces, de-centered and multi-personal environments, liminal spaces with inertial qualities), brings one back to the importance of the invented self scenarios as spatial mechanisms. Since space is experienced through the individual's mental phenomena, symptomatic architecture is the erection of structures that either interpret or, conversely, provoke new self scenarios.

Tell the Tale

"One describes a tale best by telling the tale." [7] If symptomatic architecture is considered as a dynamic diagnostic process of the multiple digital scenarios being experienced, then it can consist of a mixture of observations, evaluations and interpretations that give a hint about space – both as narrative and narrator. It is not the accuracy or solidity of a set of qualities that best describes digital space but the process of 'telling the story' – of representing personal experience through symptomatic architectures that tell a tale – one without a nameable ending.

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MY META IS YOUR DATA

Nicolas Malevé

This paper examines different data practices, taking examples from "social" networks, activist collectives and open source communities and looks at the recent decisions taken by major forums such as the EU Council, various national parliaments and ACTA negotiators. It analyzes how these decisions threaten a wide variety of spontaneous as well as organized collaborations, social interactions, and cultural developments.

The following essay is a result of my experiences with Constant, a Belgian-based cultural association working with various media since 1997. For the past decade, we have been exploring the potential of the culture of sharing, particularly in the context of artistic, creative and cultural content. In early 2000, we became interested in the way online services provided an infrastructure for sharing and collective production. Later branded as Web 2.0, these services helped popularise Creative Commons licenses. A striking example of this attitude was articulated in the early 'terms of use' of Flickr, a photo sharing service created in 2004 by the startup Ludicorp. It stated: "We encourage users to contribute their creations to the public domain or consider licensing their creations under less draconian terms than have become standards in most jurisdictions [...] Ludicorp undertakes to obey all relevant copyright laws however misguided we may all judge them to be." [1] Though this initial statement sounded promising, within a few years the rhetoric had completely changed. Big players bought up small platforms in order to expand their services and increase the value of their portfolios. Google bought Blogger and YouTube; Yahoo bought Flickr. Since 2005, the tone has changed dramatically. Now, upon accessing Flickr's copyright policy, we find the standard Yahoo copyright terms. The once-critical perspective has long since been replaced by copyright policies focused on avoiding infringements. Rather than encouraging re-use, policies are now aimed at protection, restriction and enforcement. This shift, and its consequences, should not be underestimated. This is the basis of my reflection on contexts of interpretation and why they matter.

User Data and Contexts of Interpretation

On first sight, most services seem to have kept their identity. Browsing Blogger, YouTube and Flickr, each feels like a distinct entity. But the company owning the platform actually controls the policies, and monitors data traffic across the variety of platforms they own. Through this access to user data, the companies learn from user habits, tastes, relationships, and use this knowledge to provide marketing specialists and advertisers with precise statistics and personal profile data. In essence, the function of the Web 2.0 platforms is to transform the mess of social relationships into formalised and comprehensible behaviours. As relational data is of strategic importance for creating valuable user profiles, every single action expressing these connections must be captured. Therefore, the platforms require that you state your preferences and affinities. They constantly provide you with formats, interfaces, and icons with which to express social connections. It is not enough to drop a note or a comment, you have to 'login to like this image,' 'accept a friend request,' or confirm which people you wish to disclose your content to.

This parasitic formalism occurs at every moment of digital socialisation and creates a feeling of awkwardness: friends on Facebook may only be acquaintances, but the interface forces you to either categorise them as friends, or else refuse to engage with them at all. Or consider the peculiarity of being

asked to identify familiar people in a picture in order to log in to our account. All these awkward requests can be understood as symptoms of the fact that the context of interpretation is outside of our reach. We are asked to express our likes and dislikes in such a fashion, only because the system requires this kind of structure in order to process the information. How it actually works, we don't know; what we do know is that when we surrender to its ambiguity, the system rewards us. When somebody accepts us as a 'friend', we can access their content. Identifying a half-drunk classmate in a blurred photograph allows us to log in to our account.

But, as Andrew Goffey and Matthew Fuller explained in their lecture "From Grey Eminence to Grey Immanence: The Ambiguities of Evil Media," "Crucially, systemic ambiguity is as much about the production as it is about the deciphering of signs. Becoming able to read the shifting balance and distribution of forces in fluctuating patterns of uncertain signs is one thing. Being able to produce such signs, to turn them to your advantage, is another." [2] Web 2.0 capitalises on this systemic ambiguity.

Every single mouse click connecting A to B is thus captured, logged and processed. Since this information is crucial, it needs constant verification – it needs the user's cooperation and care. As a user of social platform and Web 2.0 services, you are put to work. Not only do you produce content and connections, you also have to control the quality of the circulating data. You rate, recommend and report. And the interface rates you back: your performances are public. One can see how many comments and 'likes' you have received, how many people have played your video. You have 500 'friends,' 5 'badges,' and 3 'followers' while you yourself 'follow' 100 people, and 'you haven't added any tip near Vigo, yet.'

For their online presence, many activist collectives, though critical of commercial media, use a combination of open-source software and social network add-ons. They are often ambivalent about what to keep under their own control, and what to delegate to online services. Many forms of delegation exist: 'follow us on Twitter,' 'like' this article, 'contact us at …@gmail.com'. As reputation systems are extremely difficult to (re)produce without massive investments, these collectives 'outsource' such systems to social networks. The same is true for any functionalities requiring real-time management of communication with a large user base, connections with cell phones, or specialised features such as maps or videos. The online presence of such groups can be pictured as a thin layer managed by the group itself, superimposed on data from external services: connecting systems, but without any control of how the data is managed and interpreted.

During the student demonstrations that took place in England this year, the British police used a technique called kettling. Kettling, as Wikipedia defines it, is "a police tactic for the management of large crowds during demonstrations or protests. It involves the formation of large cordons of police officers who then move to contain a crowd within a limited area. Protesters are left only one choice of exit, determined by the police, or are completely prevented from leaving. In some cases protesters are reported to have been denied access to food, water and toilet facilities for a long period." [3]

A group of students and volunteers teamed up to create Sukey, an application informing protesters of the movements of the police, and directions protesters should take in order to avoid being trapped in a cordon. The information is transferred in real time via a web platform to and from mobile phones, and is provided by protesters, observers and people monitoring the news. Since many people rely on the authenticity of this information, identification of sources is crucial.

Sukey searches for messages on Facebook, Twitter, Tumblr and other social networks using the hashtag #Sukey. The results are then filtered using what one of the programmers calls "a kind of algorithmic reputation management." The use of Sukey has proved very useful for protesters who successfully used it to escape kettling. But it has also raised many questions regarding the way it relies on external platforms to establish the reliability and trustworthiness of its sources, in a context where trust is essential. It tapped into the social networks' power to aggregate and spread information and map out relationships, and used this power to distribute strategic information to protesters. But in doing so, it also fed the data-hungry machines of social networks with sensitive information about protesters and their circles of friends.

Using the Web 2.0 to outsource the real-time management of information and the quantification of trust, means relying on parties that have no interest in protecting user information from prying eyes, and are not committed to systematic encryption or erasing logs, but instead run systems designed to eavesdrop and record every possible element of relationality. Past experience has shown how their loyalty, more than often than not, lies with the powers that be. How long before the street corralling gives place to the digital cordon?

The example of Sukey is important on more than one level. It questions how activist applications relying on connections to social networks can preserve their autonomy and control the flow of data. It also emphasises the importance of legislation regulating how and when authorities may access information gathered by Web 2.0 platforms.

Let us now move on, from the general context of social media to the subject of the harmonisation of legal frameworks which regulate the way these media (and their corporate governance) operate within European law.

Parallel to the development of the Web 2.0, an impressive number of international agreements, directives, legislative bills and draft recommendations have landed on the desks of decision-makers in the USA and Europe (at both EU and national levels). The legal framework regulating the relationship between authorities and user data is currently undergoing a process of harmonisation. Brandishing the spectre of piracy, these agreements invariably emphasise the same point: strengthening cooperation between service providers and the authorities. The negotiators of the Anti-Counterfeiting Trade Agreement wish to promote what they euphemistically refer to as a "cooperation between service providers and right holders to address relevant infringements in the digital environment." [4] The experts consulted by the European Commission provide a more concrete explanation of this cooperation. They consider the service providers in a favourable position to not only "contribute to prevent" but also "terminate" infringements, [5] and therefore suggest to the Commission to "involve them [the service providers] more closely." [6] The Trans-Pacific Trade Agreement proposes that its signatories create "legal incentives" to ensure service providers' cooperation. [7] Clearly, adjusting legal texts in order to promote cooperation between governments and service providers is a recurring theme, meaning service providers are expected to disclose user data to authorities, to assist in monitoring user behaviour, and even to pro-actively take appropriate punitive actions.

But who exactly are these 'service providers'? The definition of the term varies from one text to another. Service providers can either be companies providing access to the Internet (also known as access providers) or companies providing services on the Internet. This rather broad definition can be explained in a historical perspective. Access providers and service providers both followed the same evolutionary path: an assortment of small startup companies, most of which were later bought up by larger ones. As

Kleiner and Wyrick strikingly formulate it in their essay "InfoEnclosure 2.0": "The mission of Internet Investment Boom 1.0 was to destroy the independent service provider and put large, well financed, corporations back in the driving seat. The mission of Web 2.0 is to destroy the P2P aspect of the Internet. To make you, your computer, and your Internet connection dependent on connecting to a centralized service that controls your ability to communicate." [8] By reducing the number of access providers and online services to a few big players, a powerful movement of concentration and homogenisation is taking place. The access providers determine how one can access digital communication; the online services increasingly define the framework in which content, contacts and dialogue take place. For governments, gaining access to these central reservoirs of information about their citizens' behaviour becomes a strategic issue. And both access providers and service providers can provide the same 'service': making available their concentrated silos of data.

Currently, although service providers are regularly mentioned, access providers still remain the preferred candidate for this kind of cooperation, as they have complete access to data traffic. But recording, analysing and filtering data traffic costs money. Governments don't have the money to finance such an infrastructure. And so a new scenario is beginning to take shape, with more clearly defined roles for all parties involved.

Service providers monitor and filter user traffic and cooperate intensively and pre-emptively in the struggle against copyright infringers and criminals, going above and beyond their traditional role of neutral intermediaries. This requires setting up a costly infrastructure, which can then be used by the service providers to allow different levels of access according to the nature of the content being transferred. Because the service providers have concentrated users' attention and interaction into a small number of specific channels, the providers can strike deals with the services: users downloading mp3s from the iTunes Store enjoy full bandwidth, users downloading the same mp3s from Jamendo are allowed only downgraded access. The infrastructure built for surveillance can thus be recycled in order to develop a commercial model of bandwidth discrimination, abandoning the tradition of net neutrality.

Although some elements of this scenario are currently being tested in France, the United Kingdom and the United States, it still clashes with existing competition policies. Recently, Neelie Kroes, European Commission Vice-President for the Digital Agenda, voiced some very strong rhetoric against such traffic discrimination: "Mark my words: if measures to enhance competition are not enough to bring Internet providers to offer real consumer choice, I am ready to prohibit the blocking of lawful services or applications. It's not OK for Skype and other such services to be throttled. That is anti-competitive. It's not OK to rip off consumers on connection speeds." [9] But as she herself needs the cooperation of access providers to finance broadband access (around €200 billion) for European citizens, will she be able to refuse them such a return on their investment? Since the future development of the digital economy depends on large investments, how long can we rely on competition policies to defend net neutrality?

To summarize: I have shown how the commercial scheme of Web 2.0 was built on the exploitation of user data, and how a collusion of interests between access providers and service providers could bring about a discrimination of access. The concentration of user information in Web 2.0 databases, and the monitoring of traffic by access providers, creates an enormous reservoir of data on citizens' behaviour. Collection of user data is defined by the terms of use of web platforms, and government access to the information collected is defined by legal frameworks and international agreements which are constantly being developed and refined. The legislation currently under way, and the social networks' terms of use, both demonstrate a similar attitude toward the gathering of user data: they disregard the users' ability

to discuss, interpret and change this data. In these contexts, user data is not seen an area for cooperation, and the context in which it is interpreted is deliberately kept out of the users' reach. Furthermore, the very process by which this data is stored and modified remains opaque as well as unilateral. At this point, we should consider the OpenStreetMap (OSM) project, which deals more intelligently with user data, and provides a wonderful example of how terms of use and legal decisions can be taken collectively by users; how a context of interpretation can be designed and maintained by a community.

In short, OSM is a Wikipedia for maps. Users upload geolocated information (GPS traces) to a server; they can then edit, clean up and enhance this information, before it is used to produce online maps. The site's database can be downloaded to create 'mirror'sites or geolocative services, or any other project requiring geodata. At various levels, the OSM project shows a clearly different approach compared to Web 2.0 data practices. Whereas Web 2.0 services provide users with an interface that conceals metadata and logged behaviour, OSM is proactively 'open' about its use of user data. The OSM experience starts by learning to think differently about the GPS device. Rather than merely follow its instructions, apprentice cartographers are asked to focus on how the device graphically renders their GPS trace and logs their itineraries. These logs can be uploaded to the project's database, and further processed to indicate roads, buildings, rivers, etc. Whereas recent legal developments in this area been controversial and non-transparent, in OSM the user community establishes its own rules through discussion and consensus.

An important legal question recently arose, which provided an excellent insight into the dynamics of this user community. A few years after OSM was launched, participants realised that the license under which they were distributing the data included in the maps was not legally valid: geographical data does not fall under the scope of free licenses which protect 'original' creations such as literary works. 'Objective' information, such as geographical coordinates, falls into another legal category in many legislations. The OSM foundation, which facilitates the operation of the project, set up a process of consultation (lasting several months) with participants including legal specialists who volunteered their services. The goal was to redefine the terms of use in such a way that everyone can simply use the OSM data, but that users are required to add to the OSM database any corrections, additions or other modifications they make to the data. It was interesting to observe how participants convinced each other, in online and offline discussions, of the importance of protecting the open-source nature of the software, and preventing their common effort from being distorted while still keeping it open; and how they accepted to formalise their participation somewhat, in other to safeguard the fundamental motives behind their participation. This type of discussion demonstrates once again how anything considered as 'public' is subject to a constant process of re-negotiation.

What these examples show, is that there is no inevitable fate forcing us to accept that the context of interpretation of the data we produce using digital technologies should be kept out of our reach. The OSM project demonstrates that social dynamics and dialogue can produce comprehensive agreements on how to collectively share data, and how to take the necessary legal decisions collectively. It shows the power of open platforms and the difference we can make by being actively engaged in creating and maintaining a context of interpretation.

OSM is, although remarkable, by no means an isolated project in terms of its philosophy and development. Today we need strategies for making collective practices of data care a part of the legal dialogue. But more than ever, we need to experiment with collective forms of management, in which the administration of user data is not synonymous with policing or profiling. We can begin with simple steps, such as

running a group's blog or imagining new scenarios for exchanging data, before moving on to more complex undertakings such as installing a web server, exploring new platforms and different policies, taking part in their design, promoting them, and participating in their maintenance. The task is huge, but it can be broken down into smaller individual actions. What we will gain in freedom and knowledge, we will have to pay for with time and/or money. But if we wish to gain access to the contexts of interpretation, free is better than 'free'.

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INTRAINTER SOCIALITE: EMOTICON JACKET FOR SOCIAL INTERACTION

Kristin Stransky Mallinger

intraInter socialite is a wearable computing experience that investigates the loss of intonation and body language that occurs at the intersection of computers and textual communication. Emoticons, an attempt to express emotional nuances in the virtual realm, are used to subtitle interaction that occurs in the physical realm. This is achieved through force sensors that display emoticons on a jacket with a LCD screen.

Kristin Stransky Mallinger, intraInter socialite, 2011, Emoticon jacket with LCD screen, Lilypad Arduino board and force sensors (artwork and photography © 2011 Kristin Stransky Mallinger).

Emoticons construct a variable language meant to convey emotions, physical and mental states in a textual context. An emoticon consists of various punctuation and letters from the Latin alphabet to create perpendicularly oriented graphics. Although it creates a graphical language and can be universally understood, it still allows for user and virtual service interpretation. Some services — IM and email clients — convert the text to a graphic, which it is perceived to represent. These graphics are an inconsistent interpretation and vary according to the client.

Two or more users that are using messaging clients can use different clients within the same conversation and get different graphics for the same text. Users can also include additional or fewer characters than what the service recognizes, which will effect whether the client converts the text to a graphical representation or not. For example, **:)** would in most cases be perceived as a smile graphically, connoting a happy emotion. However, **:-)** may be the text recognized by the client to produce a graphic. Textual representations and their varied graphical outcomes can change the interpretation of the message and emotion. Some users may feel that **:-)** is a more effective smile, whereas some would argue that **:)** or the graphics produced are more effective.

The inconsistencies in representation of emotions can lead to some confusion. Another way in which emoticons can lead to confusion are when the emoticon is not supported by a client or is not common in a user's repertoire. When an emoticon emerges, the service is often lagging in converting its use to an agreed upon graphical interpretation. Additionally, there are many different emoticons being created to fill the user's need for emotional expression. Both users may not be proficient in a particular emoticon's connotation and this may lead to an emotional or contextual disconnect in the conversation.

Just as a person's physical cues can be misinterpreted by those interacting, emoticons and their inconsistencies can lead to misinterpretation and confusion. They can also contribute to the lexical direction and enhance a conversation. [1] Emoticons provide non-verbal indicators of emotional cues that can be lost in text-based interaction, but also reinforce physical indicators if introduced to a face-to-face social exchange. When introduced to any social situation, virtual or physical, emoticons can be used to reinforce or subvert the verbal/textual message. They can change the message intent/content in as few as two keystrokes. [2] In the virtual realm, emoticons are often a subtitle for text and are often treated as a way to interpret the tone of the message. When bodily or verbal intonation infers one message and an emoticon is introduced that infers another or when both physical and textual cues are given, which is to be used as the interpretation? Do physical indications, or textual cues that are deliberately displayed, reveal the desired intonation?

intraInter socialite is an emoticon jacket with LCD screen (Fig. 1). The focus of the jacket is to create subtexts for interpersonal human interaction. The wearer uses force sensors to create computer textual subtitles for physical interaction. My investigation into wearable computing with this project is an inquiry into the loss of intonation and body language that occurs at the intersection of computers and textual communication as is evident in today's instantaneous communication and technology-centric culture.

This project explores emotional content and expression in multiple ways. The jacket:

- acts as a non-verbal, non-corporeal intermediary to a bodily and potentially verbal social interaction to create another plane of emotional meaning.
- potentially contradicts or detracts from that which is physically and verbally expressed.
- expresses, reinforces and clarifies that which is physically and verbally expressed.
- is a physical computing experience of a virtual communicative convention.
- expresses the development of an emotional and graphical mode of expression utilizing textual punctuation.
- explores whether a barrier or channel is created for emotional content through technology and physical computing.

The piece, *intraInter socialite*, asks several questions of the interaction between the user and the jacket and the social experience while wearing the jacket. Does the expression of content through electronic means become a prosthesis and/or hindrance for inter-human interaction? If it is a prosthetic, does an emotional language intermediary offer assistance for those with autism or empathic disorders? Is meaning lost and are its prosthesis capabilities diminished when precision is taken away? Emotional content is critical for daily communications and message interpretation. [3] How does the role/character of the interactor serve as a truth-teller and how does it help the user to reinforce false emotional reactions? [4] In this case, the natural method of conveying emotion through applied pressure, leads to an imprecise emotional connection and brings the emotion being conveyed into consciousness for both parties.

In this application, the effort put into replacing the nuances of personal communication with punctuation and textual cues in the virtual realm creates a subtitle for the conversation and interaction that occurs in the physical realm. It creates a range of implied emotion from the wearer. This also introduces an imprecise control over the emoticon displayed and the perception of the emoticon in the context of the interaction. The user has the ability to change the experience of the conversation when they attempt to control the level of emoticon displayed.

The techno-centric geek and socially inept express themselves more freely and create a powerful online or electronic identity through and behind the computer screen. The electronic veil is lifted through a forced vocabulary and a forced interaction in the human world. The wearer has only the jacket to hide behind, no computer screen and no alternate identity, pictures or avatar. With only a jacket in the middle of the interaction, the focus of the conversation may dramatically shift to the screen and what is being displayed. How does this create a "veil" even though the interactors are able to see each other in real-time physical space? Experimentally, adding the language of the virtual world to a physical interaction may allow the users to focus on the jacket instead of the interaction. [5]

Emoticons are an important non-standardized aspect of communication in virtual space that help convey emotion and additional meaning. They were created to help fill an emotional content void that was not being filled by short, text-based communication. Textual punctuation has become its own graphically and internationally interpreted language through emoticons. *intraInter socialite* attempts to study the effects of adding the emoticon to physical computing and interaction. It also calls to attention the use of textual elements to create graphical emotional elements to a virtual interaction. It allows the user to subtitle and create additional emotional content for the interaction, whether true or false.

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A MYRIAD OF VIBRANT PHENOMENA: THE HIDDEN WORLDS OF AUDIOVISUAL ART-SCIENCE

MARCO MANCUSO

What is today recognized as "immersive art-science" is a form of creative expression meant to rise above the notion of art as abstract representation. Thie historical-critical statement of this lecture is to map those audiovisual artists acting with a "discovery approach", observing and recording, working without the use of video or digital tecniques but obtaining the flux of sound and images only by natural and spontaneous scientific phenomena.
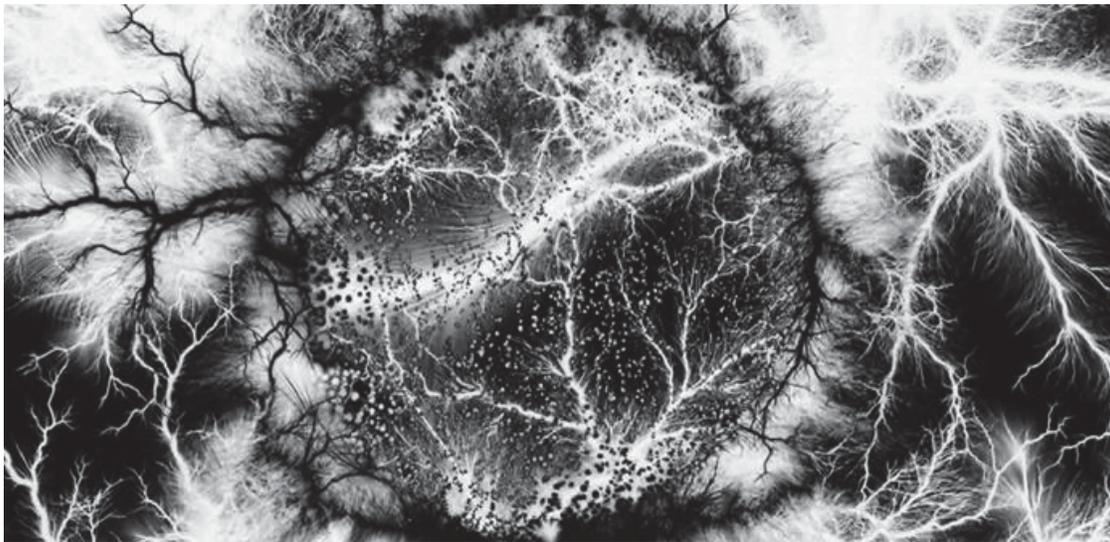
Fig 1. Energie!, 2007, Thorsten Fleisch, video HD, 5:03 minutes, Copyright Thorsten Fleisch.
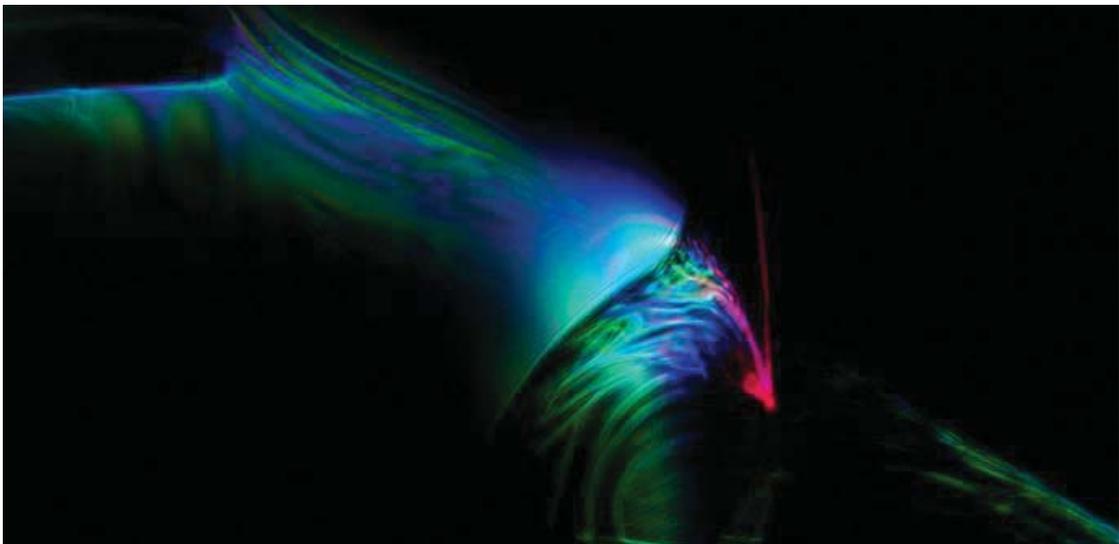
Fig 2. 10000 Peackcock Feathers in Foaming Acid, 2006, Evelina Domnitch & Dmitri Gelfand, live performance, Copyright Portable Palace.
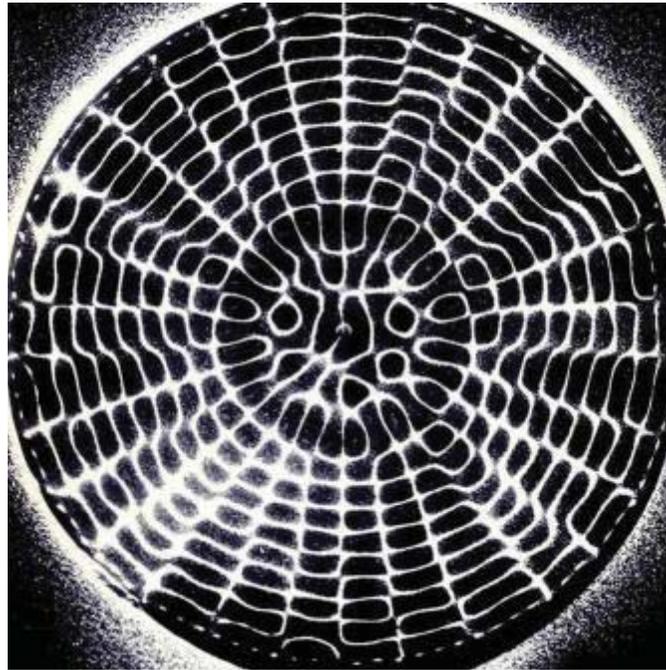
Fig 3. Sound Mandala, 1967, Dr. Hans Jenny, powder on metal plate, from Hans Jenny, Cymatics: A Study of Wave Phenomena and Vibration (MACROmedia Publishing, NH, USA, 2001 - http://www.cymaticsource.com/), 295.

In his *De Rerum Natura (On the Nature of Things)*, Lucretius denies any sort of creation, providence and original beatitude, stating that man broke free from his condition of ever present need through the use of techniques, which are transpositions of nature. The gods do exist, although they neither created universe nor they care about men's problems. Lucretius affirms that all our knowledge about nature shows us the universe as infinite, made by complex forms and composed by atoms. It follows natural laws, regardless of man's needs, and can be explained without resorting to deities. [1]

Nature as Art

Between 1899 and 1904 the German philosopher and biologist Ernst Haeckel published a book of lithographic and autotype prints entitled *Kunstformen der Natur (Art Forms of Nature)*, one of his best known works and a symbol of his zoological research and philosophy, centered on the observation of marine micro-organisms and various natural species and animals. [2] The complete volume, consisting of over 100 lithographs, each accompanied by a short descriptive text, obtained a great success even among the non-specialist public and among some Art Nouveau artists, committed to find new models to be used in the nascent industrial design and in architecture.

In this regard, the volume lends itself to multiple assessments: as a zoological work depicting the evolution of organisms, as a work of art, as a book of aesthetics that focuses on observation and perception as a way of knowing. Aesthetics, as the science of beauty, intent on understanding the nature in relation to art.

The tables of the book, according to a geometric arrangement of the drawings, are based upon the microscopic siliceous skeletons of radiolarians and diatoms, the umbrellas of jellyfishes, the tentacles of sea anemones and spirals shells of molluscs. These illustrations depict therefore the law that regulates natural energy phenomena: the evolution, the fact that organisms are formed and transformed over time, according to genetic relationships of descent, from a common original type. [3]

Looking at these tables, we can see how nature is not only capable of creating spontaneous art forms, but also of establishing a direct connection with certain geometric aesthetics, starting from a fundamental unit/core and reaching a more complex entity, as consequent evolutionary practice of adaptation.

Numbers & Forms in Evolution

One of the most currently fascinating mathematical theories is the Theory of Fractals: according to the definition of its recently passed away discoverer, the polish mathematician Benoit Mandelbrot (1975), who started his researches from the fractal structure found out by french mathematician Gaston Julia in 1920, fractals are geometrical figures characterized by a repetition to infinity of a same pattern on a more and more reduced scale.

Mother Nature is filled with forms very similar to fractals, which don't follow in any way any of the rules of Euclidean geometry. A coastline, the branches or the roots of a tree, a cloud, the snowflakes, the zigzag lightning bolts and the leaf venation patterns: these are only a few examples of fractal forms spontaneously creating in nature. Among these ones there is the spiral, the fractal form par excellence.

So, how do we forget the hypnotic editing of energetic spontaneous fractal branches produced by a controlled electron beam, emitted from a cathode ray tube on a photographic paper, in the poetic audiovisual work *Energie!* by German artist Thorsten Fleisch? [4] And, what about the time shifts, animations and techniques for microscopic natural observation in John Campbell masterpiece *Li: The Patterns of Nature*, showing how the natural world itself, due to reproductive, conservative and evolutionary processes, can create complex architectures and structures based on physical, chemical, electromagnetic phenomena ? [5]

The procedural, generative, hieratic and evolutionary element can be considered the root of all these arguments, related to a modern "computational ecology": almost 40 years of studies, analysis and researches, have passed between Alan Turing's revolutionary theories about morphogenesis (the capability of every living being to develop complex bodies, starting from very simple elements, using self-assembling processes without an external guide) [6], which followed those by bio-mathematician Thompson D'Arcy in his work *On the growth and form* (1917), and more recent studies (1980-1985) on genetic algorithms (a particular kind of evolutionary algorithms utilizing mutation, selection and other recombination techniques in order to guarantee a certain number of possible evolutive solutions. [7]

Those researches were meant to point out the almost computational characteristics of Mother Nature on one hand, while on the other they confirmed the machines' capability of simulating/replicating complex natural phenomena.

Speaking deeply about pure mathematics and numbers, we could consider also the four dimensional Quaternions, discovered in 1843 by Irish mathematician William Roman Hamilton, who was searching for a way to extend complex number on a higher quantity of spatial dimensions. Quaternions find uses

today in both theoretical and applied mathematics, in particular for calculations involving three-dimensional rotations in computer vision: exactly what Thorsten Fleisch did in his work *Gestalt*. As stated by Thorsten Fleisch himself: "Given the fact that a film is the visualization of a mathematical element, it is theoretically possible to render it as high a resolution as technically feasible without losing any detail".

If we also take into consideration the definition of "Moirè effect" in the work *Spray* by Cartsen Nicolai, the direct connection between the audiovisual outcome and the numeric and mathematical element is very clear. In physics, the Moirè pattern indicates an interference figure, frequently found in nature, composed by two superimposed grids at a specific angle, or even by two parallel grids with distanced chains in slightly different ways. The Moirè optical effect is regulated by accurate and complex sinusoidal equation where, at the variation of parameters and variables ,correspond particular changes under the optical and visual point of view.

And again, one of the most important aspects of John Whitney's production was the artistic use of what he defined as "Computational Periodics": the achievement of a "series of harmonic events in the audiovisual presentation following a sort of digital harmony". [8] In 1966, the father of computer graphics developed the work *Permutations*, together with Dr Jack Citron at IBM laboratories as an artist-in-residence, where a specific simulation of a musical progression can be achieved through the multiple superimposition of graphic objects in order to create symmetries and counterpoints similar to the ones concerning rhythm and music.

According to Whitney himself: "In Permutations each point moves at a different speed and moves in an independent direction according to natural laws quite as valid as those of Pythagoras, while moving in their circular field. Their action produces a phenomenon more or less equivalent to the musical harmonies. When the points reach certain relationships (harmonic) with other parameters of the equation, they form elementary figures."

Visualizing Sounds

Again, in 1787, the jurist, musician and physicist Ernst Chladni published a book called *Entdeckungen über die Theorie des Klanges (Discoveries Concerning the Theory of Sound)*. [9] With this text, based on experiments on the field and observations, Chladni laid the foundations for that discipline within physics that came to be called "Acoustics", the science of sound. With the help of a violin bow which he drew perpendicularly across the edge of flat plates covered with sand, he observed how sound waves generate geometric patterns and shapes which today go by the term "Chladni figures".

In 1967, starting from Chladni studies, the Swiss doctor and naturalist Hans Jenny (1904-1972) published the book *Kymatik - Wellen und Schwingungen mit ihrer Struktur und Dynamik (Cymatics - The Structure and Dynamics of Waves and Vibration)*. In the book (and many video-recordings) Jenny carries out all his experiments that shows what happened when someone takes various materials like sand, spores, iron filings, water, and viscous substances, and places them on metal plates and membranes vibrating by specific sound waves. Jenny turned these materials into alive and fluctuating forms, following geometric patterns created by using simple vibrational waves (pure tones) present in the audible field.

With this publication, Hans Jenny laid the foundations of Cymatics, the science studying the wave phenomena: for more than 25 years, poet, producer and editor Jeff Volk has been making Cymatics popular

by producing all the books and videos that witness the experiences made by Swiss scientist Hans Jenny. [10]

The artists who paid homage to Cymatics studies was the American composer and musician Alvin Lucier, in the performance called *The Queen of the South*. Much of his work is influenced by science and explores the physical properties of sound itself: resonance of spaces, phase interference between closely-tuned pitches, and the transmission of sound through physical media.

All the Signs around Us

All these examples show clearly how Nature is characterized, at the root, by a matrix of numbers and mathematical expressions subtending a series of physical, optical, chemical-physical, electromagnetic phenomena influencing natural forms, species, colours, sounds and structures.

And when we talk about Nature, we intend also those electro-magnetic signals interferences hitting and surrounding the Earth that are the product of turbulences triggered by solar winds, coronal mass ejections and other energetic phenomena on Sun's surface combined with ionization in the upper atmosphere of the Earth itself. Semiconductor developed a whole part of their artistic career working on audio-visualization of these astronomic phenomena. Recording a series of sound materials, captured with a ELF-VLF radio recorder, a tool capable of converting ground level natural radio signals into sound frequencies, in works such as *Black Rain, Brillant Noise* and *Magnetic Movie,* Semiconductor were able to give life to these magnetic fields.

If science is considered as a complex of knowledge obtained through a methodical procedure, capable of providing a precise description of the real aspect of things and the laws by which the phenomena happen, and if the rules governing such process are generally called "scientific method", then the experimental observation of a natural event, the formulation of a general hypothesis about such event and the possibility of checking the hypothesis through subsequent observations, become fundamental elements in modern scientific (and artistic) research.

What it is today recognized as "immersive art-science" is a form of creative expression meant to rise above the notion of art as abstract representation, in behalf of a multi-sensorial experience. The historical-critical statement of this lecture, and the *Hidden Worlds* screening connected to that, is to map those audiovisual artists acting with a "discovery approach", observing and recording, sharing experiences and ideas with scientists and science communities, working without the use of cinematographic or video or digital tecniques but obtaining the flux of sound and images only by natural and spontaneous scientific phenomena (physical, optical, chemical, mathemical and electro-magnetical).

Immersivity awakens a synesthetic awareness, both in the mental and in the physical space. A myriad of vibrant phenomena, usually beyond the observer's reach, are instead made reachable through an accurate psycho-physical conditioning

The Hidden Worlds Project

The *Hidden Worlds* screening, curated by Marco Mancuso, produces works that induce into a critical reflection on the existing relation between audiovisual contemporary artistic research (as regards to cinema, video and digital experiences) and applied sciences. This project, dealing with different artistic examples which investigate new expressive forms for the representation of the sound-image relation, deliberately avoids focusing on the existing common aesthetics among them, as well as on a possible expressive language. It rather suggests an overview on specific systems for sensorial perception, and emotional mechanisms of "saturation", achieved through the use of hybrid techniques, that today like never before expand the tradition of analog experimental cinema and digital audiovisuals.

The video screening takes the spectators to wonderful "hidden worlds", illustrated by artists and scientists who, more and more often, collaborate and share experiences with one another on the research of new expressive potentialities within specific mathematical processes and physical, optical, chemical and electro-magnetic phenomena.

By watching the audiovisual representation of the existing energetic and electromagnetic phenomena on the Sun's surface and of current interferences generated from interaction of electromagnetic fields between the Sun and Earth, as possible instrument of aestheticization of the space phenomena by the Semiconductor duo (in works such as *Black Rain* and *Brilliant Noise*), the passage to the audiovisual representation of chemical-physical-optical reactions of Evelina Domnitch & Dmitri Gelfand, is extraordinary short indeed. In their first work present in this exhibition, (*Camera Lucida*) they study the chemical-physical phenomena of "sonoluminescence", while in their second one (*10000 Peackcock Feathers in Foaming Acid*) they analyze the potentialities of optical phenomena generated by investigating the laser light within the nanometric structures of foams.

Moreover, if the work on "chemical grams" by the video maker Jurgen Reble (*Materia Obscura*) underlines the structures born out of a film's chemical corrosion, in the same way the first work by Thorsten Fliesch present in the exhibition (*Energie!*) shows the scorches on photographic paper produced by an high potential energy flow of an electron beam contained in a cathode ray tube.

The number is also an ever present concept, being the fundamental element of every mathematical formula which involves not only a single phenomenon present in nature, but also "superimposed" interferences, beats, accumulations, harmonies and other optical event, like Moirè's (optical illusion created by geometrical sequences of interference phenomena), as shown by the purely glitch and software works by Carsten Nicolai (*Spray*).

The number, in its highest abstraction of key element for a fourth dimension representation , is an important part of Thorsten Fleisch's video (*Gestalt*), a recognition of the quaternion worlds (four-dimensional fractals) visualized in a three dimensional space through an appropriate software. Yet maybe John Campbell's masterpiece (*LI: The Patterns of Nature*) is the work that mostly evidences the geometric structures spontaneously present in Nature, through a kind of magical and hypnotic audiovisual document.

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MY LAWYER IS AN ARTIST: FREE CULTURE LICENSES AS ART MANIFESTOS

Aymeric Mansoux

Artists have the possibility today to publish their work under licenses that offer the same freedom as free software in terms of appropriation, study and modification. In this paper, I will argue that what is often introduced as a new form of artistic freedom and collaboration, is in fact a networked evolution of constrained art in which artists are turning legal documents into artists' manifestos.

Introduction

Most discussions around the influence of the free software philosophy on art tend to revolve around the role of the artist in a networked community and her or his relationship with so-called open source practices. Investigating why some artists have been quickly attracted to the philosophy behind the free software model and started to apply its principles to their creations is key in understanding what a free, or open source, work of art can or cannot do as a critical tool within culture. At the same time, avoiding a top down analysis of this phenomenon, and instead taking a closer look at its root properties, allows us to break apart the popular illusion of a global community of artists using or writing free software. This is the reason why a very important element to consider is the role that plays the license as a conscious artistic choice.

Choosing a license is the initial step that an artist interested in an alternative to standard copyright is confronted with and this is why before discussing the potentiality of a free work of art, we must first understand the process that leads to this choice. Indeed, such a decision is often reduced to a mandatory, practical, convenient, possibly fashionable step in order to attach a "free" or "open" label to a work of art. It is in fact a crucial stage. By doing so, the author allows her or his work to interface with a system inside which it can be freely exchanged, modified and distributed. The freedom of this work is not to be misunderstood with gratis and free of charge access to the creation, it means that once such a freedom is granted to a work of art, anyone is free to redistribute and modify it according to the rules provided by its license. There is no turning back once this choice is made public. The licensed work will then have a life of its own, an autonomy granted by a specific freedom of use, not defined by its author, but by the license she or he chose. Delegating such rights is not a light decision to make. Thus we must ask ourselves why an artist would agree to bind her or his work to such an important legal document. After all, works of art can already 'benefit' from existing copyright laws, so adding another legal layer on top of this might seem unnecessary bureaucracy, unless the added 'paper work' might in fact work as a form of statement, possibly a manifesto. In this case we must ask ourselves what kind of manifesto are we dealing with, what is its message? What type of works does it generate, what are their purpose and aesthetic?

The GNU Manifesto

In the history of the creation and distribution of manifestos the role of printing and publishing is often forgotten or given a secondary role. But, what would have become of the Futurist Manifesto without the support of the printing press and the newspaper industry in France and the rest of Europe? Not much, probably. So it is not without irony that one of the anecdotes often given to illustrate the motivations of Richard Stallman to write the GNU Manifesto, the founding text behind the free software movement, is tightly linked to the story of a defective printer. Indeed, very often, the origin of the document starts with a story about a problem Richard Stallman and some colleagues of his faced when Xerox did not give away the driver source code of the printer they had donated to MIT, preventing the hackers at the lab to modify and enhance it to fit their specific needs. In this case, this particular printer model had the tendency to jam and the lack of feedback from the machine when it was happening made it hard for the users to know what was going on. [1] Beyond the inability to print, and behind what seems to be a trivial anecdote, this event still remains one of the best examples to illustrate the side effects proprietary software can have in terms of user alienation. The programmers and engineers that were using the printer could have fixed or found a workaround for the jamming, and contributed the solution to the company and other users. But they were denied the access to the source code of the software. Such a deadlock is one of the reasons why the GNU manifesto was written. What is unique in this manifesto, is the idea that software reuse and access should be enforced, not only because it belongs to a long history of engineering practice, but also because software has to be free.

Looking at the text itself, we can see that the tone and the writing style used by Stallman make the GNU Manifesto closer to an art manifesto, than to yet another programmer's rant or technical guideline. As a matter of fact, we can read through the document and analyse it using the specific art manifesto traits that Mary Ann Caws has isolated based on the study of art manifestos produced during the twentieth century. [2] For instance Caws explains that "it is a document of an ideology, crafted to convince and convert." This is correct, the GNU manifesto starts with a personal story, turns it into a generalisation including other programmers and eventually involving the reader in the generalisation and explaining to her or him how to contribute right away. Caws also characterises the tone of manifestos as a "loud genre", and it is not making a stretch to see this feature in the all-capital recursive acronym GNU and the way it is introduced to the reader. It is the first headline of the manifesto and sets the self-referential tone for the rest of the text, as well as embodying a permanent finger pointing to what it will never be: "What's GNU? Gnu's Not Unix!." Furthermore, she reminds us that the manifesto "does not defend the status quo but states its own agenda in its collective concern", which is what Stallman does with the use of headlines to announce the GNU road-map and intentions clearly: "Why I Must Write GNU," "Why GNU Will Be Compatible with Unix," "How GNU Will Be Available," "Why Many Other Programmers Want to Help," "How You Can Contribute," "Why All Computer Users Will Benefit." the GNU Manifesto also instructs its audience on how to respond to the document with the presence of a final section "Some Easily Rebutted Objections to GNU's Goals" that lists and answers common issues that come to mind when reading it. Last but not least, manifestos are often written within a metaphorical framework that borrows its jargon from military lingo and for many the GNU Manifesto is being perceived and presented as a weapon, essential in the war against the main players of the proprietary software industry, such as Microsoft. In fact many hackers saw in the GPL an effective tool in "the perennial war against Microsoft." [3] Thus, when the copyleft principle, the mechanism derived from the GNU manifesto, is introduced in the 1997 edition of the Stanford Law Review, it is precisely described as a "weapon against copyright" [4] and not just a 'workaround' or 'hack'.

From the Manifesto to the License...

This particular concept of freedom, as it is expressed in the manifesto, is focused on the usage and the users of software. It will eventually lead to the maintenance by the Free Software Foundation (FSF) of a definition of free software and the four freedoms that can ensure its existence. On top of that, the GNU Manifesto is practically implemented with the GNU General Public License (GPL), that provides the legal framework to enable its vision of software freedom. It means every work that is defined by its author as free software, must be distributed with the GPL. The license itself works as a constant reference to the manifesto, by the way it is affecting the software and its source code distribution. Every software distributed with the GPL becomes the manifestation of GNU, and the license's preamble is nothing else but an alternative text paraphrasing the GNU Manifesto. This preamble is not a creative addition to the license, on the contrary the Frequently Asked Questions (FAQ) of the FSF even insists that it is an integral part of the license and cannot be omitted, thus making form and function coincide.

Even though the GPL was specifically targeting software, it does not take long for some people to see this as a principle that could be adapted or used literally in other forms of collaborative works. As early as 1997, copyleft is mentioned as a valid framework for collaborative artworks in which artists would pass "each work from one artist to another." [5] Of course, this is suddenly brought to our attention not because of the collaboration itself, but because of its sudden legal validity. Indeed the idea of passing works from one artist to another and encouraging derivative works is nothing new. For instance, back in the sixties, mail artists such as Ray Johnson even used the term "copy-left" in their work, [6] and it was possible on some occasions to spot the now very popular copyleft icon, an horizontally mirrored copyright logo, marking a mail art publication. In this context copy-left was seen as a symbol of "free-from-copyright relationships" with other artists in a way that was "not bound to ideologies." [7] In a strange twist, the use of this term is echoing years later, not without cynicism, in some reproductions of Johnson's works which are now stamped "Copyright the estate of Ray Johnson." [8]

So why a sudden interest in such practices? Precisely because of the growing development of intellectual property in the field of cultural production. At the time, under the 1976 copyright act, the only recognised artistic collaborative work was the joint work, in which it is required that all the authors agree that all their contributions are meant to be merged into one, flattened down, work. This made perfect sense in the context of the print based copyright doctrine but was clearly not working for digital environments where the romantic vision of the author is dissolved in the complex network of branches, copies and processes inherent to networked collaboration. This situation provided much headache to lawyers focused on the copyrighting of digitally born works. One of these works is for instance Bonnie Mitchell's 1996 "ChainArt" project, in which her students and fellow artists were invited to modify a digital image and pass it to someone else using a file server. In such a project the whole process and its different iterations are the work itself, not the final image at the end of the chain. The work exists as a collection of derived, reused and remixed individual elements that cannot be flattened down into one single 'joint work' and as a consequence, from a legal perspective, could neither be protected nor credited properly under the limited copyright regulations. [9] No surprise then that Heffan picked the Chain Art project as an example of artistic work that could greatly benefit from the GPL and the use of copyleft that can encourage "the creation of collaborative works by strangers." [10]

… and back to the Manifesto

Although this conclusion makes perfect sense legally, it clearly overlooks and diminishes the artistic desire to reflect upon the nature of information in the age of computer networks. Many artists adopted the GPL early on, not because of their wish to collaborate with strangers, but instead to augment their work with a statement derived from the free software ideology. For instance Mirko Vidovic used the free software definition to develop the GNU Art project, [11] in which suddenly, the GPL becomes a political tag, a set of meta data that could be applied to any work of art. By choosing the GPL as a means of creation and distribution, artists are aiming at implementing an apparatus similar to the digital aesthetics that Critical Art Ensemble (CAE) had described "as a process of copying […] that offers dominant culture minimal material for recuperation by recycling the same images, actions, and sounds into radical discourse." [12] The weapon against copyright becomes a flagship for the recombining dreams of the digital resistance as envisioned by CAE. But by directly reusing the GPL, projects such as GNU Art failed none the less to really break through the position of Stallman that refuses to take part in judging if whether or not works of art should be free.

This is why a few lawyers, Mélanie Clément-Fontaine, David Geraud, as well as artists, Isabelle Vodjdani and Antoine Moreau, felt the need to make more explicit the artistic context and motivations of a liberated work of art by creating the Free Art License (FAL), equivalent to the popular free software GNU public License and articulated specifically for the creation of free art. [13] Suddenly, the license becomes an art manifesto. In the FAL the rules of copyleft are exposed, they stand on their own and enable the artistic creation, not for the sake of creating but as a means to produce singular and collective works. What is seen as freedom is just a very specific definition as envisioned in the GNU manifesto and that can only exist within the set of rules it represents. Moved to an artistic context, the rules to define freedom become a system to make art. In the same way that 'cent mille milliards de poèmes' was the 1961 OuLiPo manifestation of creative rules, the free art license is also a combinative manifesto, one that enables free art. It is not a simple adaptation of the GPL to the French copyright law, it is a networked art manifesto that operates within the legal fabric of culture.

Anyone who respects the rules of the FAL is allowed to play this game. Just like the ludic aspect in OuLiPo's work, and its probable root from Queneau's flirt with surrealism, artists who start to consciously use the GPL and the FAL solely for its 'exquisite' properties might start a superficial relationship with the creative process. Indeed, Raymond Queneau, co-founder of the OuLiPo reminded us already that we should not stop at the process' aesthetics itself because "simply constructing something well amounts to reducing art to play, the novel to a chess game, the poem to a puzzle. Neither saying something nor saying something well is enough, it is necessary that it be worth saying. But what is worth saying? The answer cannot be avoided: what is useful." [14] In other words and adapted to the FAL, the network aesthetics are not enough, their existence must be contextualised and positioned to escape its fate of a convenient technological and legal framework. This is why if the game aspect is obvious in the collective works that surround the FAL, we must see beyond the rules that are presented to us to perceive that such an artistic methodology aims to be an answer to the issue perceived by Chon in the analysis of the "ChainArt" project. Namely, to engage with the fluidity of information and try to turn the clichéd attitude of artists towards their unique and immutable contributions to art into a useful game. At the same time the emphasis is put on the collective nature of production and not community work.

The main issue with the intention of the FAL is that unlike the digital aesthetics modeled by CAE from Lautréamont's ideas, [15] the mechanism of a free art, against the capitalisation of culture and for the free circulation of ideas within the network can only work by making the machine responsible for this

very same capitalisation legitimate. While the mail art derivatives are happening outside of any obvious legal regulations, the copyleft art is literally hacking the system to reach a symbiosis and establish a kingdom within the kingdom. As a consequence these political works are very different from the artistic politics developed after the Russian revolution and World War I. Here, the artist is not an agent of the revolution but the vector of an 'arevolution'. A copyleft art is in the end not so much a critical weapon but instead a cornucopia that operates recursively and only within the frame of its license. Artists that are engaging with it, thus turning the license in a shared manifesto, cannot materialise an anti-culture, a counter culture, nor a subculture, they must create their own from scratch. Instead of seeking opposition and destruction of an enemy, they aim at founding and building.

Conclusion

If we look at 1897 Mallarmé's 'Un coup de dés jamais n'abolira le hasard', it is possible to only see it as an interesting visual design experiment in poetry. This approach misses the reason why this work exists in the first place. By turning art into the gathering and composing, even painting of both time and space within a text, it reached the apotheosis of parnassianism and symbolism upon which modernism broke through. [16] A similar issue of complex lineage and contextual information surrounds a document such as the FAL and leads to concurrent 'raisons d'être.' Indeed, the FAL is not just an 'excercice de style,' it is the embodiment of several elements that are announcing important changes in artistic practices: a call to turn legal rules into a constrained art system, a reflection on the nature of collaboration and authorship in the networked economy, a living archeology of the creative process by bringing traceability and transparency, and ultimately, the mark of an age of copyright and bureaucratic apotheosis that is pushing artists to develop their practice within the administrative structure of society and embed it in their creative process.

Unfortunately, and this is one of the reasons there is so much confusion and misunderstanding about the use of such licenses by artists and theoreticians, is that, with such a manifesto where form meets function, once the license is used, it triggers a process of rationalisation that leads to a fragmentation of the original ideology and intention into different, possibly contradictory, elements:

- A toolkit for artists to hack their practice and free themselves from consumerist workflows.
- A political statement against the transformation of the digital culture into what CAE calls the "reproduction and distribution network for the ideology of capital".
- A legal and technical framework to interface with the current system and support existing copyright law practices.
- A lifestyle, and sometimes fashion statement.

In practice it is possible for an artist to only see one of these facets and either ignore or not be aware of the others, making the license as manifesto multidimensional, open to different interpretations, not unlike the medium it was drafted in: the law.

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INDIVIDUATION IN GENETIC ARTWORKS AND CAUCASIAN CARPETS

LAURA U. MARKS

This paper compares contemporary genetic artworks and 17th-century carpets from the Caucasus. Both are algorithmic works that respond to new information to reach results not prefigured in the algorithm's initial state. Caucasian carpets exemplify internal differentiation, individuation. In light of Grosz's argument that art's genetic impulse arises from sexual selection, they offer criteria for meaningful individuation in genetic art.

Carpet, Caucasus, 17th C. Pergamonmuseum, Berlin; burned in 1945, parts survive. From Kurt Erdmann, Oriental Carpets: An Essay on Their History, trans. Charles Grant Ellis (New York: Universe Books, 1960).

How can algorithms produce something that looks like life — acts like life — is, "for all practical purposes," life? This talk pursues a comparison in the last chapter of my book Enfoldment and Infinity: An Islamic Genealogy of New Media Art, between two bodies of algorithmic art: contemporary generative artworks and 17th-century carpets from the Caucasus. This comparison may seem recherché, but I think it is pertinent because these carpets are perhaps the strongest examples of analog algorithmic artworks whose patterns arise not from top-down instructions but from internal differentiation, individuation. Both genetic artworks and Caucasian carpets respond to new information and come up with results that could not be prefigured in the algorithm's initial state. A problem I find with contemporary algorithmic artworks is that their developments lack strong, interesting motivations. Thinking about carpets, with help from some Deleuzian ideas, should give us a set of criteria for how meaningful individuation occurs in genetic art.

I assume this audience has some familiarity with genetic artworks, and not much familiarity with Caucasian carpets, so I'll begin be defining both. Generative artworks are algorithmic artworks whose algorithms respond to new information, such as inputs from the environment or from users. This allows them to come up with results that could not be prefigured in the algorithm's initial state. Caucasian car-

pets hail from the Caucasus, the ethnically and religiously mixed area that, historically, intersects northern Iran, Russia, Armenia, Azerbaijan, and Georgia. In the period I'm looking at, 17th and 18th centuries, when the Caucasus was politically controlled by Iran. Based on their shared genetic structure, this talk's task is to suggest some manners of individuation that Caucasian carpets offer for, and prefigure in, genetic art.

Genetic Artworks

Contemporary artworks made with genetic algorithms introduce software behaviors into environments produced by human interaction. Laurent Mignonneau and Christa Sommerer have been working with genetic algorithms since 1992, producing works that grow and change according to users' interactions with them. The works make their connection to biological evolution evident, in that they are plant-like or insect-like: the plant forms grow and branch, and the insect-like forms grow and reproduce, according to visitors' input. Sometimes this input is as simple as the amount of time a visitor spends in front of a screen (as in Wissengewächs, 2007, an interactive façade for the City of Science in Braunschweig, Germany).

Life Writer (2006) uses a manual typewriter input. The characters users type are translated into forms by assigning a standard ASCII value to each character; the resulting forms "eat" the input text, growing and reproducing. Users can't know what kind of forms their typing will reproduce; however, if they interact with the work for long enough they learn that the more they type, the more growth and individuation occur. This visually pleasing work answers the question, What causes evolution? by suggesting that evolution results from sustained engagement. Still, it leaves open the question, What motivates evolution? I am not making the argument here that interfaces should be more transparent, so that users can know intellectually what results their work produces. Maybe the slight mimetic relationship between users' gestures and the creatures' changes is enough to make the work satisfying. But in this, as in many other genetic artworks, the motivation seems slim. This is why I will look first to carpets, then to philosophy, for models of strongly motivated individuation.

Carpets as Algorithmic Artworks

Here's a detail of a Caucasian carpet. See how its motifs are figurative, but don't represent any figures we've seen before: they are a little like flowers, a little like animals, a little like crystals. Commentators on Caucasian carpets often refer to their forms as hybrid, "foetus-like," [1] anthropomorphic flowers and floral animals, and populations of "archaic, headless, two-headed beasts." [2] You can see these odd creatures for yourself.

Carpets, of course, are algorithmic media, in that a weaver follows a set of instructions in order to arrive at a predictable result. All carpets have some degree of automatization: the imposed structure of loom, thread count, knot style, and design. Nomad and village carpets allow for a lot of spontaneity on the part of the weaver. The carpets I'll show, however, were made for high-level courtly and religious clients. At the beginning of the 17th century, Shah 'Abbas of Iran supported economic development throughout his realm, and this stimulus may have established commercial rug weaving in the Caucasus. The size of the Caucasian carpets shows they were woven on large looms, suggesting commercial production. [3] They were woven from detailed cartoons that specified form, so weavers did not have much room for maneuver. However, the cartoons did not specify knots per form, giving weavers a bit of leeway.

This ratio between pre-given form and slight improvisation may account for the genetic development of the forms on Caucasian carpets. Pre-given, top-down forms individuate in unforeseen ways, producing genetic mutations that shock and delight.

Caucasian Carpets (and a Turkish one): A Model for Genetic Artworks

A couple of times in The Movement-Image Deleuze describes how the smallest elements of "flowing-matter" are perceiving, acting; alive. We do not need to see things, for things themselves already see: "The eye is in things," he writes, referring to Bergson, who imagined that every point has a point of view that can be, as it were, photographed: "taken in the interior of things and for all the points of space." [4] Deleuze describes the earliest life forms as tiny machines that perceive and react: "Biologists speak of 'primeval soup, which made living beings possible, and where forms of matter known as dextrogyres and levogyres play an essential role": they produced micro-intervals, perceiving at one end, acting at the other. [5] Each point, then, to the degree that it resists top-down organization, is a living micro-interval that responds to its environment in unpredictable ways.

Even the most strictly ordered, hierarchical carpets produce singularities where idea meets matter. Here I show, not a Caucasian, but a Turkish carpet, that's right here in Istanbul. This carpet follows a kind of cosmological organization, remarked by carpet scholars, whereby the central medallion suggests the beauty and divine order of heaven. See how the further we move from the center, the more unruly the forms get: they seem to possess an internal life force. I love this carpet because of the way the wacky flowers and cloud bands compete with the "transcendental" medallion. As though they've heard of heaven and they want none of it! This begins to raise the question, is there something in material that resists idealism, that has its own ideas of how to develop? And if so, what pushes it to develop?

Individuation

Let us define life as the capacity for individuation. While information, in-formation, is the creation of form from without, individuation comes from within. Gilbert Simondon writes that individuation occurs in a system that is metastable or out of step with itself. [6] I suggest we think of a sea or a lake as such a system. The individual form is not a final result so much as something like the peak of a wave: just a phase in process of individuation. [7] There are more potentials in pre-individual state than this individual. Becoming, then, is a mode of resolving an initial incompatibility that was rife with potentials: lots of other potential resolutions might have arisen. [8] In this awareness of the multiplicity of potentials, only one of which is actualized, we hear the resonance with theories of evolution, specifically Henri Bergson's Creative Evolution. Individuation is the realization of a life force from within; the actualization of the virtual; a becoming.

Deleuze goes to great lengths in The Fold to uphold a free life force internal to matter that shapes it from within, each according to its capacities. He uses the concept of the univocity of being to argue that the Being of the universe is a field of unlimited potential that individuates freely, without any debt to Platonic and Aristotelian concepts of form. I want to emphasize that in fact this concept arises first in the thought of Abu 'Ali al-Hussein Ibn Sina (980-1037), the Muslim philosopher from Bukhara whose innovative thought so immensely informed philosophy in both the Muslim world and the West. Deleuze indirectly acknowledges Ibn Sina's concept of the univocity of being in some of his works, but the connection needs to be better acknowledged. [9]

Back to information vs. individuation. Algorithmic artworks obviously privilege information: they are formed by a pre-given set of instructions. Where does individuation occur in an algorithmic artwork? One locus of individuation is the machinic phylum of a given artwork, its particular nexus of material and immaterial production. Another is experimentation for the sake of seduction: the desire to give rise to beauty and pleasure may be the strongest provocation for individuation. Let me elaborate on these.

1. Machinic Phylum

I struggled a lot to find a source of individuation in algorithmic artworks, which would seem to be entirely pre-determined by their algorithms, until one day I saw it starting me in the face. Algorithmic artworks are not just numerically generated; they arise from nexes of idea and material that are completely particular. Given particular material, historical circumstances, drawing on existing programs that other people wrote in particular circumstances, the genetic artwork executes in a time and place that are, of course, different every time. So we can easily say that any algorithmic artwork arises from a *machinic* "assemblage" in Deleuze and Guattari's sense of a singular nexus of ideas and materials. For example, each iteration of Sommerer and Mignoneau's Life Writing assembles the analog typewriter interface, a text-to-form editor, the artists' time, thought, practice, and conversation, funding from the University of Art and Design, Linz, Austria, and the actions and interest of users—in this documentation, at the Centro Cultural España in Mexico City.

Carpet making too is a machinic phylum specific to a culture, subject to its organizing principles. Caucasian carpets too arise from machinic assemblages. They required industrial-level design and production. Individuation occurred at the level of design, where it fascinates to try to reconstruct what was going on in the mind of a designer who drew an animal with eight legs and no head, for example. Individuation also occurs at the level of production, the decisions about knots per form that I think produced their genetically mutating forms. And individuation continues to occur in use.

Hence the fascination of Caucasian carpets, whose laws seems arbitrary, despite the industrial circumstances of their production. To me this suggests a lively competition between information and individuation.

Simondon offers a useful criterion for how technical production can create the unforeseen:

There is nothing essential about the made-to-measure aspect of the artisan's hand-craft. This derives from another, though essential, aspect of the abstract technical object: its being based on an analytical organization which always leaves the way clear for new possibilities, possibilities which are the exterior manifestation of an interior contingency. [10]

Similarly, in generative artwork, we may seek individuation at the level of programming and of material execution.

Seductive Novelty

We can certainly see a playful, experimental practice of pleasure in the way carpet patterns evolve. What about contemporary genetic artworks? The pursuit of beauty and pleasure seems such a retrograde motivation for contemporary art. It seems rather that genetic artworks, to the extent that the

artists aim to meet criteria for contemporary art, follow models of participatory and relational art. The artwork is supposed to change in response to some wish or need of the participant; this, in more radical versions, should be an ethical need. [11] I've interacted with any number of algorithmic artworks, genetic and otherwise, that practically begged me to invest them with meaning. But as with relational artwork, throwing the creative agency back onto the beholder or participant, demanding that we the visitors give the work its meaning, often results in random or lackluster outcomes. Such genetic works seem to follow the survival model of evolution: changes come about if enough participants select for them.

I think we need a stronger argument for what motivates individuation. What about this one: individuation arises from experimentation for the sake of beauty and pleasure! Moreover, the genetic impulse of art arises from sexual difference! This is the shocking thesis of Elizabeth Grosz in Chaos, Territory, Art. [12] In a brilliant feminist intervention, the Deleuzian philosopher adds sexual difference to individuation. Grosz picks up Bergson's point in Creative Evolution that we humans inherit all the creative solutions of other creatures from whom we differentiated at some point in evolution. [13] Bergson wrote:

The line of evolution that ends in man is not the only one. On other paths, divergent from it, other forms of consciousness have been developed," which are not as free from constraint as the human "but which, none the less, also express something that is immanent and essential to the evolutionary movement.

Clearly inspired by Bergson, Grosz rereads Darwin to argue that "survival" be construed in the broadest sense possible. Sexual selection highlights morphological differences that enhance the body's sexual appeal. Sexual display involves intensification—both of the one creating a spectacle of itself and the one perceiving. The wish to attract potential mates gives rise to all kinds of genetic inventiveness and experimentation, producing useless beauty. [14] Darwin write that the mature male stickleback becomes "beautiful beyond description," colorful, translucent, and iridescent, during mating season. [15] To attract pollinators, flowers color their petals yellow and rose and emit lovely scents. The bowerbird gathers colorful objects to decorate a stage for its courtship dance.

If we take the idea that evolution arises not from natural selection but from sexual selection, a universe of meaningful evolutionary beauty, seduction, and pleasure unfolds for us. The carpets I've shown are beautiful — and provocative, showing off their evolved embellishments much as the male stickleback shows off his colorful, iridescent skin. These observations about seductive evolution, in both carpets and nature, offer new criteria to artworks produced with generative software. In fact there are many digital and specifically genetic artworks that evolve in ways designed to keep our attention, to attract and delight us, much as the male bowerbird decorates his courtship stage. Critics often dismiss these works as decorative, not serious. But it is their ever-evolving beauty that makes them succeed. Beauty is an agent of evolution!

To conclude, I suggest that genetic and other artworks that rely on input from the user might try refining the random openness that so often motivates interaction. Further, they might try jettisoning the dreary, survivalist motives that incite "relational" interactions. Instead, retrograde though it may sound at first, cultivating beauty and experimenting with pleasure, may be the most generative of motives for individuation.

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FUTURE NORTH

JANE D. MARSCHING

This paper discusses the intersection of climate forecasting, future prophecies, and science at the North Pole in one hundred years in the collaborative video work of artist Jane D. Marsching and architect Mitchell Joachim / Terreform 1, Future North.

Fig 1. Jane D. Marsching and Mitchell Joachim / Terreform 1, Future North, 2008, still from 3 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.

Fig 2. Jane D. Marsching and Mitchell Joachim / Terreform 1, Future North (San Francisco), 2008, still from 3 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.

Fig 3. Jane D. Marsching, Rising North, 2007, stills from 9 minute animation. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License.

Time takes on a different meaning in a landscape where the sun is up for half the year and it is dark for the other half, where there is no vegetation, no fixed land, no animal or biological rhythms. If the absence of visual cues can result in odd plays with our perception, including mirages, Ganzfelds, and other optical phenomena, it can also result in a destabilized notion of time. Further complicating this is the fact that the North Pole ice is disappearing, a quickening process outside of our historical images of the landscape. And finally, the North Pole climate is, as discussed earlier, the harbinger of climate change to come in more equatorial zones. Its sensitive and narrow climate parameters, more affected by tiny increments of change, show us in stark relief what we are barely able to distinguish in the landscapes around us. It shows us our future, in a way, and in so doing, is an early warning system.

At the North Pole the future is brought into the now. The endless streams of data, charts, graphs, and field images chart a landscape not dying, but transforming itself irrevocably away from the one that has enthralled us for so long. The sublime unchanging wilderness is becoming shabby around the edges and full of a nervous pathos. Whenever landscapes, cultures, technologies, etc., change quickly, our culture rushes to create new mythologies, new representations, to fill the gap. The rapid industrializations of the nineteenth century with the introduction of fast-moving trains, distance-bridging communications technologies, and labour-transforming factories, created cultures fascinated by simultaneity and fractured time and visual perception, among many responses. Futurism, Cubism and other movements were experiments on the forefront as the changes took place, tracking and testing new stories and new ways of seeing.

Today we are struggling to adapt to changes in our familiar images of the North Pole. The sad icons of dying polar bears and melting glaciers don't quite encompass the complexity of the disappearance of an entire terrain, an entire cultural phenomenon. Artists are grappling with this uncertain terrain, hoping to show us what is happening and what it means to the larger world. The same work is happening in the offices of scholars and workers many other disciplines: economists, climatologists, politicians, educators, and many others. What will the future bring at the North Pole? What is the significance of its disappearance? What will it become? What will we become in its absence? In this scenario, we can translate the age old adage "as above, so below" quite literally: "as far, so near."

The challenge is to take the abstractness of these graphs and charts, the overwhelming complexity of the data, and the sense of otherness in the landscape, and to translate it into terms we can grapple with in our prosaic lives. In climatology, studies of forecasting and predicting have to evaluate the risk factors and uncertainty of these models of future events whose actual outcomes have not been observed. Looking at the future of the climate of a specific biome requires complex forecasting not just of weather, but of economic, human, and technological parameters a century from now. This is so difficult that climate modellers have determined a "sweet spot" for climate predictability in a hundred-year parameter. Our culture demands this century marker, and policy texts have used it, including the IPCC reports, the Kyoto Protocol and others. The sweet spot, "maybe between 20 and 50 years out, is where the emissions scenarios don't matter too much and where the trends start to be discernable over the noise of year to year weather." [1] The point is to think about what we can know about one hundred years from now, particularly in a terrain so sensitive to climate triggers. Climate predictability can answer that question for 20 to 50 years hence, but falls into "total uncertainty" at a century out.

If science with its sensitive data and complex models cannot provide us with a satisfactory and entirely certain vision of a future North Pole, then who can? The social sciences, such as economics, use one set of data, futurologists, inherently interdisciplinary in nature, use many sets of data but profess that the future cannot be predicted. This absence of clear vision haunts us today. We have at our fingertips and

on our screens reams of data that attempt to outline this future, but the images are hazy, or too complex, or simply too uncertain. But as the future presses down upon us more and more, as ice melts quicker, as climate triggers become more apparent, as short-term predictions become reality sooner than expected, we long for future stories that can help to frame our predicament.

One such example is the very concrete phenomenon of sea-level rise and subsequent flooding. The Intergovernmental Panel on Climate Change's Fourth Assessment Report in 2007 gives six scenarios for sea-level rise over the next century. The lowest prediction is 7 inches and the highest is 23 inches. [2] A more drastic prediction has been made by Aslak Grinsted, a geophysicist at Copenhagen University, who estimates that the sea will rise by a metre over the next century. The finding was reported, among other places, UK Daily Mirror in an article entitled: "Sea will rise 'to levels of last Ice Age.'" [3] Jonathan Overpeck, director of the Institute for the Study of Planet Earth at the University of Arizona in Tucson, modelled a 6-meter sea-level rise submerging most of Florida. This data was discussed in the venerable National Geographic in a similarly spectacularly titled article: "Warming to Cause Catastrophic Rise in Sea Level?" [4] In Hollywood, Roland Emmerich's 2009 film 2012 shows the Statue of Liberty falling in the face of the enormous tsunami of sea-level rise. Today you can find numerous transparent blue overlays of sea-level rise in your home city as you search Google Earth.   In one version you can look at what happens to your area if subjected to sea levels of 1 m to 14 m. The latter amount is the stuff of Emmerich's movie. It feeds off our fears and offers a satisfying narrative.

However, a 1-meter sea-level rise has been considered in many climate models. It doesn't depend on catastrophic events such as Greenland's ice sheet melting. On the other hand, a 3-meter sea-level rise is possible, though more likely it would take two or three centuries. This would flood most of Boston and other port cities. [5] It would be accompanied by major shifts in land use, significant migration, water scarcity, and myriad other climate-induced human affects. At the same time, the North Pole would be totally ice free for much of the year, an occurrence which we are on the verge of now. At that point, transportation routes would be established and geographic boundaries clear. The North Pole would be an accessible and open ocean, with a whole range of new stories of tourism, travel, marine life, etc.

This is the scenario among so many possible futures that we picked when I approached Mitchell Joachim, visionary architect and founder of Terreform1, with the question: if we had to live at the North Pole, what would our inhabited space look like? The end result is a 3-minute animation of port cities all over the world being flooded. As they flood, they are overlaid with ecotariums, a greenhouse-like structure that would maximize energy intake, include enough land and water to create habitable terrains, and be specific to each culture and landscape. These city-ecotariums then were detached from their larger landmasses and floated up towards an open north polar ocean, where they merge into one larger, nomadic, modular global city with shared resources.

The resulting animation is paired with another future prediction for the North Pole. A colour-field animation looks at the rise in temperature of 7 degrees Celsius over the next century. Degrees are coded with colours, just as cartographers use, with cooler temperatures being cooler colours, and warmer temperatures being warmer reds and oranges. As the temperature rises (under the control of randomizing software), the colours slowly warm. At the beginning of the piece, the colours of summer temperatures are in the pale yellow range, but after a hundred years of temperature rise, the summer colours are now warm orange verging on red. At the same time, an opera singer sings the headlines from Google News from 2007 when I searched for items associated with the term "North Pole". News headlines range from the first kiteboarder at the Pole, to oil company drilling, to climate science, to watercolour classes

in a small city in Alaska called North Pole. From the geopolitical to the mundane, from science to pastimes, the news headlines create a map of the North Pole as our culture imagines it today.

The pairing of these two videos – one a minimal evocation and one a lush narrative –with an operatic aria creates a complex space where data is offered in widely varying forms, which converge and diverge over time. The story of our future is given in versions that are based on our vision of the future now, on scientific data, and on future studies and interdisciplinary imaginings. Each one of these pictures is inherently full of risk and uncertainty, or, in the language of the IPCC, low confidence and high uncertainty. But they offer provocative and many-layered sensorial experiences that catalyze wonder, that offers a possible mythology, and that transforms the abstract and distant into a story.

Finally, different stories – the myth of the "first" explorer to reach the North Pole, the hole leading to a civilization at the centre of the Earth seen in flyovers and satellite images of the planet, webcams that offer both scientific data and an elegy to our image of the icy North Pole, a vision of a possible future nomadic urban cluster comprised of floating port cities from around the world – all circle the same centre. They are concerned with a terrain that is somehow at the heart of our culture's imagination of a mythical and spiritual north. And yet this north is changing. The more it is charted, graphed, and pictured, the more our fears for our future in the face of catastrophic climate change cling to it like barnacles. Stories are needed to tell us about what is happening and what might happen. Science, with its cautious and specialized language and graphics, can give us information. But with only data, our imaginations are left to their own devices. The work of artists and writers is to weave the data with sensory experience, with perceptions in real time and space, with human emotions and memories, with cultural histories and predictions. In these stories, we linger over what is not known, over what might be, and over that which we hope for.

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THE BANG THEORY: THE BREAKING AND (SORT OF) FIXING OF EVERYDAY OBJECTS

Luiza Martins

How might ill–designed or semi–broken objects be analyzed as to their potential to stimulate the development of new, personal and unique ways to interact with technology? Stemming from observations on faulty objects, this paper discusses the importance of an extended understanding of the aesthetics of use, misuse and individuality in the emerging theorizations of interaction design for an increasingly electronically mediated society.

Fig 1. Game Boy, 2010, Luiza Prado, Mixed media. Some rights reserved.

Fig 2. Remote and Hairdryer, 2010, Luiza Prado, Mixed media. Some rights reserved.

Introduction

"As ever more of our everyday social and cultural experiences are mediated by electronic products, designers need to develop ways of exploring how this electronic mediation might enrich people's everyday lives." [1]

The complex nature of human relationships with electronic devices is an extensive and rich topic for research. Its relevance to the design practice is unquestionable and discussions surrounding the topic have exhibited all sorts of positions and perspectives from authors, designers and theorists. The full range of potentialities surrounding the use of electronic objects, however, is yet to be thoroughly explored; as technology infiltrates itself into diverse, broader areas of our lives, new structures and perspectives for the design of those objects become necessary. Ubiquitous technology does need not be equivalent to invisible technology: visibility and transparency may very well be valuable strategies in the emerging theorizations of product and interaction design.

Starting from the development of an experimental series of objects aimed at bringing the inner workings behind the surface of familiar electronic devices to the foreground, the paper discusses the relevance of a deeper understanding of the aesthetics of use, misuse and individuality of an object. The questioning of the role of both designer and user contextualizes these observations.

Improvisation and Negotiation

The project began with a few simple observations on how malfunctions in everyday electronic items changed not only one's behavior towards these objects, but the rituals associated with their use. By shedding light on the invisible mechanisms that make up the core of an electronic device, malfunctions tend to bring out previously unnoticed potentialities in an object, opening up new dimensions as to the rituals and behaviors associated with it. Leah Buechley, in her article "Questioning Invisibility", on invisibility in ubiquitous computing and its consequences, writes:

"First, the errors are engaging – they surprise us and force us to notice technology we might have otherwise ignored. Second, they introduce legibility to technology – they reveal interesting information about how it works." [2]

The negotiation process with a malfunctioning object can provide useful insights into the relationships we develop with electronic devices. The flaw demands one's time and attention in order to be fixed, changed or at least ignored. Learning to deal with those flaws leads to the development of singular rituals and behaviors associated solely with the object in question, effectively transforming it from a mass–produced good into a unique device by means of its use.

The first item to be observed during the development of the project was an old digital camera. The camera presented an odd fault which would make its display either exhibit all sorts of glitches or be completely black. With time and use, however, the owner of the device discovered that for the display to work properly it only needed a few rather vigorous slaps. After becoming acquainted with this specific malfunction in the object by using the device multiple times, one's inclination was to automatically slap the camera as soon as it was turned on, incorporating a new ritual into the set of routine actions related to the use of that specific device.

Another item of interest in these first observations was a cheap blow dryer from a generic brand. Every blow dryer has a switch that automatically turns the device off when its internal circuits reach a certain temperature, in order to prevent overheating. This one, however, had a malfunction that automatically turned the device off every few minutes when in use. At first this behavior is quite puzzling, but eventually – also, after repeated use – one learns that in order to make the blow dryer work again it is necessary to puff air into the device until a small clicking sound is heard – the switch going off again. Eventually puffing air into the blow dryer every few minutes while using it becomes a ritual, a preventive behavior against that unique malfunction.

Exploring the complexity of these relationships was the first step in the development of the project; as a natural extension of these first observations and reflections, a call for contributions was posted in a handful of social media websites and art–related communities. The subject proved to be quite popular, as almost everyone in the targeted social circles had a similar account to share. The resulting contributions exhibited a wide variety of inventive solutions and behaviors associated to the problems of each device; one of the most striking affinities between the stories, however, was the attachment most people showed to these objects, despite their malfunctions. This attachment, although clearly dependent on many factors – socio–cultural background and income among them – was deeply related to the significance the person applied to the object, as well as its history. Many contributors commented that they felt that the malfunction made their object special and unique, something that only they knew how to use.

The Objects

Continuing the development of the project, the submitted contributions were used as a base to create a small series of experimental malfunctioning devices. First in the series was a faulty Game Boy, a portable video game console originally released by Nintendo in the early 90s. The object was based on the following contribution:

"I once had a video game console that would only work when flipped upside down." [3]

The Game Boy was thus modified using a simple circuit bending solution: a tilt sensor was connected to the potentiometer responsible for controlling the screen's contrast settings. This caused that specific part of the internal circuit to remain open when the device was placed right side up, so that the screen would appear blank while all other functions remained unaffected. When the game was positioned upside down, however, the tilt sensor caused the circuit to close, thus allowing the player to see the images on the screen (*fig. 1*).

The second object was a TV remote (*fig. 2*). The device was adapted to fit the following contribution:

"My remote never worked unless I squeezed and twisted it really hard." [4]

The device was modified by placing small pieces of adhesive tape over its internal button contacts, making it necessary to twist the remote and press each button very hard in order for it to work. The previously mentioned hair dryer rounded up the series as the third object (*fig. 2*). All of the objects were painted white in order to strip them of their brand names and individual attributes, instead presenting them as generic depictions of familiar devices.

With the objects ready, the next step was to observe people's reactions to their malfunctions. A few, informal tests were conducted in order to understand and recognize different perspectives and attitudes towards the devices. Since the project's aim was not that of a scientific study, the tests weren't conducted with a scientific method in mind. There were no initial conjectures to be proven: instead, the goal was to solely observe the effects and affects of an artistic experiment.

Right from the first test it became clear that most people tended to have a pattern of behavior towards malfunctioning electronic objects: twisting, plugging and unplugging, banging and shaking seemed to be part of an acquired gestural vocabulary towards glitchy items. After the first few unsuccessful interactions, however, most people tended to start a more careful exploration of the device. This second phase usually led to interesting results, with each person developing their own, individual and performative responses towards different malfunctions. Some people tried to adapt themselves to the situation by developing new ways of using the device; others tried to correct the faults with other, external solutions, like using other objects as aids and tools. It is interesting to note that, regardless of the problems, very few people stopped using the devices altogether; most tended to be amused and challenged by the objects and thus tried their best to work out a way to use them in spite of their defects.

The Aesthetics of Misuse

"Concept art is theorized as a perceptual process in which the image (concept) is experienced as an immediate presence – an art that presents to the viewer/listener an experience to be completed through the very act of perception." [5]

Building upon LaBelle's views on concept art, the design of electronic objects can be theorized analogously; the perception of the experience of use needs to be considered an integral and essential part of the identity of an object. Under these terms, the object would be an incomplete entity in and by itself: only through use the rituals and behaviors associated with it would complete the picture. LaBelle goes on to quote Nam June Paik as stating:

"In a nomadic, post–industrial time we are more experience–oriented than possession–oriented." [6]

Experience thus becomes a material in itself, as much as all tangible components that make up the physical representation of the electronic object. This set of intangible attributes, albeit abstract, is decisive in the definition of a device's identity.

During the development of the project one of the most significant questions raised by all the experiments and contributions concerned the reasons that made most people keep using malfunctioning objects, aside from the conspicuous financial issues. Electronic items with proven malfunctions can be returned to their manufacturers or sellers with relative ease; there is, admittedly, a very strong influence of psychological and socio–cultural matters that can explain the reasons for the decision to keep such an object. As a result, a multitude of answers are plausible, ranging from the object's history to its functionality; nevertheless, what strikes as a particularly interesting in the research is the usual connection of this decision to live with the necessary rituals and behaviors as part of the development of a relationship with that object, almost to the point of emotional attachment to the very flaw that was problematic in the first place. What was initially considered a malfunction becomes, then, a defining trait in an object, asserting its individual identity in a sea of mass–produced goods. An aesthetics of misuse thus emerges, as an essential transformation of the individual's interaction with the object.

Reflection on imperfect objects is not a new subject in design research. Let it be noted, however, that electronic objects represent an entirely different category of objects; the rich field of possible iterations and interactions, as well as the behaviors associated with them, cause the experiences associated with this kind of object to be of a completely different nature.

Conclusion

"The most difficult challenges for designers of electronic objects now lie [...] in the realms of meta-physics, poetry, and aesthetics, [...] the post–optimal object could provide new experiences of everyday life, new poetic dimensions." [7]

By stimulating and nurturing individualized responses and uses, explorations on the misuse electronic object can open up a new range of possibilities beyond the realms of efficiency and results. Design takes a new role, not as an instrument to the imposition of values, meanings and hierarchies; instead, by making the individualized input an essential part of the construction of the identity of an object, the figure of the user can be elevated to a new level: that of an actor. Whereas the user merely abides to an aesthetics of use already defined by the designer as the embodiment of an ideological system and is, ultimately, subdued to the machine, the actor embodies a new perspective on interaction design, where machine and human share the same hierarchical space. Dunne writes:

"According to Virilio (1995): 'Interactive user–friendliness'... is just a metaphor for the subtle enslavement of the human being to 'intelligent' machines; a programmed symbiosis of man and computer in which assistance and the much trumpeted 'dialogue between man and the machine' scarcely conceal the premises: ... the total, unavowed disqualification of the human in favor of the definitive instrumental conditioning of the individual.'

This enslavement is not, strictly speaking, to machines, nor to the people who build and own them, but to the conceptual models, values and systems of thought the machines embody." [8]

The actor has an active role in the questioning of this enslavement to pre–fabricated behaviors. By subverting the notion of a generic travesty of the user, the actor has the power to open up a new range of poetic and metaphysical possibilities as to human relationships with electronic objects. Growth towards a new notion of technology is, however, of prime importance, as its visibility plays a central part in the shifting of roles from user to actor. By completely obliterating visibility into the technological workings behind the surface of an electronic device a rich source of new experiences and perspectives towards the object is lost. Buechley writes:

"Invisibility is a narrow design goal. It's not necessarily a bad one, but it doesn't capture the full range of technological or creative possibilities." [9]

"Why should ubicomp – or any other computing discipline, for that matter – consign itself to the ignored, invisible realm?" [10]

Marcel Duchamp considered his readymades as a response to purely retinal art, creating additional dimensions to the artistic object not yet explored at that time; taking cue from this idea, malfunctions

have the potential to respond to the perception of product design as a discipline merely focused on results, usability and user–friendliness, particularly in an era where electronic devices tend to mediate more and more areas of our lives that are less dependent on these factors.

"The electronic object does not have to fulfill our expectations; it can surprise and provoke." [11]

That doesn't mean, surely, that dysfunctional design should be the main goal for the development of meaningful experiences in and for itself; it is, however, a path to be explored and observed as useful and playful critique. Questioning the role of the designer as merely responsible for

"creating semiotic skins for incomprehensible technologies" [12]

is essential to the development of design practice itself.

"a 'space' of chains and layers of meaning between the object and the viewer, continuously expanding with no fixed origin or closure." [13]

Understanding interaction design through Roland Barthes' definition of text might be a useful beginning.

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THE SOUND OF SMALL BRAIN CIRCUITS: PLASTICITY AND SYNCHRONISATION IN THE NEUROGRANULAR SAMPLER

JOHN MATTHIAS

This paper explores some control strategies using synaptic plasticity in the simulation of an artificial network of spiking neurons in the Neurogranular sampler -a musical instrument which triggers grains of sampled sound when the neurons 'fire.'
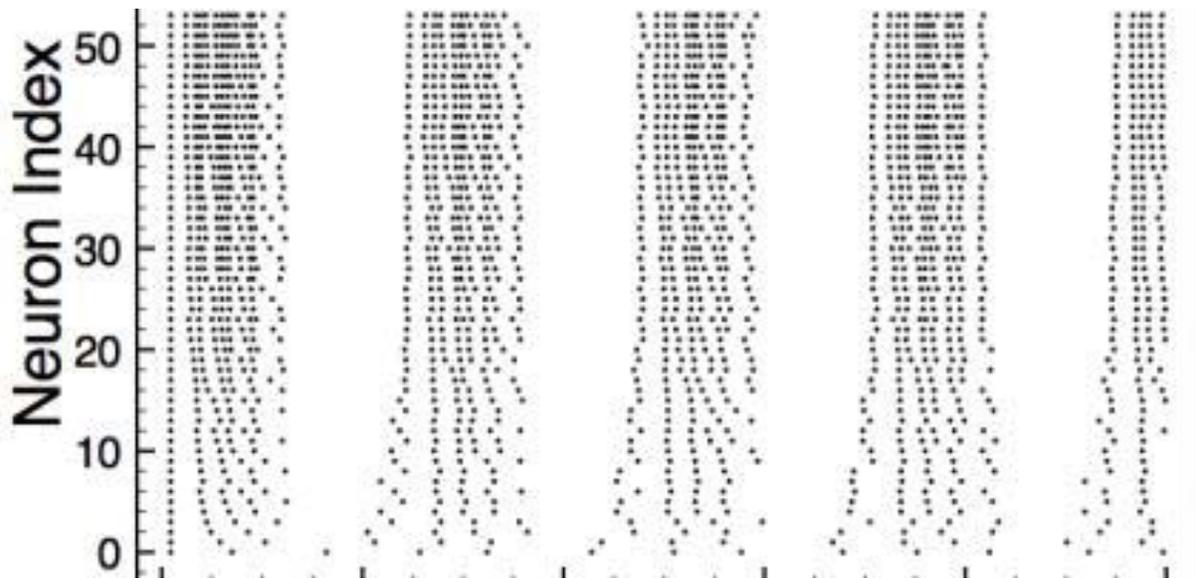
A raster plot showing the spiking behaviour of simulation of a network of 64 neurons modelled using the Izhikevich Model (2004) copyright Kevin McCracken.

Introduction

The Neurogranular Sampler is a software musical instrument which triggers grains of live sampled audio when any one of a network of artificial spiking neurons 'fires' [10,11]. The level of synchronisation in distributed systems is often controlled by the strength of interaction between the individual elements. If the elements are neurons in small brain circuits, the characteristic event is the 'firing time' of a particular neuron. In this paper we propose how we might 'neuroengineer' the collective firing behaviour of small networks of artificial neurons and therefore also engineer the sound of the Neurogranular sampler by exploiting a counter-intuitive property of Neuronal Plasticity.

Plasticity

The term 'plasticity' in the neurosciences refers to the ability of neurons or nerve cells to adapt their connectivity according to the electrical activity of the other cells in the network. The ability for cells to

make new physical synaptic connections via axonal growth and synaptic growth and decay (synaptogenesis) is known as structural plasticity. [1] In this scenario, the axons (long tubular structures) from neurons grow towards other active cells through an induced chemical gradient, a process which has a timescale of hours to days. A different category of plasticity is known as 'Spike Timing Dependent Plasticity' (STDP) and refers to the millisecond strengthening and weakening of connections between neurons as a result of the transmission and reception of *causal* spike signals between neurons. [2]

This 'causal' effect was initially proposed by Donald Hebb and is known generally in the literature as 'Hebbian Learning.' [3] Essentially, the idea is that connections between neurons become post-synaptically strengthened (i.e in the direction of the motion of the spike signal) if the pre-synaptic neuron fires before the post-synaptic neuron. In the Spike Timing Dependent Plasticity scenario, this has been refined such that the change in the strength of connections is dependent upon the relative timings of pre-synaptic inputs and post-synaptic spikes. [4]

This continuous strengthening and weakening of neuronal connections resulting from the timing of neuronal stimulation and the relative timing of the resultant spiking behaviour coupled with the effects of the differing transit times of spike signals according to axonal topologies, has led to the idea of 'Polychronisation' (not at the same time, but in clusters). This term put forward by Izhikevich and others describes the formation of groups of neurons which fire according to particular sensual and cortical inputs. [5] A neuron can be a member of any number of such groups, meaning that it is not simply the number of neurons which is involved in neuronal processing, but the combinatorial number of possible polychronous groups, which in the human brain is a number larger than the total number of elementary particles in the Universe.

The idea that patterns and sequences of neuronal firing might be associated with particular sensory inputs has been around for a long time (see for example [6]), but it has only been relatively recently that this has begun to be understood at the level of the micro-dynamics of networks of cells. At this dynamical level, the interplay between model parameters associated with neuronal topologies, spike transit times (often called 'delays' in the literature), sensory input, synaptic plasticity and global 'noisy' inputs crucially affect the robustness and formation of polychronous groups and the associated spike timings.

These models of small brain circuits provide us with a very rich dynamical palette with which to experiment on the controlling of sound, by using the 'spike' signal of an individual neuron to trigger sonic events. Typically, in neuro-technological or neuro-engineering contexts, the spiking output of a network of artificial spiking neurons goes through an 'encoding process' and is sent to a 'motor' control, such as those which might control the movements of a robot, for example. [7] One example of this encoding process, is called 'rate coding' in which the frequency of the spikes generated in the output of the network is interpreted and used as a control parameter, the resulting behaviour from which is fed back to the network. [8] In our work, directed towards sonic control, the spiking output *is* the motor output, and in a sense the artificial neurons in our system have triple sensory, cortical and motor character. [9]

The Neurogranular Sampler

In the Neurogranular Sampler, [10] the spike signal from any artificial neuron from a number of cells specified by the user triggers a single 'grain' of sound, either from a 'live' microphone, or a pre-recorded sound file. Typically, these grains can be between 20 milliseconds and one second in duration. We can choose different kinds of neurons, which exhibit different kinds of spiking behaviour (Regular Spiking or

Bursting, for example) and choose either a homogenous group of neurons or a heterogeneous group (a selection of different types). If the group of neurons is chosen to be homogeneous and of 'Regular Spiking' variety, we find that the network of spiking neurons rapidly enters a dynamical state in which the neurons fire together –almost in synchrony (see Fig 1). In the diagram Fig 1, the firing activity in a simulated network of 64 neurons (labelled on the 'Neuron Index' axis) is shown over a period of 2000 milliseconds, or two seconds. A dot on the diagram, or 'Raster Plot' as it is known in the neuroscience literature, indicates a firing 'event' from that particular neuron. Vertical lines on this diagram indicate synchronous firing behavious meaning that the instrument will exhibit pulse-like behaviour, the frequency of which can be controlled by a 'stretching' or compression of the audio signal. We can move away from this synchronous dynamical state in several ways; one way is to introduce heterogeneity into the system, i.e by introducing different kinds of artificial neurons. This acts as a kind of structural disorder, making the synchronous state impossible. Perhaps surprisingly, another way of moving away from the synchronous state is to exploit a recently discovered property of synaptic plasticity in small brain circuits by Lubenov and Siappas. [11]

Controlling Synchrony

Lubenov and Siappas showed that if the neurons in a network of artificial regular spiking Izhikevich neurons are all initially in a synchronous regular spiking state, the introduction of Hebbian Spike Timing Dependent Plasticity into the model network rapidly takes the network into a very uncorrelated state, in which the spiking patterns are almost indistinguishable from a random pattern (lubenov ref). As the neurons' firing times are already initially synchronised, the adaptation of relative spike times due to the changing of the connection strengths introduced by the plasticity algorithm can only have the effect of taking the spikes out of synchrony! The network subsequently gradually re-aligns itself temporally and self-organises to a state at the 'border between randomness and synchrony.' [11]

We can exploit this in our Neurogranular sampler instrument –in this way synaptic plasticity is being used as a control mechanism to 'de-synchronize' the network of neurons. It is possible to use an Anti-Hebbian algorithm [11] in order to re-establish the initial regular spiking synchronized state and we can follow the correlation in the network spiking behaviour using an 'order parameter' which is a function and a phrase borrowed from condensed matter physics.

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BENDING LIGHT: STRANGE TALES FROM THE PROJECTIVE PLANE

Alex May

This paper presents an overview of the ongoing research and art practice from the Quadratura Video Projection Research Laboratory, which is concerned with exploring the medium of light; mainly through the utilisation of video projection and mapping techniques and disparate technologies coupled with more traditional optics such as mirrors, lasers, and illusions.

Shadows of Light #2, 2011, Quadratura, video projection, Copyright Quadratura Ltd.

This paper presents an overview of the ongoing research and art practice from the Quadratura Video Projection Research Laboratory, which is concerned with exploring the medium of light; mainly through the utilisation of video projection and mapping techniques and disparate technologies coupled with more traditional optics such as mirrors, lasers, and illusions. Quadratura also develop interactive works that explore the role of the observer in art; subverting the traditional one-way communication and creating emotive interactions that can either encourage and/or discourage participation within the viewing 'agreement'.

Each project from Quadratura has necessitated some degree of in-house software development as ideas and concepts within the work have evolved. The main focus, PatchBox, is a highly complex and specialised application; an amalgamation of six years exploration into video mapping techniques. It is capable of a wide range of functionality, from performing simple affine transformations of video onto arbi-

trary flat surfaces, to dynamically mapping any combination of real and virtual geometry onto any physical structure from multiple video projectors, from multiple physical viewpoints to facilitate real-time, high resolution, digital trompe l'oeil effects.

PatchBox is designed in such a way as to be flexible enough to be used as a VJ performance tool, a rapid urban video projection bombing system, or for long running multi-screen interactive installations. However, it was never designed to be a commercial product, or indeed used by anyone outside of Quadratura. This decision has facilitated a rapid development schedule as it is not ever had to be used by a third party; rather it only has to keep pace with our artistic requirements.

Video Mapping

PatchBox was first utilised in 2007 for a large scale audio/visual installation in the historic Holland Park located in London; a major commission by Kensington and Chelsea Council. Alex May (real-time video artist and programmer) and Martin A. Smith (sound artist and composer) – who would later become the directors of Quadratura – developed a series of original video projection and lighting installations that formed a darkly cinematic narrative through the ancient wooded section of the park taking visitors on a sublime journey through life, death, and remembrance. PatchBox was used to map a multitude of different blinking eyes (looping video clips) across the canopy of a 30 foot tall oak tree from a single laptop powering one video projector. The real-time functionality allowed dynamic placement and adjustment of each video element.

More recently, Quadratura created a large scale, site-specific architectural video projection mapping for the 2011 Kinetica Art Fair in London. The installation, entitled "BioReactor", was conceived and developed in collaboration with bio-artist Anna Dumitriu who described it as:

"A dirty wetware body, thick with bacteria and mutated by electromagnetic fields, which learns to feed off the digital technology that surrounds it, leeching energy from every data source and transforming - not only itself but also the world around it." [1]

PatchBox was utilised to accurately map video onto the complicated architecture of P3 in London where the event was taking place. Due to the dynamic nature of the mapping system, it took just 10 minutes from turning the computer on to a final, pixel accurate alignment.

Interactive Installations

Since 2008 Quadratura have been developing interactive video installations exploring the relationship between art and the observer.

In 2009 Quadratura exhibited a series of interactive video installations in London entitled "Shadows and Falling Light." Each installation was carefully designed to present a different form of interaction to the visitor without needing to be explained in any way. This was achieved by devising one or two simple abstract 'rules' per installation that would be quickly understood.

"Shadows of Light" rewarded visitors that stood still, rather than moved about. As the visitor stands still, their silhouette is slowly drawn onto the wall in a randomly picked solid colour. If they stand still

even longer they find that the silhouette will begin to act as though it is spray painted, causing drips of 'paint' to start streaming down the wall.

Conversely, "Mesh" is a constantly moving mesh of electric blue lines. Touch any of the lines and it will break them like a beam of light. The mesh will attempt to reform around any physical obstruction (the visitor). Visitors tended to slowly stop moving so they wouldn't break any more beams.

Before 2011, Quadratura had developed their own technical solutions for tracking visitors as they interacted with the work based on infrared illumination and various background subtraction algorithms. In November 2010 Microsoft released the Kinect: a peripheral designed for the Xbox 360 that featured a video camera and depth camera. By utilising the depth camera it became almost trivial to segment and track visitors. While 'Kinect Hacking' has become a world-wide phenomenon, and there have been a great many examples of artists creating and developing concepts on the hardware, Quadratura believes that it was the first to publicly exhibit a Kinect based artwork in a gallery: "Shadows of Light #2" (2011) at Kinetica, London, February 2011.

"My Robot Companion" (2011) was a series of robot heads designed to promote discussion of the ethical issues of how we might relate to robots in society, created as part of Alex May & Anna Dumitriu's collaboration as artists in residence at Hertfordshire University working with the Adaptive Systems Research Group (ASRG). Exhibited at the Science Gallery in Dublin (June-September 2011) as part of their HUMAN+ show, the installation centred around 'Charley', a humanoid research robot created by Dr. Michael Walters from the ASRG, with a stripped down Kinect embedded on its chest, and featuring a video projected head. As visitors approached the robot, it would turn its head towards them, and its face would slowly morph into theirs. If more than one visitor stood in front of Charley, its face would become an amalgamation of all of their faces. It was designed to explore how people felt about a robot that looked (progressively) like them and/or their family, and at which point the "Uncanny Valley" effect might kick in. [2] "My Robot Companion" was awarded joint first prize for public understanding of artificial intelligence by the Society for Artificial Intelligence and Simulation of Behaviour.

Conclusion

Video projection is a powerful medium; it is able to non-destructively alter the appearance of surfaces on a large enough physical scale to present the observer with an environment that can be almost entirely digitally manipulated in real-time in response to their motion, pose, and proximity. Some instances of Quadratura's interactive artwork require observation to exist in any meaningful way; although the communication between the observer and the work is allowed to evolve within the artistic constraints designed into the system, whether it is physical, verbal or otherwise. Our challenge, therefore, is one of creating meaningful communication within the boundary of the technology.

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RECOGNITION AND RESPONSE TO HUMAN MOVEMENT CONTAINED IN MOTION CAPTURE DATA USING THE SELF ORGANISING MAP

John McCormick

Neural Networks have been used successfully for recognition of human gestures in many applications including analysis of motion capture data. This paper investigates the potential for using the same methods for both recognition and synthesising responses in relation to movement contained in motion capture sequences.
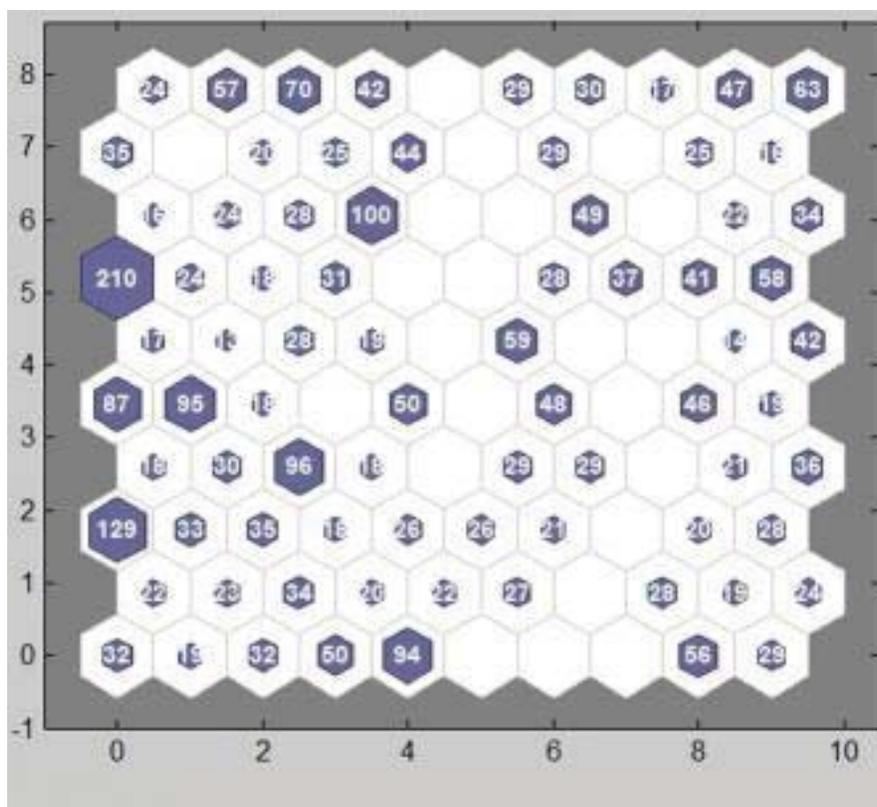
Representation of the trained Self Organising Map with neurons containing clusters of similar patterns derived from the motion capture data.

This research arose from questions regarding the nature of collaboration and the use of immersive digital sound and visual environments as a component of live dance performance incorporating real-time motion capture data. Human collaborators are able to make use of their experiences and memories to respond to developmental concepts and synthesise possibilities in relation to a new artwork. If the software environments or agents were to be considered part of the collaborative process, what traits would be beneficial to them?   Some form of memory would be useful, so the agent would have references to apply to incoming stimulus, or some substance with which to synthesise possibilities.

In contemplating the software agent as collaborator, even in a very limited sense, this research considered models of software that attempted to mimic human brain functions. Artificial Neural Networks (ANN) attempt to model the behaviour and capabilities of neural networks in the brain, and have been popular in the area of machine learning, including the field of gesture recognition. While there have been many successes in the area of gesture recognition using artificial neural networks, [1] [2] in human communication that recognition may often be a precursor to a response and a solution was sought that offered possibilities of both recognition and response especially in relation to human movement contained within motion capture data. There are many types of ANN however this research currently employs a particular type of ANN, the Self-Organising Map (SOM) or Kohonen Feature Map, after Teuvo Kohonen who first described them. [3] [4]

The Self Organising Map is an unsupervised form of neural network in that there is no ideal output suggested to the network, only the input data is provided. Furthermore the input data is not necessarily labelled in any manner so it is up to the SOM to find any patterns within the data and to group these into classes.

Sequences of movement were captured using both Motion Analysis and Optitrack optical motion capture systems to determine if the method was system independent. Both systems used multiple cameras to record the positions of reflective markers attached to the body of the dancer. The data was produced to represent both limb position as defined by marker positions and a hierarchy of joint rotations. This allowed testing of the SOM with the most popular representations of motion data, i.e. position data or joint rotation data. The SOM chosen was represented as a 10 X 10 array of neurons giving 100 neurons competing to classify the samples of motion data. The motion sequences were around 3000 frames long and each frame was treated as a sample by the network. Within each frame there were either 34 marker positions (the number of markers on the dancer's body) or 19 joint rotations, and each of these represented by a vector (x,y,z), so a total of 102 position values or 57 joint rotation values. Each frame containing all of these values was presented to every neuron and the one deemed to have the closest match (Best Matching Unit, BMU) is the winner and the map is adjusted accordingly. A weighting for the winning neuron and a decreasing number of neighbouring neurons are adjusted and over many iterations a weighting map is formed that increasingly matches the topography of the input data. The final map can be visualised in a number of ways, but perhaps the most pertinent to this paper is in the form describing the number of clusters or hits each neuron achieved.

Figure 1 shows the number of frames each neuron gathered as a class or cluster with similar data patterns. The patterns here, being frames of mocap data, could be considered dynamic postures extracted from the movement sequence. To test the trained network, mocap data representing a limited number of movements of known composition and length was introduced and the resultant neuron map compared to the map of the trained network. For example the main sequence contained a few hundred frames of the dancer in T-Pose (standing with feet together and arms out to form a T shape) at the start of the sequence. A short sequence of mocap data containing only T-Pose data when presented to the trained network resulted in all the frames stimulating the same neuron that contained the T-Pose samples from the original sequence. This pattern was seen when presenting other short, known movement postures to the trained network. The classification or recognition of the movement data was seen in both position and rotation datasets, though the resultant maps were different in the distribution and number of hits each neuron accumulated.

The SOM proved to be a robust method for classifying motion captured movement. It was able to create a map of movement frames which could be used to classify or recognise further incoming motion data.

More importantly for this research, it was able to create a map that could be treated as a type of memory of the dance as represented by the motion data. Traversing the map in different ways could lead to responses that are inherently related to the memory of the performed movement, but with the potential to create variations on the movement as responses to incoming motions. This is possibly analogous to the process displayed by human performers when improvising or developing movement and it is this re-synthesis or traversing of memory in order to produce movement responses that is the current stage of this research.

The results have pointed to a number of further possibilities relating to live performance. Multiple maps representing different components of the performance; movement, sound, images, could be trained and then traversed simultaneously during the performance. The use of multiple maps may be analogous to the processing of specialised information by different parts of the brain and could be used with some higher function logic to co-ordinate the synthesis of the multiple elements.

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HOW LOCATIVE MEDIA ART SET THE AGENDA FOR MOBILE LOCATION AWARE APPS (AND WHY THIS STILL MATTERS).

Conor McGarrigle

This paper argues that locative media art has had a significant role to play in the shaping of emergent location-aware technologies with this influence very evident in the latest generation of locative smartphone apps.

It is argued that this influence goes beyond superficial similarities in approach but rather represents a shift in thinking about location which has far reaching implications for the future of location-aware applications.

NAMAland, 2010

Introduction

This paper explores the connection between Locative Media (LM) a set of art practices centred on location aware technologies and current Location Based Services (LBS) and applications. To achieve this LM

will be traced to the origins of the term and to the originary ambitions driving this unique mode of engagement with emergent location-aware technologies. This involves returning to the first principles of the Karosta Locative Media workshop, its associated texts and to Ben Russell's "Headmap Manifesto" [1] to locate the intentions and ambitions embedded in the term itself.

From its inception it can be said that LM has set itself the task of defining modes of operation for emergent locative technologies. These emphasise the technology's ability to augment space through revealing layers of meanings and associations which act to foreground the rich lived experience of place. With the growing ubiquity of locative technologies I propose that LM exerted a significant influence on these unfolding technologies shaping the application of the technologies resulting in a more user centred experience which opens the technology to a wider constituency beyond the realm of specialists. This influence goes beyond the specifics of similarities in approach between particular applications and artworks, representing a shift in thinking about location which has implications for the future of locative applications.

The Ambitions of Locative Media

The term "Locative Media" originated at the Locative Media Workshop which took place in Karosta, Latvia in July 2003. The term was originally employed to distinguish the questioning artistic uses of locative technologies from their instrumentalised commercial and military uses. The proposition was that locative technologies, which had at this point only recently become widely available for civilian use, represented a fundamental shift (or the means to bring about such a shift) in our perception of geographic location. That the artistic uses of these technologies not only represented a new artistic form but had an important role to play in the opening up of the possibilities of these media to everyone. It was the embodiment of Ben Russell's prescient predictions in the Headmap Manifesto,

what was once the sole preserve of builders, architects and engineers falls into the hands of everyone: the ability to shape and organise the real world and the real space. [2]

Russell correctly identifies the potential of the convergence of high bandwidth mobile internet and location awareness in mobile devices to overlay real space with a geographically referenced layer of annotation and context sensitive information. His interest mirrors that of the Ubicomp community of researchers but his concerns focus on the privileging of user-centric practices and the aspiration that these technologies become tools for creation rather then solely consumption. This concern echoes those expressed by the creators of urban annotation project "Urban Tapestries" that practices emerging around locative technologies (in 2003) were "unnecessarily impoverished" [3] a concern which Urban Tapestries sought to address.

LM can trace its origins to the year 2000 when "selective availability", an intentional degradation of the Global Positioning System (GPS) signal accuracy for non-military users, was switched off. GPS, a multi-billion dollar space based positioning, navigation, and timing system established by the US Department of Defence and controlled by The U.S. National Executive Committee for Space-Based Positioning, Navigation, and Timing, then became a system in search of a new commercial market. Ben Russell commented that

hardware manufacturers seem to be producing devices that are as capable and open as possible, perhaps in the hope that users can tell them what the devices are for. In this sense, they seek grassroots and

consumer level interpretation of what these devices are as surely as they seek an answer from corporate users. [4]

LM can be thought of as a range of art practices which sought to reinterpret these emergent technologies as bottom-up rather than top-down technologies. [5] Ben Russell placed it squarely at the convergence of a rapidly unfurling technology and the social and physical spaces in which it is being deployed, describing it as:

a new site for old discussions about the relationship of consciousness to place and other people. A framework within which to actively engage with, critique, and shape a rapid set of technological developments. A context within which to explore new and old models of communication, community and exchange. [6]

It is this sense of a practice which seeks to engage, to shape and to set the agenda for location aware technologies which defines LM. I propose that this engagement takes it beyond a purely oppositional stance confronting what has been seen as the flaw in tactical media which "point out the problem, and then run away." [7] Through the introduction of novel practices and approaches toward technologies of location awareness, through questioning what this means and what it can mean, LM have in effect become involved in a process of shaping these emerging technologies. Lisa Parks in "Cultures in Orbit" asks "how might Western controlled satellite technologies be appropriated and used in the interests of a wider range of social formations?". Locative media offers one response.

Practices

I posit that this is due to locative media's influence on both the ways in which locative technologies are employed in an increasing range of everyday situations and fundamentally the way we think about and understand these technologies. This can be attributed to the set of user practices introduced by LM which shifted the meaning of these technologies through the privileging of user-centric modes of operation focusing on space as Lefebvrian lived space.

What do I mean when I speak of practice? At one level it can be thought of as the ways in which users engage with technology, the usage modes and habits which grow up around new technologies. [8] On a deeper level it is the ways that the technologies are integrated into everyday life which makes them meaningful and therefore useful. Paul Dourish sees the concept of practice as "one that unites action and meaning" describing "how the world reveals itself to us as one that is meaningful for particular sorts of actions". He continues "part of what people are doing when they adopt and adapt technologies, incorporating them into their own work, is creating and communicating new meanings though those technologies as their working practices evolve." [9] Crucially this process of making technologies meaningful comes through practice, it is not inherent in the technology nor can it be inscribed by designers being rather contingent on real world situations and revealed through practice. [10] The integration of new technologies into the everyday is dependent according to this account on a "supervening social necessity". Regardless of how innovative they are, technologies will not be adopted if they cannot be made to be meaningful in the context of the everyday.

The emphasis here is on what people actually do rather then what they are expected to do or are instructed to do. This can be described as tactical where "the imposed knowledge and symbolisms become objects manipulated by practitioners who have not produced them," [11] a form of resistance or

subversion. Or in a less oppositional sense as simply part of a "process by which we can experience the world and our engagement with it as meaningful" [12]. In effect it is to be expected that practices can be both, acts of resistance and pragmatic acts of appropriative assimilation.

The corollary is that practices which add meaning to a technology have the power to reposition the technology from the original intent of its creators, hastening its acceptance through shaping the technology. My proposal is that the work that LM has done in this regard is at two levels; one it has established a set of practices for engaging with location-awareness, with GPS and other location technologies and with the networked devices that are enabled by them and secondly it has caused us to think about location differently, in effect acting to "recode relations." [13]

The first consumer orientated applications of locative technologies which achieved broad appeal were satnav devices, direct descendants of their military antecedents in their approach to position. They orientated around position as points on the Cartesian grid identified by co-ordinates of longitude and latitude with the connection between the satnav unit and GPS satellites ever present. Of course this makes sense in an application designed for navigation, up to a point. As satnav gained a wider user base and became part of everyday situations so too did the anecdotal and media reports of its shortcomings. The familiar accounts of mishaps attributed variously to an over reliance on fallible technology but more cogently to an inability of the technological practices to account for real contingent local conditions. While satnav still has a niche the focus of development for location aware technologies and associated applications has shifted to mobile devices and applications which have a very different character focusing on exploring the individual's relationship with her location and augmenting that experience in a meaningful way. In short drawing substantially on locative media practitioners ambitions for these technologies and their articulation of location as Lefebvrian "lived space."

Position vs. Location

LM's articulation of location as lived space as distinct from the cartesianism of position is central to its approach. Position treats space as points on a cartesian grid identified by co-ordinates of longitude and latitude to be tracked and targeted with locative technologies ; for example as I write this at home an app on my iPhone locates me at 53˚17' 22.74" N latitude, -6˚8' 15.26" W longitude. Useful information if I were lost at sea, to or to be targeted by a Predator drone but it provides no information about the nature of this place, its history and the layers of association which constitute my relationship with it. In short it fails to address location as lived space and in doing so fails to build on the potential of the technology to enhance space. Location on the other hand is an "existential, inhabited, experienced and lived place," [14] the space of individuals and communities replete with histories, narratives and layers of association which imbue location with meaning which can be revealed and made visible through the application of locative media. I suggest that locative media's privileging of lived space and development of a rich set of practices building on the affordances of the technologies have introduced new thinking about location and the use of location aware devices.

Tracing Influence: The Afterglow of LM

There is much to be gained in tracing the trajectory of location-aware technologies and their public acceptance from the early GPS-centric satnav to today's smartphone apps and to unpack the nuanced but nonetheless significant differences in how they think about location and place. If location awareness is to be the nexus of mobile internet and the geospatial web then it assumes a pivotal role in the unfolding

of these technologies and their integration into the everyday. It follows then that for location awareness the practices which grow up around them are a critical contested space for the future of digitally mediated space. This fact is recognised in the ambitions of locative media practitioners.

I propose that the practices employed by LBS, particularly those which potentially have a wide user base like Facebook Places or which capture the popular imagination like Foursquare, are the agents involved in shifting the balance of these technologies from control space to enhanced space. If we follow the short trajectory of locative technologies as they move from new technologies addressing specialist user groups of military, mariners and surveyors to their current position as emerging technologies tentatively reaching a broader constituency of everyday users employing a burgeoning constellation of devices and applications we find a commensurate shift in the meaning of location-awareness.

Locative media practitioners operate within this window developing practices which are sometimes experimental and other times eminently practical which establish a mode of operating for location aware technologies which, if successful, remain permanently inscribed. Through augmenting space with location specific narratives, personal annotation, through revealing hidden histories, ludically transforming everyday space into digitally mediated game-space and developing proximity based social networking it can be said that LM projects foreshadowed all of the key areas of current location aware applications and services. Space doesn't permit a comprehensive detailing of these so I will outline a few examples each indicative of an approach shared by a number of LM works.

Consider "Urban Tapestries" (UT) the 2002-2004 research project which used location aware mobile devices to allow users to virtually annotate physical space to be asynchronously accessed by others in the locations to which they referred. The project established a rich set of practices which were researched, tested and refined. Envisaged as a public authoring platform UT consciously adopted a position as a counterpoint to what they saw as the "unnecessarily impoverished" prevailing views of the application of location aware technologies seeking to instead find out what it was about local places that mattered to people as they went about their daily routines.

True daily life is richer and more complex than the traditional view, relying as much on social networks, personal experiences, and chance interactions and connections, so pervasive computing applications should attempt to reflect this. [3]

Indeed this could be the mission statement for so many location aware mobile applications. Apps such as Color, Local Mind, Ditto, Whatser, Weddar, Foursquare, Gowalla, GraffitiGeo, SCVNGR, Yelp and Dopplr among many more share the concept of location as a social space defined by relationships and communities of interest through providing user tools for virtually annotating space . Building on the facility to quickly and accurately locate users mobile devices their focus is on location as lived space employing varying approaches and exhibiting an ambition to enhance space through fostering and building location based connections between individuals.

Similarly the practices of urban gaming, the ludic transformation of urban space mediated by mobile devices, introduced in LM projects such as Pacmanhatten and Blast Theory's Mixed-Reality games have pervaded LBS such as Foursquare and SCVNGR which incorporate game elements as well as location-based games such as Gbanga and AR games like Battle:Los Angeles. Proximity sensing familiar from LM works such as "Umbrella.net" (Brucker-Cohen, Moriwaki 2004) and "Aura" (Symons 2004), has become one of the fastest growing areas for LBS with the dating/contact apps of Gaydar, Grindr, Skout and

Whoshere standing out in a crowded marketplace. LM projects which overlaid physical spaces with narrative and sound such as "Trace" (1999), "Murmur" (2003), "34w118n" (2004) and "Media Portrait of the Liberties" (2004) have established a genre of their own with any number of location based heritage applications and commercially available apps such as those produced by companies like SoundWalks.

All Changed, Changed Utterly?

It is important to not overstate the extent of locative media's influence on location aware technologies or understate the challenges presented by the influx of development money as they enter the mainstream. These changes are incremental changes which insinuate themselves into the logic of the technology through introducing practices and ways of operating which are assimilated. They are however persistent, shifting user understanding of the technology which in turn impacts on the nature of development employing the technology. This is a process being continually renewed and challenged as new location-aware technologies emerge.

This does not necessarily result in a loss of agency for LM artworks. As illustrated by this author's 2010 "NAMAland" an augmented-reality app which overlaid Dublin with a layer detailing patterns of property ownership associated with the Irish banking bailout. The project was a popular success becoming part of the national debate on the financial collapse. From the perspective of our argument here it permanently connected emerging AR technology with activist political critique. There is a sense in LM practice that the introduction of user-centric practices responding to real needs can and have shaped the trajectory. This is backed up by a realisation that as location-aware technologies become part of the everyday they "might have been otherwise." [15]

Conclusions

It is my contention that the engagement of locative media artists with location aware technologies has changed their application in a range of everyday situations and shifted concepts of location from a GPS-inspired instrumentalised vision of positioning to a richer user-centric conceptualisation as lived space. These changes are reflected in an ever increasing range of mobile applications and services. This does not necessarily mean that Locative Media per se needs to continue, Locative Media represents a mode of engagement which will evolve with the technology. This mode of engagement, in whatever form it may take, will continue to have agency in shaping locative technologies as bottom-up rather then top-down.

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BODY AND MIND: A 3D CGI ARTIST'S APPROACH TO MRI VISUALIZATION

JOHN MCGHEE

This paper discusses the author's practice-led approach and philosophical perspective to creating images that combine Magnetic Resonance Imaging (MRI) data with interpretative 3D CGI techniques. The paper concludes that more approaches to MRI data visualization could provide an aesthetic language that offers an alternative mode of interaction.
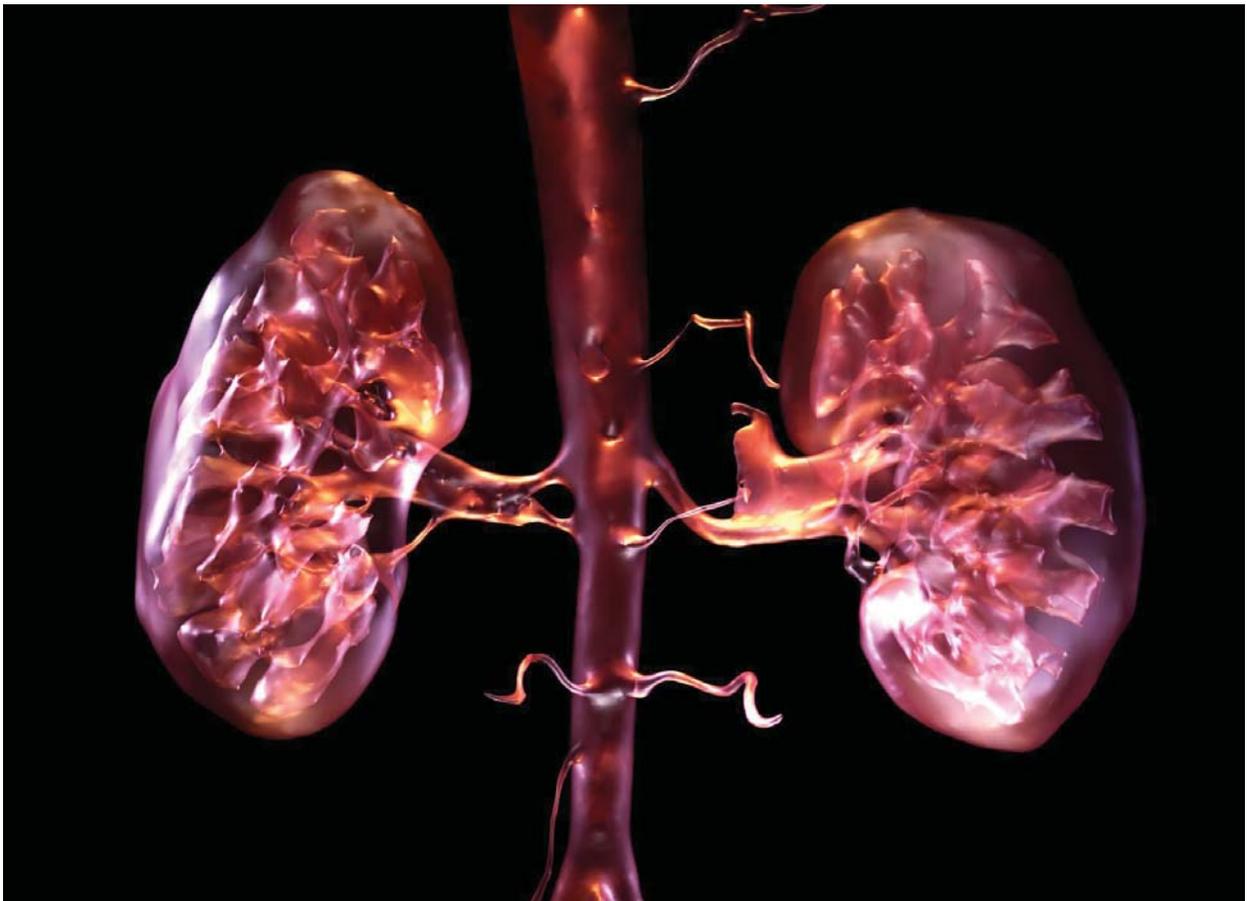
Fig 1. Kidneys. Copyright John McGhee.
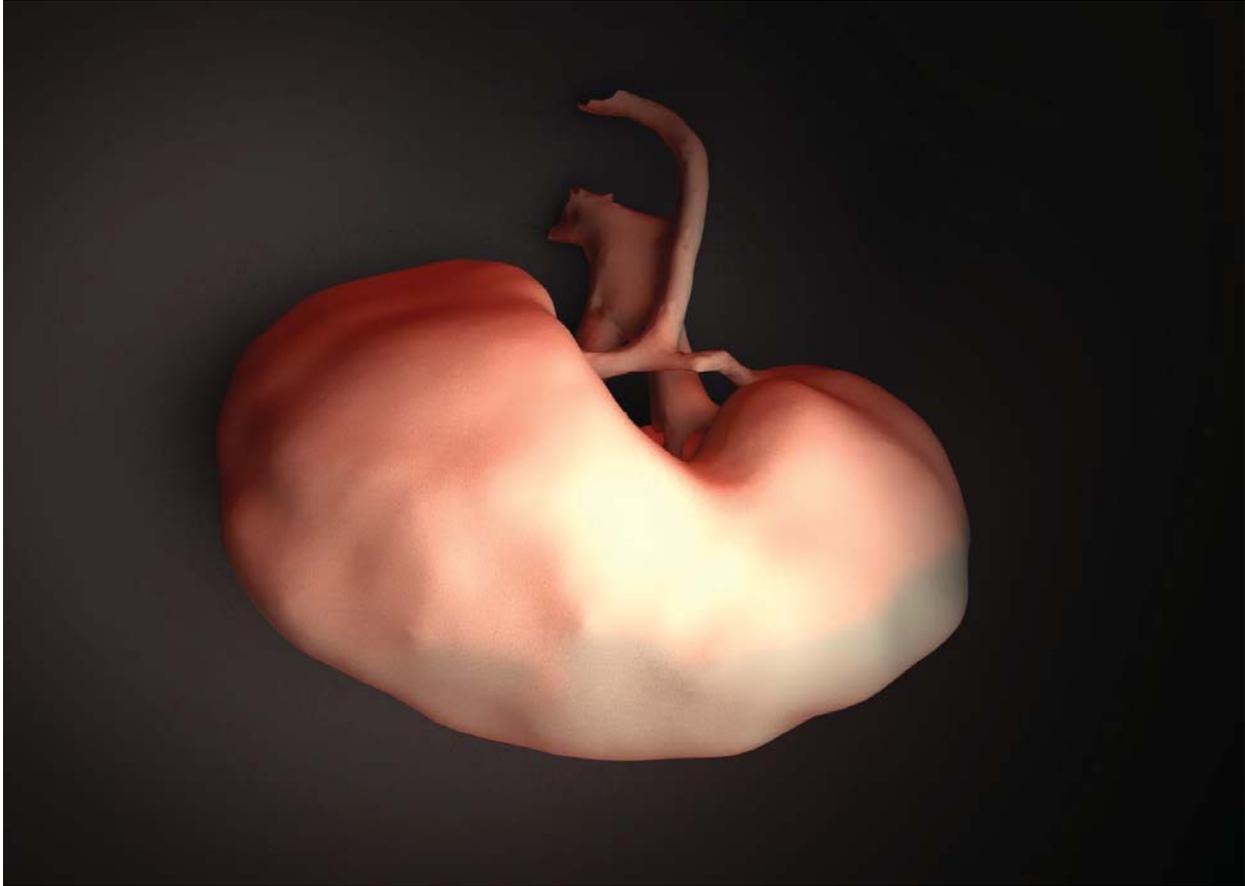
Fig 2. Isolation. Copyright John McGhee.

Introduction

Clinical imaging modalities such as Magnetic Resonance Imaging (MRI) allow the healthcare professional to explore, research and visualize our internal body structure. However the raw image data can be difficult to understand and interpret by the lay viewer. 3D CGI artists and researchers have the toolkit to widen accessibility to this type of image data.

In previous research work, the author established a pipeline in Mimics software to combine clinical MRI datasets with 3D Animation software Autodesk Maya (McGhee, 2010). Mimics is a package that facilitates the thresholding, segmentation and 3D meshing required for making MRI or CT into a surface <http://www.materialise.com/mimics/main_ENG.html>. The initial purpose of creating this hybrid approach was to develop 3D vascular images to improve patient understanding and comprehension of their vascular disease. This raises a series of philosophical questions and choices for 3D CGI artists; what is our role in creating these hybrid images? Do we act as a translator? Or should we mediate the data? In this paper the author argues that artists operating in this domain should provide new perspectives on

the data and not solely act as a conduit for scientific image dissemination. This, the author also argues is particularly relevant when stimulating dialogue between patients and health professionals.

The role of the artist as scientific illustrator prevails in western medicine and has done for many centuries, whereby the artist is commissioned to illustrate for his or her scientific patron. This historical progression can be studied in germane research such as; 'Human Anatomy: Depicting the Body from the Renaissance to Today' (Rifkin et al., 2006). This type of medical anthology identifies the significant historical landmarks in medical illustration, highlighting the evolving role of the medical illustrator and placing the author's practice and research within an historical context.

Contemporary 3D computer-based animation in the field of biomedicine is a continuation of this historical timeline, providing screen-based tools to illustrate the internal body. According to Dijck (Dijck, 2005), computer 3D animation and visualization has provided artists with the apparatus to 'mediate' the human body with imagery. This 'mediated' perception as described by Dijck, has advanced into the digital age with both science and medical illustration using computer tools to virtually recreate and visualize the body. In the article 'Picture this' in the journal 'Nature' (Gewin, 2005), the medical writer Virginia Gewin identifies computer animation in biomedical science as a 'New-wave' niche. While this notion of 'niche' could be partly true, there is evidence to suggest 3D computer animation and visualization by medical artists is fairly widespread.

In Mike De La Flor's 'The digital biomedical illustration handbook' (De La Flor, 2004) several biomedical areas are cited where 3D computer graphics are applied. These include: 'surgical explanation, medical-legal, veterinary, patient education and cellular illustration'. In 'The Guild Handbook for Scientific Illustration' (Hodges, 2003), we also see evidence of the trend to move from traditional 2D methods of illustration to 3D computer animation, with an article by Mathews and Winkleman (Hodges, 2003) setting out a list of tools, materials and techniques for the 3D computer based illustration of science.

The medical animation firm Hybrid Medical Animation (Hybrid, 2010) demonstrates this emerging style. This model of production involves computer animators and artists being hired to construct a narrative to communicate a complex medical condition, a surgical procedure or the latest drug therapy. Further examples of commercial companies adopting this model include Biodigital Systems, Primal Pictures, Eyemaginations, Random42, Nucleusinc and Zygote to name but a few. However, these commercial examples often utilise edutainment as a mechanism of imparting complex biomedical information to the viewer. Edutainment mostly offers a stylised version of human anatomy and disease.

2.0 Clinical imaging aesthetic

In contrast to the 3D computer animation approaches discussed, clinical imaging refers to the acquisition of medical data, gathered from Computed Tomography (CT), MRI, Ultrasound and Positron Emission Tomography (PET) equipment. These modalities of contemporary clinical imaging apply a non-visible spectrum (radio waves and X-rays) to capture cross-sectional image slices of the human body. The term 3D medical visualization is a reference to the post-processing of this medical data acquired during scan procedure.

Medical interpretation of the body is but one stream of visualization, representing the body using a set of protocols and attributes embedded in science e.g. MRI. Radiological instrumentation describes disease in the language of science; abstract, specialist and separated from the body. In effect these images are encoded for interpretation by clinical radiologists only.

In this research the artist worked with cross-sectional MRI data of the human aorta, renal arteries and kidneys. The imagery captured by scientific instrumentation was a representation of inner body space. It is not truly a rendering of anatomy, but a translation of the body by the reactions of the tissues to the magnetic field of the scanner.

These types of radiological imagery attempt to break the body into pieces thus reducing it to understandable components, in the spirit of true reductionism. Empirical science sees the 'body as machine' a concept put forward by Descartes and Bacon and which still underpins the dominant reductive paradigm in medicine. Rosen argues: '…science is currently locked in the grip of a Cartesian tradition that asserts that organism is machine' (Rosen, 2000 p.297).

Established 3D clinical visualization in medicine is designed as a tool to support medical professionals in diagnosis, planning and training. It is a machine-based reductive form of instrumentation that is controlled, with interpretation minimised. This type of MRI imagery is absent of style, is based on reductive values and automated scientific protocols. The 3D visualization of data has some interpretation applied but is an automated and measured process, designed to minimise human intervention.

While the acquisition and visualization of MRI data generates an image that is difficult to understand for the lay viewer, it collects unsurpassed detail of internal body tissue. The medical gaze of MRI sees deep

into the body, exposing what would be 'invisible' to the visible spectrum. This clarity of vision and verifying of data, while encoded, could potentially inform and take the lay viewer to places previously unseen and unexplored. In comparison to the more interpretative approaches seen in 3D CGI biomedical animation, clinical imaging modalities offer the scientific clarity and detail that is difficult for the 3D CGI artist to achieve on his or her own.

3.0 Arts-based interpretation of clinical (radiological) data

There are individual artists who do not conform to the artist-as-illustrator of science model, and represent an alternative perspective. These visual practitioners go beyond the current notions of visualization and representation of MRI data, albeit using predominantly physical media. These individual artists are not necessarily concerned with communicating functional aspects of the inner body. The work they produce is not intended for clinical or diagnostic purposes, but for providing an alternative way of viewing the inner body for exposition. Sian Ede, the author of 'Science and Art' describes this approach as beyond the didactic: 'Artists don't 'do' prettification, product or propaganda for public understanding of science. But they can engage with it and create images, which suggest alternative ways of seeing' (Ede, 2005 p.3)

Ede discusses this reflective and experiential aspect of artistic thinking: 'If art is 'about' anything, it is a reflection of human experience in complexity and it emanates from an inventive individual with an unusual and sideways view on things, communicating with vigorous, visual acuity and daring, its intellectual content.' (Ede, 2005 p.3). The role of the artist as described by Ede cannot just be about producing imagery for 'product or propaganda for [the] public understanding of science'. Ede suggests that artists have a responsibility to produce images and artefacts that present an alternative way of seeing the world.

In the work of individual international artists such as Justine Cooper, Angela Palmer, Susan Aldworth and Jane Prophet we see an interpretative approach to describing the inner body. These artists use medical scan data to challenge and explore our perceptions of the body, as exposed by clinical imaging. While these individual artists offer 'alternative ways of seeing' their respective approaches are often more about their own personal statements and creative agendas.

In a clinical context, this artist-centric approach could be seen as inappropriate, with the space for self-expression and ambiguity being redundant in diagnosis. However, to merely produce imagery that serves science would contribute little to the field and inevitably dilute the artist's contribution.

There is evidence to suggest that purely scientific didatic approaches to disease explanation may not be the best suited approach in patient communication. Cecil Helman in his book 'Culture, Health and Illness' (Helman, 2001), describes the communication problems that currently exist in the field of doctor-patient interaction. In particular, the notion of mind and body separation is significant, as it situates disease in the context of mechanics, separate from the mind. Illness is defined by 'objectively demonstrable physical changes in the body's structure or function which can be quantified by reference to 'normal' physiological measurements.' (Helman, 2001 p.80). Medicine concerns itself only with abnormalities of the body, viewing 'physical abnormalities' as opposed to a 'patient's symptoms, their psychological state, or cultural background' (Helman, 2001 p.81). If we are to connect with patients more holistically, I would argue that utilising new visual approaches and creating images that reconnect body and mind are advantageous.

4.0 The author's visual practice: the hybrid approach

The various pathways discussed in this paper all have merit as a means of engaging differing types of audiences using screen-based media. The author proposes that the blending and combining of these modes of visualization can result in an alternative pathway for visualising medical scan data. By mixing the strengths of clinical data and 3D CGI arts based interpretation, a series of 3D CGI artefacts emerge that could facilitate a new mode of interaction. This paper briefly discusses some examples of the author's approach.

I) THE KIDNEYS - WIREFRAME EXPLORATION

Once the data is extracted from the MRI dataset, the artist is left with a 3D model of the anatomy, containing none of the colour and lighting present within real life photographic situations. This provides a mechanism for interaction, displaying a digital model in real-time. In these wire-frame renderings, I can tumble through, around and inside the 3D mesh. This familiarisation process provides me with a means of exploring the complexity of the anatomical form, as well as stimulating ideas for visual narrative and aesthetic.

This type of image is not meant as a fully rendered final shot, but provides a digital sketchbook for exploring form and composition. The image files provide me with a window into the body, although not necessarily an understanding of the body.

II) THE KIDNEYS

The intention of adding digital lighting and colour to the wire-frame model is not to inform the viewer of the mechanical processes involved in blood filtration, but to start to develop an aesthetic language for communication. Using CGI lighting, a visual quality is applied that renders the image more like glass than soft organic tissue (Figure 1 - Kidneys). The transparency used in the render of this image provides a simulated optical effect that shows a structure within a structure. This aesthetic style translates the human kidneys into a screen based digital artefact with an alternative approach to the reductive.

In a separate piece of work a virtual camera was placed inside the aorta. A cave-like interior starts to emerge from the data, as the model is rotated and digitally surveyed. This suggests a feeling of isolation within a very large passageway or tunnel that winds its way through the human body. This stepping inside the aorta enabled me to explore yet another engaging structure, within an overarching complex form. By placing the viewer inside the structure, a sense of audience participation is introduced, challenging the viewer to explore this vast space further.

III) ISOLATION

The inner human body is completely devoid of daylight. It is a space that functions in constant darkness, only ever illuminated by the non-visible spectrum of MRI and X-rays.

Building on further exploration from the same dataset, a single kidney was isolated from the rest of the form. The kidney was rendered using a more diffuse and scattered lighting technique (Figure 2 - Isolation). The form takes on an almost foetal like position with a warmth to the surface. The essence of this image is to convey the sculptural form of the human kidney, isolated from the body.

5.0 Concluding remarks

This paper puts forward the idea that 3D CGI artists can combine clinical MRI data with a more arts-based approach. The goal of this combined approach is to develop a new visual aesthetic. The application of this type of work transcends the gallery space, offering digital imagery that could stimulate dialogue between health professionals and patients; an impartment of information beyond the purely functional.

It could be argued that this is not a new approach. The early anatomists saw this philosophical stance as the norm. The Renaissance humanist and Professor of Anatomy at University of Padua, Andreas Vesalius

(1514-64) published seminal work, entitled 'De Humani Corporis Fabrica Libri Septem' (The Fabric of the Human Body in Seven Books) (Versalius, 1543). This provided the first detailed published anatomy book in western medicine. Vesalius believed in the humanist notion that images embody an idea and offer meaning beyond words. This work revisits this approach, in developing a contemporary visual language for potentially improved patient interaction and communication.

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ANIMATED GRAPHIC NOTATION

Shane Mc Kenna

This paper discusses the authors' use of animated graphic notation to encourage collaborative music making for a wide range of performers with different musical backgrounds. In terms of notational reform this essay will ask two important questions with reference to the author's work: What are the problems with the old notation, both traditional and static graphic notation, and what is useful about new forms of animated notation.

Fig. 1 - Combination of audience and instrumental notation.
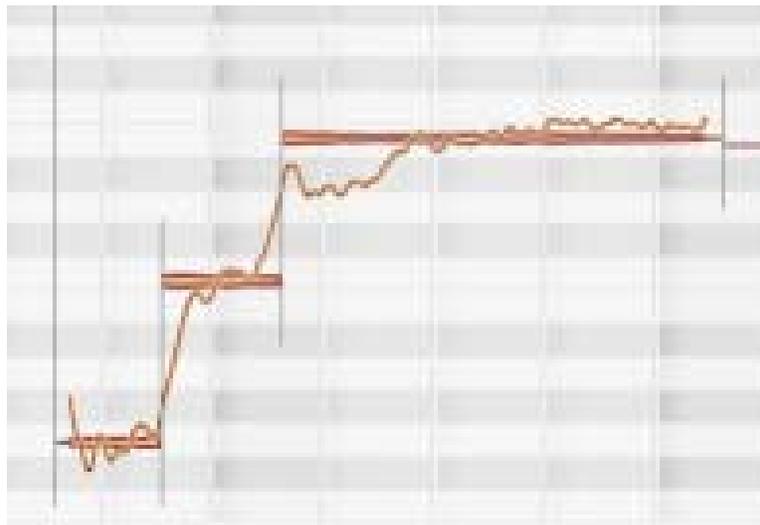
Fig. 2 - View of Melodyne with pitch shown on the vertical plane and time on the horizontal plane.
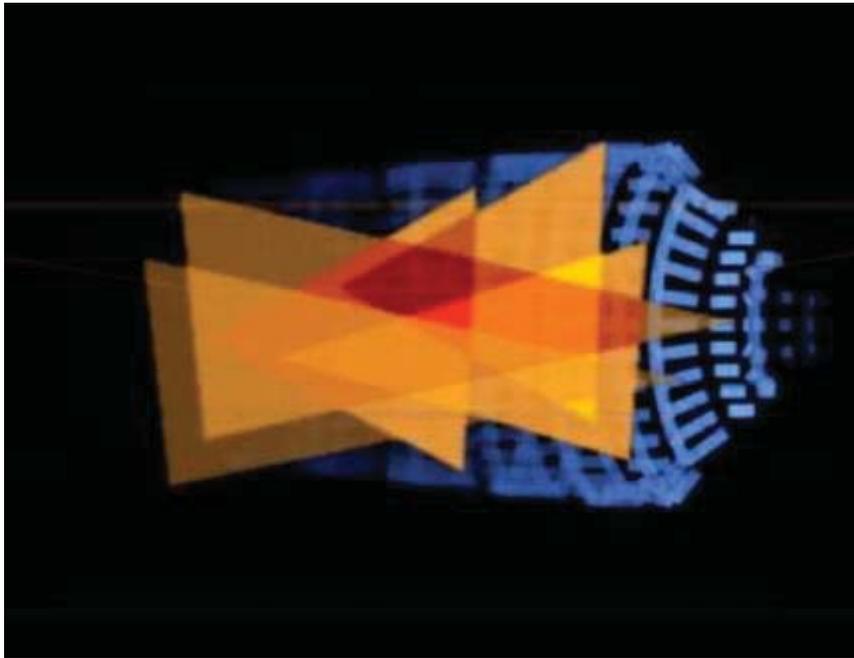
Fig. 3 - Notation for orchestra

Origins and Motivation

As a music maker and music teacher the main aim of my work has been to create genuinely accessible musical experiences, which invite participation based not on musical experience or training but on a simple willingness to take part. This approach arises from the view that music is a fundamental human activity, which forms a part of all known human cultures past and present [1] and which not only satisfies our creative urges but plays an important role in our personal and social development just as it has in our evolution and survival [2] as a way of promoting cohesion through collaborative experience. In western art music the development of notation lead to a gulf between those who take part in music - performers and composers - and those who simply listen - their audience. This has been reinforced by a music education system which concentrates largely on music and notation of the past without giving due attention to the development of musical ideas in contemporary music and to notational reform. The use of graphic notation in education has been shown to encourage creative thinking, collaboration and ensemble performance, while also dealing with general musical concepts, which apply across many genres and styles of music. [3] From my own experience of using graphic notation in the classroom, and as a compositional device I began to develop a system of animated notation, which would further serve the idea of creative collaboration and accessible music making.

Notation – The Western Tradition

Conventional music notation represents a system of communication between composer and perfomer which has been the basis of musical creation in the western world for hundreds of years. The writings of Guido of Arezzo from the eleventh century reveal that notation was used to record and preserve music and to provide performers with a memory aid to assist performance. [4] In *Micrologus* (ca. 1025-28), which drew on the theoretical studies of the ninth century, *Musica enchiriadis* and *Scolica enchiriadis*,

we also see the development of a fixed system of notation giving rise to the study of music as a theoretical language. With the refinement of this notation came the opportunity for composers to create polyphonic works for a number of musicians reading independent parts, replacing the single line melodies sung in unison, which had previously dominated. These developments allowed for the thoughtful organisation of music, which calculated the effect in advance of the performance and provided an exact timetable for the coordination of different parts. An in-depth knowledge of notation, and the musical theory needed to decipher it, became a pre-requisite for becoming a musician and certainly for becoming a composer. A hierarchical structure developed in western art music with the composer instructing the performer for the benefit of the listener, creating a situation where all of the musically uneducated can listen, few can perform and even fewer compose. If we consider listening to be the most vital and beneficial part of the musical experience then this system is justified. If we consider participation in music making to be the most vital aspect, then this system must be questioned.

Animated Graphic Notation

The evolution of graphic notation in the 1950s was, in part, due to the perceived failure of conventional notation to adequately represent the growing range of sounds and performance techniques being explored by some of the more innovative composers. In the 1920s work like *Hyperism* and *Ionisation,* by Edgar Varèse, liberated composition from melody, harmony, rhythm and regular pulse, ideas easily represented using conventional notation. The growing use of unpitched, non-western instruments and electronic sounds exposed the limitations of notation to accurately represent these imaginary sound worlds to be produced in live performance. Graphic notation allowed composers to create musical scores which would represent their ideas but which needed the collaboration of the musicians to produce the desired sounds. This implies a new composer/performer relationship, where the composer relinquishes some control over the resulting sound, alternatively trusting the musical instincts of the performer. The focus of the score now shifts from being an accurate timeline of sound events, which the musicians must produce, to a communication of a musical idea to be interpreted.

One of the great advantages of conventional notation is the control it offers the composer over durations within a piece. With the help of trained performers, composers can create rhythmically complex works with large ensembles, where every detail of the musical timeline is precisely arranged in advance. This is only achievable after establishing conventions of rhythmic notation as standard amongst composers and performers. With static graphic notation, the lack of objective rhythmic conventions often leads to both indefinite rhythm and unknown duration of many graphical pieces. Animate graphic notation allows for intuitive and clear cues for durations and for dividing sections of an ensemble using visual parameters, like colour and position on screen and although it is difficult to emulate the precise rhythmic nature of conventional notation, visual rhythms can be easily used to indicate pulse leaving the precise rhythmic interpretation up to the performer. Much of my work, which will be discussed later, chooses to leave the final decisions of rhythm, pitch and timbre to the performers with the notation designed to supply enough information to communicate a musical idea without specifying a musical sound. This type of animated notation allows each score to be accessible to a wide range of performers, with different levels of musical experience, and to be open to different interpretations from ensembles of all sizes.

In April 2008, two experimental electronic artists, one cellist with a looped effects unit, a classical trombonist and clarinet player, a number of percussionists and around forty audience participants as vocalists, took part in my first experiment with animated graphic notation for a large ensemble in The Bernard Shaw venue in Dublin. None of the performers had seen the score before the performance so the ensemble was divided into three sections: the vocalists followed the white parts (mainly letters like 's' and 't', for texture and percussive sounds); the acoustic instrumentalists followed the blue yellow and orange sections: and the electronic performers interpreted the background video elements (Fig. 1). The notation for The Score in the Bernard Shaw resulted from a number of months of experimentation with simple animated shapes and video footage mostly concerned with changing scale and visual rhythms and the use of colour to divide up sections of an ensemble. The performance worked extremely well as an example of collaborative music making with an ensemble of performers who hadn't rehearsed, many of whom were not familiar with graphic notation. The diverse range of performers working closely together as part of a spontaneous musical experience was the most encouraging part of this early experiment and much of the notation used here was adapted in the next stage of research, involving a more scientific approach.

The next step was to create an installation piece which invited people to give a vocal interpretation of a short animated graphic score, each in isolation and without hearing the other participants' interpretation. A mixture of participants with different levels of musical experience were chosen; from professional classical musicians to participants with no musical training. Their interpretations were recorded, analysed and used to create a layered backing track for a live multimedia performance in 2008 entitled *Three Streams,* a piece that used the same animated notation interpreted by trombone, cello and percussion*.* The score for the installation was divided into a series of animated shapes and symbols, which repeated three times. The first two were a line of 's' and 't' shapes moving across the screen used as an example of a socially learned symbols which are easily interpreted as vocal sounds. The symbols and shapes gradually became more abstract and with more complex movement in order to explore the instant oral response to the visual parameters of changing scale, movement, texture and position (in relation to screen position and to other symbols). These visual parameters were expected to influence the dynamics, duration, timbre and pitch of each interpretation.

Great lengths were taken to animate each part of the notation in a way which could be instantly interpreted by using changes in opacity (fading in and out) and screen position to mimic the forward reading that takes place when a musician sight-reads conventional notation. When sight-reading the brain does not simultaneously absorb individual pieces of visual information, process it and control the motor functions that make the sound. Instead, the reader takes in large amounts of information within the visual field in what are called fixations. [5] Each fixation involves looking forward but also looking backwards (regression or backwards fixation) which is represented by fade in and fade out in this system of this animated graphic notation. The analysis of the recordings, which included forty individuals, showed similarities not only in the interpretation of socially learned symbols like letters but also in the response to abstract shapes. Similarities in participant's pitch, duration and even timbre suggest that certain visual parameters are objectively linked to sounds and that a common musical language exits between the participants, which may be socially learned but is not a product of musical training. A notable feature of these vocal interpretations was the lack of discrete pitches used throughout, with a complex combination of sliding pitches more common, making it difficult to analyse the exact pitches used (Fig. 2). The performance, which followed the installation, was a combination of the layered installation recordings with live interpretation of an extended score. This was projected for the

musicians and the audience, many of whom had participated in the installation, providing an intimate insight into the performance and composition of the piece.

Pulsing Shapes Colours

My 2009 piece *Pulsing Shapes Colours* was created to explore the use of animated graphic notation to create a spontaneous performance for orchestra introducing each section separately, with each following a different colour, but with a combined sense of pulse drawn from visual rhythms. No member of the orchestra had previously seen the score so the notation was designed to be easily sight-read using a small number of repetitive pulsing shapes, which fade in and out over eight minutes. Each one of these shapes contains both a simple pulsing rhythm and complex inner rhythms, which may be interpreted in different ways (Fig. 3). This was designed to keep the individual performers and each section linked into a common pulse while allowing them the freedom to explore different rhythms, from the visual rhythms on screen or from listening and mimicking each other. Each section of the orchestra was given a different part of the score to follow: The piece begins with brass and upper strings, followed by lower strings responding to any red parts of the score and woodwind following the red/orange section. The percussion were given free reign to pick up on any interesting rhythmic parts they saw on screen or heard from the rest of the orchestra. No performance instructions concerning pitch, performance techniques, rhythm, timbre or dynamics were given. The members of the orchestra, who had been chosen through audition as the most highly accomplished musicians of their age in Ireland, seemed to relish the chance to perform freely without the level of instruction and direction they were normally accustomed to. Yet as soon as the lights went down and the animation began – which was projected onto a huge 20ft screen – they became immersed in a new musical experience where they were given the freedom and the combined responsibility for shaping the sound of the piece. The orchestra continued playing for ten minutes after the piece had finished, taking advantage of the opportunity to explore orchestral sounds in a spontaneous and improvised manner.

Three For Four

Three for Four was created for the Irish Composer Collective and performed in Sonic Arts Research Centre, Belfast and the National Concert Hall, Dublin. The piece uses just three simple shapes: lines, circles and triangles, in four colours moving in different ways. This piece was originally created for string quartet and was performed as part of a concert with a traditional audience/performer setting, with the exception that the performers were positioned side-on to the projection on stage so they and the audience could see the score clearly. Although in this type of concert the audience is not directly involved in the music in terms of performance, they are given an insight into the piece through the projected score. As was suggested in the installation piece for Three Streams a subjective connection between certain moving shapes and symbols exist so that the audience can understand the interpretations of the performers. Three for Four was also used to explore the versatility of animated graphic scores by recording a number of different interpretations from different groups including New Dublin Voices (a thirty-piece choir) and jazz pianist Johnny Taylor. Each section of the choir – soprano, alto, tenor and bass – followed a different color while Johnny Taylor recorded a separate layer for each colour, working within a loose harmonic progression for different sections and assigning certain themes and motifs to shapes and colours. Each of the three interpretations were used in an interactive installation where the score was repeated on a loop and the passing audience members could use three faders to mix the recordings of the individual interpretations together. Although none of the groups heard the others interpretation and there was no discernable connections in choice of pitch in terms of

traditional harmony, the subjective connections between moving shapes and sounds create a relative movement of pitch, dynamics and duration which compliment each other in the same way the orchestra found a common sense of movement. The choir recording also had a strong connection to the recordings taken as part of the Three Streams installation. Although New Dublin Voices are a highly trained and experienced group of singers they rarely rested on discrete notes with their undulating pitch and rhythm showing many similarities to the individual *Three Streams* recordings.

Conclusions

Over four years of performances and recordings have shown that animated graphic notation is an effective way of creating a shared musical experience through creative collaboration. Over 200 performers have taken part in these pieces ranging from experienced noise artists, jazz and classical musicians to amateur musicians and participants with little on no musical training. The connections between all of these performances indicate an understanding and ability to create musical sounds, which use dynamics, pitch, durations and rhythms, that may be socially learned but appear not to be based on musical training. It is the role of music education to encourage and nurture this shared musicality for the benefit of the individual, the group and of musical culture in general. For composers and musicians, new notation presents opportunities for working in more collaborative, accessible and versatile ways, which encourage participation in musical activities beyond the listening experience. The advantages of using animated graphic notation to add structure, encourage creativity and provide a focus to ensemble performance makes it an important element of current notational reform.

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TOWARDS CO-AUTHORING COMMUNITAS: CONSIDERING THE POTENTIAL OF DIGITAL ART PROJECTS WITHIN PLACE–MAKING AS A PROCESS OF BECOMING

Anita McKeown

Digital technology, particularly the internet, "a natural environment for liminality" (Waskul 2004,40) in conjunction with open source software / culture are considered as tools for the creation and production of liminal phases / liminoid spaces. Could such digitally produced spaces produce communitas and if harnessed within place-making, encourage a process of 'becoming' both for the project participants and place involved.

Aristotle's belief that humans were a mix of matter (constant) and form (constantly developing) contributed to his understanding that humans have an "innate capacity for action: to change the world to his or her whim (techne), the abiity to move from sheer possibility to actuality." (Brommage 2005,11) This process of change from a lower level of potentiality to the higher level of actuality is known as becoming. Maslow referred to this process as self-actualisation, or to become more and more of what one is, or capable of becoming. Within Jungian psychoanalysis self-actualisation can only fully occur once the process of Individuation is complete.

Individuation is the transformational process of integrating the conscious with the personal and collective unconscious (Jung, 1962, p. 301). Through Jungian psychoanalysis, a period of reflection and transformation is undertaken during which, the essential personality of the person, their individuality can emerge. Jung believed this resulted in a profound healing effect on the person (Jung 1962, p. 433). This process often occurs within a particular context or setting separate from but in parallel with the mundane, everyday life of the individual, a context, which could be referred to as liminal.
The term Liminal derives from the Latin limen, or threshold and was first used by Arnold Van Gennep (1909 translated to English in 1960) in Les rites de passage.' Here Van Gennep discusses three stages that accompany the 'movement from one cosmic or social world to another' (Madge & O'Connor 2005, 93), separation (preliminal), transition (liminal) and reintegration (post liminal).
During the pre-liminal stage an initiate is separated from their usual social environment and what has been their way of life and its related beliefs to date. They then enter the liminal phase, which signifies for Van Gennep, a ritual space of transition. Here the initiate's pre-conceived ideas and beliefs are challenged through the extra-ordinary experience of initiation, followed by the post liminal phase. Within Van Gennep's rationale, during the post liminal phase the individual and their initiatory knowledge is re-integrated into the general society.

The anthropologist Victor Turner (1967) in his often-cited text 'The forest of symbols' picked up on Van Gennep's ideas and re-defined them within the context of 1960s counter culture to develop a new anthropological perspective on liminality. Turner, argued that in order for the process of becoming / self-actualisation to take place the dissolution of the normative values or understanding of one's self and

context is necessary (Turner 2008). For Turner, this dissolution, occurring during a liminal phase, although initially destabilising, could create an environment conducive to the individual's values and normal modes of behaviour being reflected upon and transformed.

For both Van Gennep and Turner the liminal state signifies a time of transition albeit manifesting differently, a 'time out of time' where one is 'betwixt and between' (Turner 1967,) not only social status but also social mores and beliefs. Where Van Gennep discusses the phases as part of a ritual process, Turner deviates, taking the idea of the liminal into secular contemporary societies; spaces he identifies as liminoid. Turner proposed (1982, 32) that liminal spaces could not be applied to 'modern societies' as they are for the most part secular. Liminoid spaces have similar qualities and functions but are not part of a spiritual or initiatory journey with no rite of passage. It is Turner's evolution of the liminal into liminoid, which holds fertile potential for digital arts practice to contribute to a process of becoming through the practice of place–making.

Place–making is a community-driven process of people making a place and strikes a balance between the physical, the social and what could even be considered spiritual qualities of a place. (PPS 2011). This process, returning to Aristotle's understanding could be re-considered as a process of becoming, 'moving from sheer potentiality to actuality'. If we employed digital media/technology as part of this process, this could also be an opportunity for self-actualisation. The creative use of digital media / technology could be used to deconstruct an understanding of a location, a reflective and transformative process by residents, which could manifest as an essential personality inherent within the location.

Turner when explaining the essence of liminality stated it was " found in the release from normal constraints" adding that; liminars were individuals who had the power to "reveal the freedom, the indeterminacy underlying all culturally constructed worlds, the free play of mankind's cognitive and imaginative capacities" (1969 161). Contemporary cultural theory reconsiders Turner's notion of limen or threshold within the notion of the border. Indeed it has been argued, (Rosaldo, Ortner et al) that Turner's vision is somewhat Utopian and in fact that rather than being re-integrated into the status quo the individual may in fact seek to change it. Turner identifies "Ritual Liminars or Edgemen" who "possess the 'radical potential of cultural critique, indeed of deconstruction," (Turner 1969, 128) yet for the most part Turner's ideas lean towards re-integration to society in a similar vein to Van Gennep.

Weber considers the liminal phase to be simultaneously "culturally dangerous but culturally creative," (1995, 526) a place of action. As the cultural beliefs are challenged and broken down any re-integration may include an inability to conform to the previous value system, yet this may in turn contribute to the creation of new systems.

Digital technology, particularly the Internet, "a natural environment for liminality" (Waskul 2004,40) and open source software / culture can be considered as tools for the creation and production of liminal phases / liminoid spaces where a constant cycle of de / re -construction takes place. Technologies often referred to as new / digital Media, in particular the Internet / cyberspace have as defined by Flew (2008) the following characteristics; they can be manipulated, are networkable, dense, compressible, interactive and are perceived at least, as immaterial. It is these qualities, that create the in-between or threshold states, reminiscent of the liminal phases Turner and Van Gennep referred to, the liminoid spaces that could be utilised within the the processes and practices of place–making.

Projects that use these technologies in particular the internet or cyberspace can be considered from this perspective of in-betweeness or threshold space as any activity undertaken cannot be separated from

our pre-liminal understandings or connection to our embodied experiences and practices. Whilst we can transcend the physical limitations of time and space momentarily, we enter this space from a corporeal position and always return to our corporeal world and all that entails.

Pratt 2002; Walmsley 2000 highlights this in noting that 'communities and forums that exist online are still rooted in place and space whether that is a physical location or a space of shared interest, being human they can be rooted no other way. Whether as the creation of bits, the use of the Internet, either through social media, virtual worlds or simply searching for information, the virtual and corporeal are all part of the online virtual experience. We cannot separate from our physical world and the disruptions of presence / absence, mind / body on and offline are all part of this dualism.

This dual nature has social, cultural and political implications with geographers increasingly examining what Kitchin refers to as "the role of space and place in a distributed social space that lacks physicality" (1998a, 393). I propose that it is this very lack of a fixed physicality and the momentary transcendence or disruption of physical limitations that can be exploited for the deconstruction or undoing of understandings of place and a co-authoring of communitas. The identity of a place is not fixed, with individuals having a personal, subjective understanding of a place and knowledge that could be viewed as assets for change and evolution, personal and locational.

Turner's relating of Van Gennep's ideas to a secular contemporary world incorporated what Weber (1995, 527) calls "the shifting unfolding, processual, dynamic dimensions of cultural change: the shifting relations among liminality, communitas, and structure." The dictionary definition of communitas refers to "an unstructured community in which people are equal' or 'the sense of sharing and intimacy that develops among persons who experience liminality as a group." (dictionary.reference 2011) The etymology of the word stems from the Latin communis, meaning common or public and is therefore often used to denote a sense of community, public spirit or a willingness to serve one's community. Turner distinguishes between three types of communitas; existential or spontaneous communitas, the transient personal experience of togetherness. Normative communitas, communitas organized into a permanent social system and ideological communitas, which can be applied to many utopian social models. (Turner 1969: 132)

A participatory digital art project's potential to produce communitas can be considered from a number of perspectives in relation to Turner's definitions. Firstly the life cycle of the project through the nature of shared experience and achievement offers an opportunity to develop existential or spontaneous communitas, which Turner and Van Gennep argue occurs within a liminal phase / space. The community of the project exists temporarily, although some longstanding relationships maybe established and extend beyond the lifetime of the project. If working well will evolve, "an equality of relations, a comradeship that transcends age, rank, kinship etc. and displays an intense community spirit. Thus people from all social groups may form strong bonds, free from structures that normally separate them." (Madge and O'Connor 2005,93)

If the project is embedded within the practice of place–making then the process of communitas becomes one of collective power and production and the shared personal experience of the place–making could be a collective response then integrated into the processes of planning and regeneration. In this sense the inclusion within the system utilises the rules and power relations of the social structure simultaneously, to constrain and enable human agency as being closely involved in the reproduction. This would most closely resemble the post-liminal phase and if we think of communities as being based on

the shared experience of living in a location rather than more romantic notions then normative communitas is more easily identifiable. The concept of place–making as a process of becoming through the co-authorship of communitas, at once is more achievable if considered as the shift from the potential of the city and its inhabitants to a higher level of actuality.

For Turner (1967) the liminal phase was important as a 'threshold' space that held the potential for communitas given the intimacy and commonality of shared experience evolving through the liminal phase of an initiation or rite of passage. The rituals and activities undertaken within the liminal phase provide an experience of where the status quo appears to dissolve. Although initiates re-integrate into society their understanding has shifted. Using Turner's secular re-interpretation of Van Gennep's theories, digital art projects function as liminal phases / liminoid spaces through offering "time out of time" or Turner's concept of "betwixt and between" while being parallel to the everyday existence.

Digital art projects focussed towards the practice and process of place–making provide the time and space to represent more voices and experiences to expand residents' understandings of place and in turn disseminate this knowledge. Pred (1984) states the "character of unknowing in a place constrains the cultural and social projects that eventually may occur" therefore the importance of having new shared understanding of place, or knowing is necessary for the purpose of becoming and any shift from potential to actuality. Through experiencing this process, an intimate shared experience enables the participants of the project to explore different ideas and possibilities and ultimately create different solutions or outcomes for a location.

The 45s series, an on-going series of audio-visual projects, that exist both off and online and offer opportunities for continuous remixing, explore these ideas. Once the physical aspects of the project are complete (motion sensor installations, films, psycho-geographic workshops, projection events etc.) the films and audio mixes live on line with all the samples available for re-mixing. These common lands of digital data enable the contributors to create an on-going co-construction of the area through the virtual galleries and submitted portraits after the initial project is completed. This continues to encourage counter-factual re-presentations and conditions by a multitude of voices. Through the "posing of possibilities beyond what is assumed to be the case," Macleod 2005, the on-going project activities lead to a conscious re-fashioning of their 'place'.

The 'legacy' of the projects, a co-authored communitas, reflects and enshrines the community's self-directed, heterogeneous self-image. The 45s series enables the process of place–based learning and re-learning evolving an intimate relationship with place and in turn the location's other residents. Enough compatibility is generated to enable communication and a more expanded experience of place and ultimately learning. Through the intimacy created within the shared experience (communitas) of the project and the deconstruction / reconstruction that Turner refers to during liminal phases / liminoid space, a transformative process equitable to individuation "integrating the conscious with the personal and collective unconscious" can occur (Jung, 1962, p. 301).

This process reminiscent of Jung's process of individuation extends the communitas of the project through a process that potentially enables diverse groups made up of strangers, to interact with people whose opinions, values and culture are different. The project contains the group giving them enough commonality to begin to feel comfortable with their difference. These emerging relationships can then be capitalised to develop and evolve the places we live, conducive to our well-being with the legacies of the 45s projects include networking activities, campaigning forums and sustainable community activity.

Such persistent challenges to given understandings of place through the constant re-presentation of multiple identities and understandings, ultimately offers, processual re-tellings of the story of that place, the location of individually felt meanings and values expressed coherently as its personality and unique-ness – its individuality. Returning to Jungian psychoanalysis Jung believed that this process of reflection and transformation in which, the essential personality emerges has a profound healing effect. The limi-noid spaces that are created through the digital art projects may offer a contemporary opportunity to undertake activities that within a secular existence to experience aspects of the liminal phases of ritual many no longer engage in.

Perhaps in the steps towards co-authoring communitas through the use of digital art projects within the process/practice of place–making, the places we reside and ourselves may undergo a process of becom-ing. In reaching a higher level of actuality, we may go some way towards fulfilling our potential, mani-fested and tangible in the places we make.

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PLAY WITH FIRE | A REAL-TIME VIDEO EXPERIENCE FOR SUSTAINABILITY

Mónica Mendes, Nuno Correia, Valentina Nisi & Pedro Angelo

Play with Fire is an interactive art installation that proposes participants to ignite generative fires over live streaming video of selected forests. This experience paradoxically encourages playing with fire to stimulate awareness and prevention of fire related damages to the forests. Our goal is to raise awareness for human causes in forest fires and effect attitude change towards environmental protection.
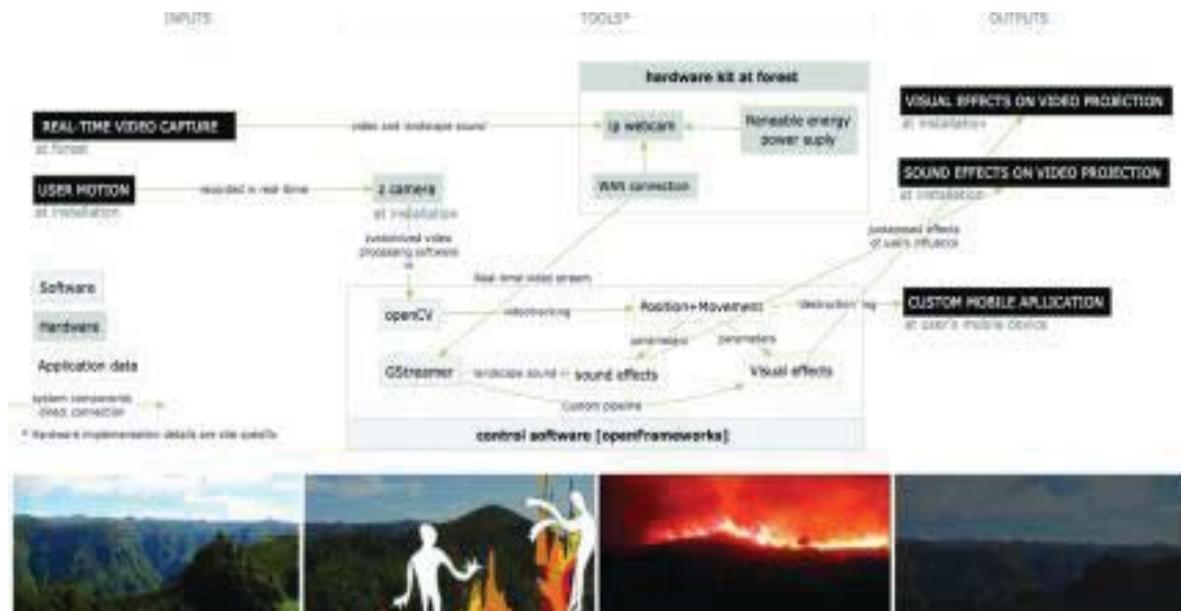
Fig 1. Play with Fire concept art and system architecture.

Fig 2. Sketches for the interactive installation, user experience and gestural interaction outdoors.

Fig 3. Task analysis testing the user experience.

Play with Fire is an exploratory research project that proposes an interactive installation to engage the audience senses in unconventional ways. It is a performative, immersive experience that invites people to interact with real-time video from selected forests by playing with virtual fires through gestural interaction.

We envisage the installation triggering controversial feelings by combining the "beauty and danger" of a forest on fire. This duality becomes part of the experience, and raises concerns in the audience mind, such as the pleasure and excitement of playing with fire versus its effects on a natural resource such as a forest. The experience concludes with visuals of a forest virtual regeneration process underlining the message: the forest will eventually grow again, but what is the price to pay?

In order to foster awareness and stimulate activism, we decided to conceive and design Play with Fire as a digital art experience that happens over three different moments: an introduction to the installation and its theme with an invitation to interact with it; the performative active part where the participant engages with the gestural interface, and a reflective part taking the form of a mobile application, which will stay with the participant for a long time after the installation experience.

An ARTiVIS experience

Play with Fire is part of ARTiVISS (Arts, Real-Time Video and Interactivity for Sustainability), an exploratory research in digital media related to sustainability [1].

At the intersection of Art, Science and Technology, the research engages a multidisciplinary team that follows a collaborative approach, where artistic practices are supported through technology. Regarding the impact and the potential of art and technology on society and the environment, we aim at creating a "forests showroom" experience through digital media, in order to inspire change in the lifestyle of the public. The outcomes of ARTiVIS include an online platform, interactive installations – Hug@ree, Treeellucinations, B-Wind!, Enchanted Forest, MAicro, and this Play with Fire experience – and the design of a DiY surveillance kit prototype.

MOTIVATION

Living in places that have always been extremely exposed to forest fires, makes us very sensitive to the destruction of the forest patrimony by fire hazards, which also applies to a world scale. This interactive experience paradoxically encourages playing with fire to stimulate awareness and prevention of fire related damages to the forests. Ultimately, we seek to pose a constructive approach to the destructive dynamics of fire that aggravate climate change. Can digital art foster awareness and respect for nature?

RELATED WORK

Play with Fire is a transdisciplinary project and, as such, requires a diversity of references. Involving digital media, the environment, and real-time video, this interactive experience congregates references from the Arts, Sciences, and Technology. The selected case studies presented in this section are examples that in some way inspire the concept, its features and future developments.

Climate change and surveillance are very relevant and currently discussed topics in the areas of digital art and design. The role and potential of design research in the transition towards sustainability is being discussed in mainstream design and digital media art events, such as "Repair" and "Goodbye Privacy" at *Ars Electronica*, *Changing the Change* [2], and *Transmediale* putting the threat to the sustainability of our planet in perspective with "Perish in Beauty? Climate Change as Cultural Demand". The interactive installation *Play with Fire* also takes us into forest fires issues, specifically: distribution, detection, effects, causes, consequences, prevention, and forests surveillance.

Digital Artists such as Tiffany Holmes, have since a few years engaged in eco-visualizations projects [3] in order to sensitize audiences towards sustainability issues and climate change. Our approach enhances the eco visualization aspect of such an engagement with the activist component triggered by the gestural interface, which reflects the participants actions directly on the real-time video of the forest.

Interactive experiences engaged with the use of technologies are increasingly embodied in video based environments. Whereas real-time video has been mainly used as a functional tool for surveillance, for informational and safety purposes, the use of this resource has an enormous potential for artistic exploration. Some initial steps in this direction have been made by projects such as *Funky Forest*, an interactive ecosystem where children create trees with their body and divert the water to the trees to keep them alive [4]. *Parque* is also an interactive installation with an ecological message: "the growth of a forest is determined by the amount of attention it receives"[5] – the system recognizes vertical movements as inputs for making trees vector graphics grow. Petros Vrellis' *Fire* installation [6] poetically displays the compositing of generative fire propagation and destruction effects over static backgrounds and Float4's FireFX demo shows how performative and responsive generative fire effects can become [7]. *Hand from Above* [8] is an experience that playfully challenges our perception of spaces and objects, enabling virtual and real to coexist in real-time, demonstrating participants' immediate engagement, and it also evidences how determinant scale is.

The *Games for Change* project hosts an archive with many good examples of the expressive power of the medium for environmental awareness [9]. The work of artists like La Molleindustria [10] that appropriate and subvert videogames as an interactive medium for persuasive purposes has also influenced our work.

In *Play with Fire* the participant is confronted with the information of the burnt forest together with the images of it. Regarding visual effects, we can find virtuous examples of fire effects with cellular patterns in Fedkiw's computational fluid dynamics [11] and Horvath's high quality artist-directable GPU implementation [12].

Finally, the inspiration towards acting rather than watching comes from compelling and controversial movies such as Stanley Kubrick's *Clockwork Orange* (1971), and David Fincher's *Fight Club* (1999). These works stand out as references to recall regarding the construction of experiences that subvert reality and common sense in order to convey a message.

INTERACTIVE INSTALLATION SETUP

In Play With Fire, a surveillance camera will be setup at a selected forest location, transmitting real-time video to the installation space, a room inside of which the performative gestural interaction is contained.

One semi transparent wall is where the mash-up media and information about fire hazards and forests will be displayed. From the outside, the participants are seen as silhouettes of the arsonist – "fire wizards" performing inside the installation room forming a choreography with the changing media displayed. This is also functioning as an attractor for the audience to enter the interaction space. When the participant enters inside the installation room, the system asks him or her to place his/her mobile device on a special deck. Ready to face the screen, the audience member is presented with the start of a fire, triggered by positioning the phone over the deck, and he/she can get ready for the performative interaction.

The participant faces the main screen. A whole body gestural interface based on a depth camera captures the participant's movement. He/she goes straight into the interaction with the real-time video of the selected forest projected on the whole large scale wall. The sound of crackling fire attracts attention

to the action of the fire and how it is spreading. As the user is prompted to act upon the virtual fire, it will react through real-time generative graphics and fire animation according to the gesture just performed. Intuitive and natural gestures for controlling fire (starting it, growing, concentrating, moving it, extinguishing) have been tested and selected in order to map the user engagement, still allowing further performative explorations.

After a certain amount of time, the fire takes over the trees and forest and develops its own behaviors. If at this point the audience does not intervene by performing gestures trying to extinguish the fire, the forest fire climaxes to a point of no return. Fire flames follow the trees structures. Fire has developed its own behavior and spread through the forest. The scene becomes a spectacle for the audience. Once the fire has climaxed, the amount of virtual damage to the forest will depend on how much the audience has played with the fire, how much it has watched the spectacle of burning trees go on and if he/she had ever tried to stop the flames from taking over. A desolating burnt landscape is the resulting scenario.

The interactive experience ends with the participant being presented with a screen showing information of the resulting damage in the style of a game score: as a measure of the damage generated in the Play with Fire interaction along with a snapshot and general data about how the performance fire damages, regeneration times and possible effects on climate change.

The participant picks up the phone from the deck where he/she had placed it when entering the room and is prompted to open a URL that contains a Play with Fire mobile web application that displays the damaged forest the participant leaves behind and its slow regeneration process. The duration of the forest regeneration and the length of time the application will accompany the participant will in fact depend on the data generated during the performance. Participants will carry it as a memento of their experience for a duration determined by the real-time interaction with the installation.

TECHNICAL CHALLENGES

The implementation of this experience as described above brings some important technical challenges, namely the capture of user gestures, the real-time rendering of fire effects, the illusion of destroying a forest over a real-time video stream, and the mobile component of the experience.

Capturing complex user gestures with fidelity and low latency is a challenging prospect. During the project's pre-production we developed a library of gestures to be discovered by the participants that would trigger specific behaviours of the fire simulation. Although these gestures involve full body movement they can be fully described by arm motion. Taking this into account we are using a Kinect 3D depth sensor and mapping user arm movement to *TUIO* input. This allows us to prototype the installation interaction using common multitouch hardware and software tools.

An impressive and responsive real-time fire simulation is crucial for user immersion into the experience and hard to get right. We are using Horvath's high quality artist-directable fire simulation model developed for film special effects [12] and implementing it in real-time.

Virtually destroying a remote forest presented as a real-time video stream presents some interesting technical challenges. First there's the need to extract approximate tree structures from the video to build a "fuel map" where the fire simulation will take place. This is complex to do in a fully automatic

way, so we'll be using a semi-automatic process where the rough tree strutures are drawn over the feed in a calibration step and then the optical flow of image features is used to deform these structures over time.

The next challenge is how to composite the effects of fire destruction over the streaming video. We will have to take some artistic license in the rendering of this destruction. We looked into Melek's work on rendering fire damage [13] and start by blending a black matte over the fuel map to simulate the charring of the wood, and then add smoke, ember and spark effects where appropriate to add some visual impact to the result.

One last challenge that presented itself during development was the uploading of a native mobile app to the user's phone. This approach presented problems related to mobile phone security and having to develop and support a different app version for each phone. The solution we found was to make the mobile application a web application, that would only require that the participant's phone have a web browser in order to check his "score" and the regeneration state of his forest.

CONCLUSION

Play with Fire as an artistic experience has been designed, from the beginning, to be ambiguous, even "wicked". Questions raised by the audience in public presentations have focused mainly on its paradoxical nature: "Won't Play with Fire inspire people to be arsonists instead of forest caretakers?" In his book "Persuasive Games", Ian Bogost introduces the concept of *procedural rhetoric* to discuss how games and interactive simulations can be used to teach a point of view and contribute to effect attitude change [14]. By playing with the system's rules, the users become familiar with it and gain a deeper understanding of its mechanics, allowing them to confront their assumptions and beliefs with this new understanding, through a process of cognitive dissonance conducive to changes in personal attitude [15].

We have designed this interactive experience for persuasive purposes, inviting people to engage in forbidden and dangerous actions in a controlled environment, in order to confront them later with the long term consequences of their own choices. In Play with Fire, participants are initially invited to experience a realistic model of something forbidden, usually outside their scope of possibility. They are allowed to experiment with what is wrong as a learning experience in a game-like environment. This (so called) magic circle [16] – where the consequences are negotiable, played in a protected environment – works not as reality abstraction, but as reality protection.

Collaboratively developed by artists, activists and technologists, Play with Fire is an innovative approach - with a challenging technological component - that comprises a strong dimension on social and natural sciences converging New Media Arts and Sustainability. After the conception, design and initial basic prototyping of Play with Fire, the main implementation of the interactive installation is currently underway and is scheduled to premiere in the Fall of 2011.

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BAPSI SIDHWA AND DEEPA MEHTA: AN ARTISTIC COLLABORATION

Claudia Meoli

In this paper I shall focus on the collaboration between two artists who have created two acclaimed artistic results: the novel *Cracking India* by Bapsi Sidhwa, and *Earth*, its cinematic transposition directed by Deepa Mehta. The collaboration between the writer and the director is interesting not only because they share the same topics, interests and poetic expressions, but also because they are both exiled artists.

Introduction

The division of the Indian subcontinent belongs to the memory of every Indian and every Pakistani, as does the violence of the tragic events that started after the Partition was announced at midnight on the 14th of August 1947. That night the world's biggest mass migration began and in nine months, at least two million people had been killed as a result of ethnic violence. Many women were raped and murdered - it is what Sidhwa and Mehta bring back to human memory.

The two artists are exiled, even if they have not been 'forced' to leave their countries, but, once away from their mother land, they have been able to adopt a new and original perspective on the question of the attachment to one's own origin. My contribution would like to determine how their geo-cultural displacement has made it possible, for them, to deal with the issue of the Partition between India and Pakistan.

Cracking India

In an interview with Derek Attridge (1992:55), Jacques Derrida remarks that:

"A writer cannot not be concerned, interested, anxious about the past, that of literature, history, or philosophy, of culture in general. S/he cannot not take account of it in some way and not consider her - or himself a responsible heir […] Account cannot not be taken, whether one wishes it or not, of the past".

One cannot not write one's own story, and the story of a community of people: Bapsi Sidhwa was born in Punjab, the Indian region where religion, traditions and history have always played an essential part in the memories and experiences of its inhabitants. Needless to say that Punjab was strongly affected by the Partition; the newly established boundary divided the region with such an impact that since then, people have called the division the 'line of hatred'. Sidhwa was born in Karachi and grew up in Lahore - being a Parsi, she remained a spectator of the Partition. When Lahore was given to Pakistan, she was only a child (perhaps her young perception was particularly shocked by what she was witnessing; it must also be the reason why she adopted a child's point of view in narrating the story of *Cracking India*). What is more, at the age of two, she contracted polio, so she was spending her life in solitude: she did not go to school, and could not play with the other children - it was mainly books that provided her with

a space of freedom. She was an 'outsider' and a lonely person, mainly possessing literature as her company, literature creating for her the alternative world to the cruelty she was facing.

Today, Sidhwa does not live in Pakistan; she moved to Houston, in the United States. Since then, she has often come back to Lahore, where she enjoys playing the role of an observer of Pakistan. Her identity is characterized by a kind of 'hybridity', which is reflected in her books, written by a 'Punjabi-Parsi-Pakistani' writer. In this vein, we can also say that Sidhwa's writing is acutely ironic, and, even more importantly, it is always written in very articulate, though accessible, English –she herself having studied through that medium. Of course, her familiarity with English made it easier for the writer to live in the U.S.A. In *An American Brat* (1993,) she narrates her experience: she has faced her exile in a 'double bind' – that is, enjoying American freedom with a point of nostalgia, in a bittersweet way.

Cracking India is Sidhwa's third book. Published in 1991 under the title of *Ice-Candy-Man*, the novel narrates the Partition of India and its consequences from the point of view of a child. In an interview with Julie Rajan, who asks her why she wrote of events that took place in a distant past, she replies:

"I wanted to write about Partition precisely because so little has been written about. […] When you see something like that, it becomes a very powerful and important memory" (http://www.monsoonmag. com/interviews /i3inter_sidhwa.html).

Cracking India is not, however, an autobiographical novel (even if there are many precise connections): it is the story of the writer's research into one of the most forgotten and hidden events in international postcolonial history. In order to write a novel devoted to the trauma and suffering provoked by such an incredible historical-social fact, she had to find out information – in her research, what she found out was that people did not want to talk about it; everybody refused to remember the kidnappings and ravages that happened to men and, particularly, to women: "Maybe the hurt was too fresh" the writer says. The question of the women's involvement and their suffering was to become the centerpoint of the novel - in an another interview (http://changinguppakistan. wordpress.com/2008/08/29/a-novelists-perspective-on-pakistan-a-conversation-with-bapsi-sidhwa/), Sidhwa observes that,

"at times of such anarchy, women seem to bear the brunt of the attack – they attack a woman because they are attacking a man's honor. A woman is often used and misused for these purposes".

Being a woman herself, the writer focused on the condition of women in that critical period, by exploring the 'collective repressed' and by giving a voice to its female victims.

Of course, there have been other writers who have written about the Partition, such as Saadat Hasan Manto and Khushwant Singh; but they are male writers, who approach their subject matter mainly from their own perspectives. Sidhwa's feminine point of view proves different: the Partition of India created one of the highest numbers of exiled people, mainly women, in the history of the world. These events are narrated in the novel, even if we never find neat descriptions of what is happening. Precision in historical reconstruction, in fact, does not matter to Sidhwa; what is important is to construct a story where women are at the centre.

The novel tells the story of Lenny, a 7-year-old girl, who suffers from polio. Lenny has a nanny, (*Ayah* in Hindi, and the name given to her character throughout the book), who is a beautiful woman surrounded by people who love her. She has two suitors in particular: Ice-Candy-Man and Masseur, both of Muslim

religion. Ayah is at the centre of a group of friends who spend time together, regardless of the differences in their religious beliefs. Lenny, probably because of her walking difficulties, spends more time with Ayah and her friends, than with the children of her age. Ayah is framed in an interreligious and interethnical circle; when the harmony breaks, it is she who becomes the victim of the Hindian-Muslim sectarian war.

Sidhwa uses her character to make her point about the Partition of India, its consequences, and, in particular, its repercussions on women - the events gradually become vivid to the reader, who naturally empathizes with the characters being caught up in the story. It is a story of an 'exile' that begins when people are still in their own homes, when they gradually become exiled in their lands, forced to migrate because of their religious beliefs. We can recall what Julia Kristeva, in *Strangers to ourselves* (1991:8), says,

 "In crossing a border (…or two), the foreigner has changed his discomforts into a base of resistance, a citadel of life".

 During Partition, borders were first created, and, after the imposition, people had to cross them, leaving their lives behind. The Parsi community played witness to this change - it saw the horror that originated from the transformation, as if it were crossing the border itself - when everything changes, it feels like crossing a border - nothing more, nothing less….

Earth

In his *Reflections on Exile* (1983:185), Edward Said reports some lines of Hugo of St.Victor:

"[…] The man who finds his homeland sweet is still a tender beginner; he to whom every soil is his native one is already strong; but he is perfect to whom the entire world is as a foreign land. The tender soul has fixed his love on one spot in the world; the strong man has extended his love to all places; the perfect one has estinguished his."

The Palestinian scholar further explains,

"that the strong or perfect man achieves independence and detachment by working through attachments, not by rejecting them. Exile is predicated on the existence of, love for, and bond with, one's native place; what is true of all exile is not that home and love of home are lost, but that loss is inherent in the very existence of both."

 If this quotation does not sound appropriate for Sidhwa, it seems fitting for Deepa Mehta. A 'hybrid' artist by her own definition, she claims to be a "citizen-filmmaker of the world": not an Indian and not a Canadian either. Actually she was born in Amritsar, in Punjab; as a child, she moved with her family to New Delhi where she graduated in Philosophy. Soon after, she started producing documentaries and she currently lives in Canada. She does, however, travel consistently, from one country to another, continuously trespassing geographical and cultural borders.

In an interview with Richard Phillips (6th August 1999, http://www.wsws.org/ articles/ 1999/ aug1999/ meh-a06.shtml), Mehta says that she has always thought about Partition. She has been fascinated by this event, and also disillusioned by the silence inscribed by Western cinema. When she decided to devote a film to the Partition, her desire was to trespass the fixed images India often recalls to the Western

mind; her aim was to 'de-exoticise' or 'de-orientalize' India - as Said would say. When she came across the novel *Cracking India* by Sidhwa, she thought it was exactly what she was looking for- it was then that the two women artists started collaborating. The chance was there for them because they both felt free due to the distance of time and space. In fact, it was somehow comforting to find someone to share the work with. To make sense of this shared need, and the richness that it created, Julia Kristeva (1991:12) offers her analysis of the advantages of being 'exiled':

"Free of ties with his own people, the foreigner feels 'completely free'. Nevertheless, the consummate name of such a freedom is solitude. […] No one better than the foreigner knows the passion for solitude. He believes he has chosen it for its enjoyment, or been subjected to it to suffer on account of it, and there he is languishing in a passion for indifference that, although occasionally intoxicating, is irreparably without accomplice. The paradox is that the foreigner wishes to be alone but with partners, and yet none is willing to join him in the torrid space of his uniqueness. [...] Accordance is the foreigner's mirage. More grueling when lacking, it is his only connection – utopic or abortive as it may be."

The collaboration between Sidhwa and Mehta has proved 'utopic': from their intimate and productive accordance, *Earth* was born. According to Sidhwa (http://www.monsoonmag.com/interviews/ i3inter_ sidhwa.html), Mehta was carried away by the book in such a way that she wrote the script even before signing the contract. That was how Sidhwa wanted it to be: the director had to love her book deeply. At the same time, it was not always easy to collaborate. Sidhwa was always present when the film was being shot; she saw when her title was changed, but, even if at the moment, she did not think it matched the book, she knew Mehta was making her trilogy on the natural elements (*Fire*, *Earth*, *Water*). What was really difficult to accept was to see entire sections of the book being deleted: once again, though, Sidhwa understood that cinema is a different media: for instance, it could not contain all the novel's incidents and characters. The most evident and different of the changes relates to the 'end': the novel *Cracking India* follows the aftermaths of the Partition; *Earth* finishes soon after the event, when Ayah is kidnapped. Because of these minute differences, what was becoming clear in their collaboration was that literature and cinema are different; they cannot but rule the experience of reading the novel and of watching the film. For instance, the first part on the screen creates a positive and peaceful atmosphere among the characters in a way that is different from how Sidhwa narrates it in her book; in the second section, everything changes; the tragedy begins; the film changes its register; it becomes darker; it changes its colours... What follows is a short analysis of some of the rich differences between *Cracking India* and *Earth*.

The colours

Colour is an important element in Mehta's films, giving her the possibility to communicate feelings and atmospheres that can be 'felt' by the spectator. It is a powerful possibility and Mehta benefits from it as much as she can, paying attention to the use of colours. Generally, her films have a dominant colour and for this film it was the colour terracotta that came to her mind when she was writing the script. Conversely, she did not want the colour blue. It is exactly like that: the film covers a range of colours from green to yellow, from red to brown; and only in one scene, there appears the bright blue of Ayah's sari.

Michael Taussig, professor of Anthropology at Columbia University, in his "What color is the sacred?" (2006:51), refers to the relationship between Proust and Vermeer, saying that the use of colour in painting is similar to the use of words in writing: "style is to the writer what color is to the painter". Daring a risky comparison, we could say that this dialectics works also for Sidhwa and Mehta: being a director,

Mehta has her own singular ways of expressing sensibility. In her films, photography plays a key role - light is at the core of photography, and one has to know how to use it. Colours change with light, creating various atmospheres and conveying different emotions. These visual elements combine with music – which is always original in Mehta's films. Even though, *Earth* stays faithful to *Cracking India.*

The language

Another difference between *Cracking India* and *Earth* is 'language'. Despite the fact that Sidhwa is Pakistani, the novel is written in English, with a few words in Hindi or Urdu. The official language of India is Hindi; English is common among the upper class and educated Indians. Sidhwa does not draw differences in class, religion, or occupation - every character speaks in English. Of course, this is because of narrative reasons: it would be extremely difficult to read a book with characters often switching language. This limit does not exist in cinema, where a dialogue can be easily understood by adding subtitles. The original language adds realism to the social and cultural picture of the film. English is the *lingua franca* allowing Indians to communicate among the different dialects spoken in India; though it is not the language spoken by everybody. The size of the country and the variety of languages and dialects spoken make it difficult to define India's national language. In this context, English plays an important role - it has lost its negative connotation of being the language of the British oppressor, and it has also developed a unifying function in a fractionated country. If Sidwa was more or less bound to make a choice, Deepa Mehta decided not to do so. The characters in her film speak different languages: sentences in Urdu, Punjabi, Gujarati and, rarely, in English are pronounced in the film, that switches from one language to another, sometimes mixing Hindi to English: this is a narrative strategy that gives the idea of the 'multilinguism' and 'multiculturalism' of the country.

The British rule

The use of English as *lingua franca* suggests the presence of the century-long British rule, the influence on the politics of the subcontinent and the inheritance it has left. British rule on India is a discussion that is not addressed by the film, while it is clear in the novel, even though neither artist delves deeply into the subject. A scene in the house of Lenny's parents is the occasion to show how this controversial debate can degenerate into a fight. Lenny's parents invite their friends for dinner: Mr. and Mrs. Singh, both Sikh, and Mr. Rogers, an English policeman, with his wife. They are spending an enjoyable night chatting away, when Mr. Singh and Mr. Rogers start arguing; the reason relates to the time when India will be independent, allowing the most crucial points of the debate on British rule to be thrown onto the table. The British imperialistic and racist belief is that the Indians will never be able to self-rule - it is what Mr. Rogers says, strongly opposed by Mr. Singh. They then start discussing what will happen when the British quit India. Mr. Rogers' conjecture is wrong, when he says that the situation is politically confused (the political situation will become clear soon after Partition, with the Congress Party and the Muslim League respectively placed in India and Pakistan); still, he is also right in foreseeing the explosion of violence that will follow. The discussion turns into a fight: as soon as the calm returns to the table, the hosts make a list of the good effects of the British domination in the subcontinent - in the book, conversely, the narration goes on to describe the continuation of a pleasant and relaxed dinner. The point of discussion is presented, the mainstream idea that the British colonialism had, in the end, its advantages: the British built roads, they gave India the regular Post service; they taught the Indians English! Could we expect a better 'comfort' for the death and suffering of so many people involved in the Partition? The novel and the film have played their part in re-opening this question…

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CREATIVE SPACES OF THE IMMIGRANTS: REVISITING THE DISCUSSIONS ON CITY-SPACE, TECHNOLOGY AND ARTISTIC PRACTICES

Ceren Mert

Taking into consideration the matters of diaspora and immigrants, and their 'possible' relationship within the translocal creative and technological flows, this paper will concentrate on the films of one of the most recent notable film-makers: Fatih Akın. This paper will focus on whether Akın's films can form an antagonistic creative space in relation to the hegemonic discourse of the practices of the city-spaces where these immigrants dwell.

To start with, as some authors argue I too endorse the view that globalization always remains an unfinished project. The creation of a 'global culture' should not be perceived as a straightforward homogenization practice. Globalization rather encompasses those processes of systemic desegregation in which the local cultures turn out to be thoroughly interdependent and interconnected. [1] After remarking on globalization and underlining the significance of local cultures within the emergence of the so called global culture(s), one could argue that one area of manifestations of this would be cinema, whereas music would be another. Accordingly, the global cultural flows engender new spatializations around various cultural productions of the diasporic peoples, which have an effect on the global (sub)cultures in return. Just as within the sphere of music, cinema too is a medium that has or rather has the potentiality of altering the everyday practices and viewpoints of people as well as reflecting them.

It is within the discussions of space and the process of globalization that we can merge the issue of city-spaces, how they become the focal points of Deleuze and Guattarian conceptualization of deterritorialization and reterritorialization, as Deleuze and Guattari's geo-philosophy environs territorialization and thus flows. Also, the notion of 'desire' is important in their analyses, as it is an underlying factor of flow and the direction of flow. For Deleuze and Guattari, desire enables beings to be pulled towards each other, which produce connections, and it is these connections that are considered in spatial terms by these two authors. [2]

Articulating the geo-philosophical propositions of Deleuze and Guattari in her work as well, one of the interesting conceptualizations about Doreen Massey, I believe, is her elaboration on space. In this regard, she argues that space is initially the product of interrelations –either emerging from a huge, global level or as tiny as one to one relationships. Second, what Massey proposes is that space encompasses distinct trajectories that coexist simultaneously which thus enable the coexistence of heterogeneities. Third, and which is connected to her other two assumptions, is that space is never finished and closed. [3] Hence, space is always a process that is being made which always entails openness and multiplicity. Recalling the process of globalization in the light of these arguments, where mobility and migrations can be seen as flows and becomings at the heart of the process of globalization, or rather glocalization, how can then the so called "migrant" cinema open up new spatializations, thus pave the way for new becomings, or in other words the 'possibility' itself for new becomings? Spatiality that encompasses such possibilities for new happenings and vibrancy, and just for this reason I would prefer to call it a third space. Also, taking into consideration Lefebvre's elaboration on (social) space as a (social) product, [4] Innis

also contemplates on space in terms of technology and its spatial and social organization of knowledge. Likewise, communication technologies simultaneously produce and demolish difference in their subjects. Innis thus depicts technology being part of a more complex apparatus that both brings out and holds back power. Hence, marginal groups resist as well as they depend on the cultural technologies that create their awareness of themselves as margins. [5] Inferring from Innis's ideas on the relationship between space and technology, it could be questioned if and to what extent technological medium is employed by those at the "margins" of society. That is, in terms of this paper, the aggrieved populations utilizing the technological medium artistically, such as that of shooting and producing films, thus reflecting the hardships of their everyday lives and disseminating their voice more "powerfully".

In this respect, Fatih Akın, who is a second-generation Turkish-German director born in Hamburg, became one of Germany's distinct filmmakers in our contemporary era. Or rather, Fatih Akın is a German filmmaker with a Turkish name and Turkish parents. Akın's dislike of the hyphenated identity label can also be observed from his words in an interview after his film Short Sharp Shock which gained a wide success in 1998: "If I can't be Fatih Akın, I'd prefer to be known as the German Martin Scorsese." [6]

Consequently, how Fatih Akın engages the city-spaces in his films will also be another crucial aspect that will be elaborated upon. Furthermore, it will be proposed that Akın creates spaces through his films, which can also be thought of as flows of desire that rather form a third space. This third space is constituted through the characters Fatih Akın employs and the cities Hamburg and Istanbul where his films' protagonists are situated or rather unsettled at –just like Akın himself. Such unsettledness can sometimes be seen by their transition between these two cities, or the idea of going back (to their "idealized homeland"), as well as a disturbance or a feeling of displacement they seem to experience in their current city. In terms of city-spaces and the creation of a possible homeland, taking into consideration the engendering of a third space, I will concentrate on these three films of Fatih Akın: his first full length feature film Short Sharp Shock (Kurz und Schmerzlos) in 1998, his 2000 movie In July (Im Juli) and maybe his first worldwide known movie Head-On (Gegen die Wand) in 2004.

In Fatih Akın's Short Sharp Shock, the main characters 'Costa', 'Gabriel' and 'Bobby' who are respectively from Greek, Turkish and Serbian family backgrounds are three close friends with "criminal" personas. The viewer also sees a praying father, a representation that, as Rob Burns indicates, "comes perilously close to the figure of the speechless Turk propagated by 'guestworker literature' and the 'cinema of the affected.'" [7] With the 'cinema of affected' Rob Burns addresses the growth and recognition of the diasporic literature in the 1980s, involving the profound effect of the Turkish-German authors, who also influenced the migrant filmmakers. [8] Accordingly, the Gastarbeiter or guest worker experience was worked up in filmmaking. However, starting from the 1990s there emerged a new generation of filmmakers whose works to quote Rob Burns "is above all notable for the sustained attempt to dismantle rather than recycle cultural stereotypes and to open up a 'third space' between the celebration and the denial of otherness." [9] Although these groups of filmmakers emerging in the 1990s are rather heterogeneous in their filmmaking, they still share a common incentive in their desire to break away from the earlier dominant images that portrayed the migrant Turks as victim. Fatih Akın, who is one of the most successful filmmakers depicting this situation, underlined in one of his interviews that he had started to make his own movies because he was reluctant towards those film productions where migrants could only appear as a "problem". Rather he explains that he sees his growing up in two cultures to be an advantage and enunciates as follows: "I do not have to transmit a message of tolerance or deny one of my cultures. I simply link them –in my person and in my films." [10] These words of Fatih Akın can be observed in his films by the way he reflects a peculiar persona in almost all of his film characters. It is as though the ethnic and socio-cultural features remain secondary compared to the characters he deploy;

as if wanting to highlight the uniqueness of each individuality –where people in the so called "real life" may sometimes be blind to, as a result of their apriori prejudices and categorizations.

I also agree with Burns that Fatih Akın is not resisting to position stereotypes in the name of challenging them. [11] Hence, Akın sometimes by fiercely inserting the viewer to the patriarchal dominance and violence where the female protagonists may at times seem to appear as victims, he also manages somehow to subvert and destroy such representations of dichotomies such as victor/victim, oppressor/oppressed and so on. In my re-reading of Akın's films, such a subversion of the boundaries of such dichotomies are not just in terms of gender or ethnic backgrounds, but also encompass the inner journey of the main characters; as if Akın is shouting out loudly through them to his viewer saying "feel the pain and fear as well as joy and hope in that moment of human existence." However, in my point of view, such psychological connotations develop as a result of Akın's exposure of the viewer to the materialistic reality as well as brutality, nevertheless still interestingly managing to resume the hope for the possibility of the impossible, even when the main characters may hit bottom: for example, the way Akın uses spaces of captivity or claustrophobic spaces such as prisons. Again, as Rob Burns emphasizes, "Akın's films' prisons are configured directly and either are shown only at the moment of liberation or function as sites of enlightenment." As towards the end of his film In July, the main character Daniel discovers in prison the reason why Isa has been carrying a dead body in his car's trunk, which allows for a new bond and sympathy between the two men. Whereas in Akın's film Head-On, the prison becomes the space where Sibel visiting Cahit there for the first time confesses that she loves him which in turn changes Cahit's stance towards life. Accompanying such a transformation in his inner life, when he gets out of jail he has rather a different style and appearance: the reckless and dirty rocker Cahit is gone and a more charismatic and stylish Cahit has come. Hence, the boundaries between the brutal reality and spiritual imaginary all get blurred.

In Akın's 2004 film Head-On, one can remark on his presentation of spatial and temporal transition between Hamburg and Istanbul. [12] Further, Akın utilizes the issue of self-destruction through the male protagonist Cahit who has distanced himself from his Turkish background, therefore cannot speak Turkish well, and who has a suicidal background and loves punk and rock music as well as cocaine. His apartment in Hamburg is as dirty and messy as a pig's hole. One night in his car, he attempts to commit suicide by stepping on the accelerator and crashes into the wall, later opening up his eyes in a hospital. Just shortly after this incident he meets Sibel, the female protagonist of the film while waiting for his doctor at the rehab center to call him. Just after getting out of the doctors room, Akın sort of surprises his viewers through his character Sibel, who has also tried to kill herself and therefore is too staying in the same rehab center, runs towards Cahit, whom she has never met before, says "you're Turkish aren't you? Please marry me." Cahit in his cool manner rebuffs her in slang and goes away hurriedly. The viewer gets to realize Sibel's insistence in marriage is only because she wants get free from her family and marrying a Turkish man is her only escape.

Now, going back to the spatial transitions in Fatih Akın's films, and in this case of Head-On, as mentioned earlier, there are two cities: Hamburg and Istanbul. Cahit, after getting out of jail goes to Istanbul to find Sibel, where one immediately becomes aware of the sea, the Bosphorus Bridge and the cosmopolitan city with busy and colorful sideboards at the Beyoğlu area in Istanbul. As in almost all of his films, Akın playfully utilizes space, under various categories in my point of view. In this respect, music is maybe one of the most crucial creators of space in his films. Akın applies music and sounds so eclectically, from punk-rock music, to jazz and soul, to hip-hop, to electronic, to traditional as well as alternative Turkish music and many more. Hence, the 'lived spaces' of the characters and the spatial transitions are accompanied by the director's sophisticated taste for variety of musical genres. For instance, in Head-On, the

film opens up with an orchestra of a gypsy band in front of Istanbul's Bosphorus Bridge where a woman sings a traditional love song 'Saniye'm'. This should be seen as the chorus of the movie as it appears a few more times throughout the film. However, as said previously, while Cahit is in the car trying his failed suicide attempt, he listens to Depeche Mode's song 'I feel You'. In various scenes one can hear the song of Nick Cave to the West Berliner experimental group Einstürzende Neubauten.

Another suggestion to why Fatih Akın can be thought of as yielding a third space can be analyzed in terms of Lefebvre's 'representational spaces'. Lived spaces are those spaces that embody the real and the imagined spaces simultaneously. Or to put it in Lefebvre's words, "representational space is alive: it speaks… It embraces the loci of passion, of action and of lived situations, and thus immediately implies time… It may be directional, situational or relational, because it is essentially qualitative, fluid and dynamic." [13] Within Lefebvrian trialectics, the third space, that is, the representational spaces also embody the first and second spaces, which are the perceived and the conceived. Likewise, Fatih Akın's films can be seen as this gateway to the third space because of its expressiveness of the diasporic community. Such an expressiveness is not only seen in the case regarding the Turkish diaspora, but also the Italian, just in the case of his 2002 film Solino or the Greek in the case of his 2009 movie Soul Kitchen and so on.

In terms of Akın's expressiveness of the lived spaces of both those in Hamburg and in Istanbul, I prefer to call it a possible representation. One of the reasons for this is my own problem with the issue of 'representation' as when one declares that s(he) represents something or a group of people it would never be a one to one replica of what is being represented. Second, representation could itself entail a hegemony resulting from relations of power. Also, as there is a constant flow and dynamism within the spatial praxis, there will remain possible gaps as well as a possibility of change. Nevertheless, with its 'possible representations', successful cultural productions such as the films of Fatih Akın, I believe, have the power of altering boundaries of a globalizing, glocalizing or translocalizing world and its everydayness. Hence, recalling Deleuze and Guattari, by such an expressiveness through his films Akın de-territorializes the boundaries of the social space and its cultural flows and desire, in order to incorporate his own desires and thus re-territorializes them.

Akın's characters are not trapped within a victimized space, but they interact within the everyday life with others of various backgrounds. Respectively, Akın's films indicate a move from the cinema of the victimized, or the affected, or the subaltern to a cinema of hybridity. Although, the viewer is presented with characters that are attributed local aspects of various ethnic backgrounds, they interact and engender alliances or disaffiliations with each other within a transnational spatiality and temporality. For instance, one of the main underlying preoccupations of the director in his film In July seems to be the idea of "boarders". I view this film as standing for Akın's own transnational imaging of the world and his preoccupation with questions such as passports, boarders and the reasons of restrictions for crossing territories. As in most of his films, Fatih Akın reflects the utopia where he crosses borders in order to achieve a better place that is symbolized with the city of Istanbul. Correspondingly, the male protagonist Daniel who is a shy schoolteacher with a routine life in Hamburg, one day buys a ring with a Mayan sun symbol from a street vendor called Juli (July). Juli tells Daniel that he will find his true love by the guide of this ring and that he will recognize that person, as she will too have the same Mayan symbol of the sun. However, Juli, who herself fancies Daniel believes that in the end he will understand this person is Juli herself. Later on, Daniel falls in love with a mysterious Turkish woman named Melek ('Angel' in Turkish), from Berlin, who comes to his town wearing a t-shirt with a sun pattern on, leaves for Istanbul for vacation a day after. Daniel being so charmed by Melek believes she is the one hence decides to catch up with her in Istanbul. It is after this incident that the road trip begins in Hamburg, passes through Bavaria, Hungary, Romania, Bulgaria and then it finally ends in Istanbul. In the beginning of his road trip while in

the car, Daniel coincidently sees Juli who is hitchhiking. The paths of Juli and Daniel will intersect from time to time where in the end of the film, Daniel will realize that his so called "sun" that he was searching for and going after was not Melek but Juli herself.

Deleuze and Guattari's concepts of smooth space, deterritorialization and nomad can be very well applied to In July, as well as to his other films. However, in this case of In July, the deterritorialization takes place as part of the road trip of Daniel and Juli where Akın seems to be teasing with the ideas of physical boarders and the official documents needed to prove that one belongs to a specific place. This film, according to me, is most probably one of the director's best manifestations of his emphasized transnationalism and hence his so-called nomadic characteristic that is expressed through his creation of smooth spaces. The smooth space, for Deleuze and Guattari, is the space of the intensive becomings and the nomad, whereas the striated space is the product of stratification, especially that is caused by the State apparatus. [14]

I believe as being part of the second-generation youth with a Turkish descent, Fatih Akın would not be the migrant like his parents, but a nomad in Deleuze and Guattarian terms. As he moves while he is seated, just like the nomad; he is from Hamburg. What he is right now, that is, his worldview was formed through his experiences in that city, hence Akın's hometown. However, the director himself moves globally as part of what he produces cinematically. In this respect, it would not be wrong to argue that he creates smooth spaces through his expressiveness; in other words through his cultural productions of films, where one could witness his criticisms as well as his hope for a better world. One of the manifestations of this would be the multilingualism in his films: Turkish, German, Greek etc would appear in different parts of his film as well as the variety of sounds and music he employs as mentioned before. Rather than the nations, we see that it is the cities that have a profound emphasis in the films of such second and third generation of filmmakers, which would not be a surprise when taking into consideration the emergence of a new global cultural economy built around city or urban spaces. To recall Lefebvre once again, space is socially produced. For this reason, it could be thought that humans create the spaces where they live and therefore it could be remarked that space embodies the 'political' as it involves the appropriation and distribution of resources within the everyday life. However, the openness and the multiplicity attributes of space, as Massey have underlined, also engenders the possibilities and changes yet to take place. In this respect, it could be thought that Fatih Akın is one of those artists who reshape the dynamics of spatial formations through his questioning and expression of the everyday lived spaces of the 'displaced' peoples and their so called "differences" for a cultural reconsideration of spatial politics.

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HYPERIMAGE RELOADED. THE EXPANSION OF THE PHOTOGRAPHIC IMAGE IN VIRTUAL SPACES

Karin Mihatsch, Roswitha Schuller & Markus Hanakam

"HYPERIMAGE reloaded. The expansion of the photographic image in virtual spaces" is based on the on-going interdisciplinary collaboration between the artistic practice (Hanakam & Schuller; artists, Vienna/Austria) and the art/cultural sciences (Karin Mihatsch; researcher, Paris/France).
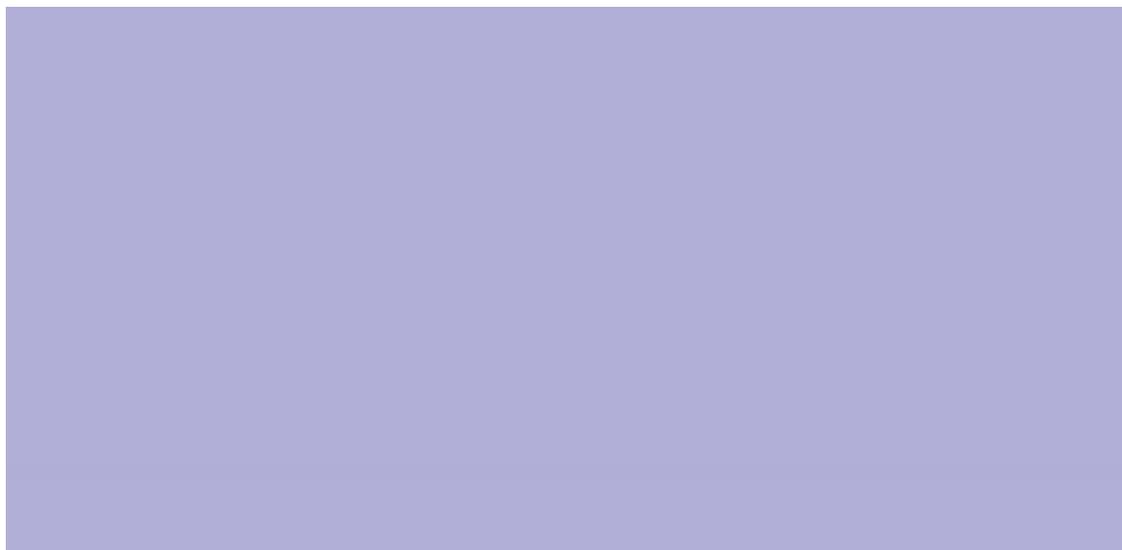
Fig. 1. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller, web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller.

Fig. 2. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller, web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller
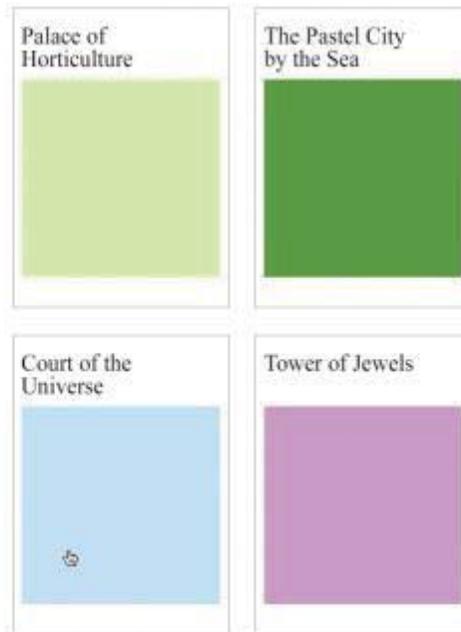
Fig. 3. Palaces & Courts, 2009/10, Markus Hanakam & Roswitha Schuller,web-based Computer Application (Flash); Screenshot Detail, copyright Markus Hanakam & Roswitha Schuller

This paper is based on the ongoing interdisciplinary collaboration between artistic practice and the art/cultural sciences. It is intended to broaden and deepen some of the issues raised during the inter-working of the online-work "Palaces & Courts" (1) by Hanakam & Schuller. The work – based on the imagery of photography – was created within the ongoing discourse with the researcher Mihatsch. (2)

From his concept of the World Wide Web, Tim Berners Lee paved the way for a wide distribution of images on the Internet. These images follow other regulations than printed images and are committed to the process: links between images may be set by respecting a network or structure called "Hyperimage". According to this structure, any image can be integrated in any network or sequence. These sequences may be narrative or not, transparent or not.

The Matrix behind "Palaces & Courts" ("P&C").

"P&C" is a Flash based computer application for online use basically working on various Pools of Text/Image information in connection with random generators. These so called "Pools", which are extracted text fragments from the exhibition catalogue "Palaces & Courts of the Exhibition" by author Juliet James, attempt to give an overview of the Panama Pacific Exposition San Francisco from 1915, in

terms of describing the exhibition areal, its palaces, courts and intersections as well as the exhibit, showcased in this temporary World Fair architecture. The catalogue text can now be found online as a digitalised version at Project Gutenberg.

The artwork "P&C" works in two dimensions; reconstructing the architectural setting in an abstracted and interactive mode as well as distilling the atmosphere of a World Fair of a time, that nowadays appears to be nostalgic. The basic graphic pattern consists of uni-coloured fields in combination with short texts; these may appear in a group of four, or as single units or as just "detail", which takes the single colour tone only. In a group of four, every colour field has the same quotient of grey, so there is always the impression of a harmonious colour play.

The Matrix of "P&C" is simple in its programming, but confusing to the user, as it does not follow a tree-like structure, as one could expect on the first clicks. There are four instances -which form pools- the random generator can revert to: Architecture (A), Exhibit (E), Exhibit Detail (ED) and Colour (C).

Pool A is composed of architectural terms of the world fair; for example "Palace of Varied Industries" or: "Court of the Ages". Pool E refers to single exhibits inside these Palaces or the various Courts. Both A and E pages always show a group of four. ED is a direct link from one element of E. Finally C shows details from EDs.

The starting page always shows the user A, which can link to the pools A again and E; this action continues randomly.

Once the user gets onto the instance E, then E or ED is linked in; this action also continues randomly. Once the user gets onto the instance ED, there is only the option of linking onto C, and in this case it does not link to the whole pool of Cs, but only onto the colour that is connected to the colour from the previous exhibit detail page. Once the user gets onto the instance C, this may randomly link back to the previous ED; or to pool A, or to pool E, or to pool C.

Behind this Matrix, that is not over-complex, lays the artists attempt to mirror strategies of pictorial production as well as the motional and atmospheric embedding of this production within Web2.0. This paper is also intended as an interplay between a theoretical discourse about re-production of (photographic) images, the structuring of images and a media-artistic approach towards this issue.

Creating the Hyperimage.

The development of the Internet dates from the 1960s and was a coproduction between scientists (content) and the US military (budget). (Warnke, 17f) At the beginning economic reasons were not the focus, but rather the exchange of information in a scientific context. The first networks were developed in the USA (Paul Baran: ARPANET with following applications from the early 1970s: TELNET, FTP and E-MAIL) (Warnke, 34ff) as well as in Europe (Donald Davis: MARK I, opened in 1969). (Warnke, 20ff)

Beside these there were several other networks. To enable communication (links) between the different nets, the Transmission Control Protocol (TCP, presented in 1973) was introduced. TCP and the Internet Protocol (IP) permitted the connection between different networks. (Warnke, 43)

In the late 1970s/early 1980s the first PCs, Apples and Macintoshes came on the market. For this reason and due to the dissociation of the Internet and the Military, the user-community enlarged remarkably despite geographical limits. From 1989 to 1992 the WWW was developed at CERN at the suggestion of Berners Lee. (Warnke, 46ff) There, different research teams worked on „non-sequential writing". The so called "Hypertextsystem" offers a references-net: Consequently, researchers can work simultaneously but in an independent way on the same document. (Warnke, 50ff) This innovation lays the foundation for the distribution of images on the Internet. The processual images on the net can be integrated in the Hyperimage-Structure that allows a non-sequential link-network and creates a sort of narrative structure between images.

Besides the structure of Hypertext and Hyperlinking; what is especially intended by using the term "Hyperimage" is not only its quality in web-based structure based on its programmatic level, but its very distinct quality of unfolding narration, plus an atmospheric "sense" of the topic it is related to, which can be allegorised by the term "cloud". Continuing with the example of the world fair catalogue – how can a physical representation of the world be transferred into the virtual? And in the sense of this transforming process, taking a world fair catalogue and reconstructing it as an online computer application is so much an allegory for the internet itself. It is about putting a physical setting into an imaginary setting; digitalisation and virtual re-construction then have narrative quality, in the sense that the virtual space unfolds an imaginary space as we know it from literature or gaming. This shift from "analogue" imaginary to "digital" imaginary spaces – the difference cannot be made by the term virtual itself - may be caused by a crisis of physical space, a process that Paul Virilio describes as "the aesthetics of disappearance". (Virilio, Schroer 263)

From exhibition structures and guiding systems to image structuring in networks.

Paul Baran defined three different communication-net-systems: the star (centralised), the tree (decentralised) and the interconnected net (distributed). All three net-structures do not correspond to the Internet. The Internet is rather provided with a lot of nods linked with little links and little nods linked with a lot of links. This is typical for a scale-free network. The research-group around Albert-László Barabási tried to display the "continents" of the WWW. This attempt showed the wish to reproduce visually a given situation. (Warnke, 106ff) The desire to visualise the world became apparent in the universal exhibition a long time ago. For example, the "Panama-Pacific Exposition of San Francisco" presented a representation through the latest inventions and fabrications. By the decontextualisation of the traditional frame and this new structuring of the exhibit objects, another perception is evoked amongst the beholders. (McLuhan). So, our world is translated into another structure by original objects and representations.

The representation-process is submitted to another translation by the catalogue. (3) On the occasion of the "Panama-Pacific Exposition" the catalogue „Sculpture of the Exposition Palaces and Courts" was published. It contains texts and BW images and documents on the architecture and sculpture of the exhibition. So we can say, that in a linguistic and visual way, the catalogue focuses on the structure providing elements, like the pavilions (= nods), independently from the exhibited content. (The IP also doesn't care about the content.) So the succession of the chapters proposed by author Juliet James could be considered as the representation of a way (=links) through the real exhibition/network of pavilions.

The catalogue is organised in a tree-like-structure. It is introduced by a general foreword, which aims to give a certain orientation to the reader. The reader then has the option to follow the sequence proposed by the author, or to follow their own personal order.

There are different online versions of this printed catalogue. Here we will have a look at the OPEN Library version.(4)

The formal characteristics such as pages and chapters, have been maintained in the (animated) scans of the catalogue.

The typical internet structure is not visible for the user at first glance, but influences the handling and the reception (Genette): instead of thumbing through the catalogue, the user clicks on the pages, the haptic sensation with the object "book" gives way to visual interaction with the screen. Finally, the dimensions of the pages have been adapted to the screen format. (Malraux) Another difference between the printed and the online version is the choice of having the catalogue read to the user. This processual characteristic is an element that cannot be translated into another media.

The structure of the real exhibition is very well presented in the online version: the internet technique permits the showing of several small pictures of the catalogue pages at the same time. This application rends possible a new point of view of the exhibition structure.

As users we grew up with the "traditional" internet of the 1990s, that was organised mostly in tree-like structures, a setting that represented reality in a form with reduced complexity without limiting the possibility of listing content. With the rise of so called Web2.0 applications, our orientation through the internet has changed. The term of "surfing" may still be appropriate to the single user, although this new 'wave' carries along with it, much more individual information than ever before. Users show a tendency to develop a second "reality" inside the "virtual reality" (an example is "Second Life"), so there is a huge contingent of highly individual data transported via the internet. To come back to the media art context of this paper, the example of "P&C" shows an attempt to make this process of stumbling through pictures and stories, without finding the way back or knowing how one got there, visible.

Narrative aspects, associations and the role of the beholder in hierarchical and net-like structures.

The narrative is accented by the dramaturgy developed by Hanakam & Schuller. "Dramaturgy" is described - in the German Duden - as the "teaching of the outside structural form and the regularities of the inner structure of the drama [...]" This definition evokes the presentation structure which is put on centre stage: the frame will be visible.

The issue of the narrative within the internet is spreading in various directions, as it deals with hierarchies, power, communication, psychological aspects and many more themes. With "P&C" the focus is set on the main aspects of reproducing physical space and developing a kind of stage-like setting; principles known from literature as well as from gaming. Indeed, the matrix of "P&C", and the immersive aspect on the user, is quite similar to Role Game Playing, a play-structure at the intersection between story-telling and gaming, that is also strongly connected to improvisational theatre, but without a clearly defined audience.

Three-dimensional elements disappear in photographic (digital) reproduction. The picture is reduced to two dimensions. Hanakam & Schuller break up this two-dimensionality thanks to the narrative moment: the beholder takes an active position (Push and Pull Media) and follows a way/parcours through the structure. The beholder/user moves through the space of the universal exhibition using imagination on the one hand, and on the other hand by paging through the catalogue "Sculpture of the Exposition Palaces and Courts". This all doesn't happen in a linear way, but follows the non-sequential linking system.

"P&C" makes the transformation of the physical world into the imaginary playground visible, as it unfolds this transformation process visually, in re-assembling text passages and by offering a colour-based guiding system that gives the most possible latitude for association.

Photography in the light of the transformation of its materiality in depictions of exhibitions, printed and online exhibition catalogues.

There are no longer any images in the computer system, only binary codes, which can represent either image, text or sound. So the image itself disappears by being translated into another coding-system. It only evokes the impression of still being a picture. Image and text are now at the same code-level; only the user makes a perceptional difference.

The uni-coloured picture on the screen still has the same density of date information, as the "concrete" picture would have; though the information to its beholder is at first sight less complex – in consequence the "abstract" picture will be assumed as complex to, depending on the effort the reader has to put into its interpretation (McLuhan).

In contrast to analog photography, which serves as a memory tool, digital photography devotes itself to visual communication, according to Andreas Schelske. (5) This means that the digital image communicates in an active way, whereas the analog picture rather memorises in a passive way (Push and Pull media). So, we can speak about an interactive situation between digital data and the beholder.

Setting up a digital representation of a genuine physical figure always results in a third, different figure, not only within the internet, but in digital media in general ("The virtual reality"). So this „third" should not be analysed in reference to its representative quality, but also by its transformatory effects – that impact on structure, narration and aesthetics.

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AUGMENT_ME: AN ALGORITHMIC MEMORY, ABSENCE AND PRESENCE IN THE CLOUD

Brad Miller

Can you have a memory without photographing it? Where does a memory live? How do we make sense of them? If it's online, who owns it? What is association at a global scale? What are the conventions of western time and how might that be visualised or utilised? Can you live forever in the cloud? This paper examines these questions through the media art installation augment_me.

augment_me, 2009, Brad Miller, Installation, Artspace Sydney. Image Copyright Brad Miller.

The ultimate promise is that the flow of data may restore the flow of life when it is temporarily halted. Biological death becomes a small death, data becomes the through line that joins old subject to new. [1]

Data and Identity

The autobiographical starting point to augment_me was an ontological crisis not dissimilar to the one experienced by the protagonist in the Italo Calvino story The Adventure of a Photographer [2] that Lizzie Muller cites in her article [3] about my interactive media installation augment_me. When what was to become augment_me began, I was an amateur photographer resembling a life logger who lackadaisically aimed to record every moment of his life.

In 2000, prior to the existence of Facebook® and Flickr®, I bought a low-resolution digital camera on a trip to China. The speed, ease and in-expensive production costs the camera afforded me meant that I was soon obsessively snapping everything: the daily state of my bed, an empty car park, signage, friends at a wake, a flower, architectural detail, a sleeping girlfriend. Eight years later, I bought a digital SLR camera with better lenses and more capability. The photographs changed. There were panoramic land-scapes, a closer attention to skies, a greater awareness about light, angle, resolution and focus – they sat alongside the 'snaps' with no superior value ascribed. My only interest was the actual moment and recording it. Those 12,000 or more photographic moments, taken over 11 years, became the images comprising the augment_me database: my through line that connects past and present, the banal and significant, public and private, life and art.

Also germane to my obsessive recording and the subsequent creation of a database was a loss of artistic identity, in part a result of the fact that the technologies (for example, the CD ROM including the Mac "Classic Operating system" and analogue video) that I had worked with early in my artistic practice had become redundant and were superseded by other technologies. Consequently, my work [4] and the evidence of its existence disappeared. The loss was traumatic. augment_me was born, I came to understand, only retrospectively, from an anxiety about not disappearing as a creator.

In early 2008, I mocked up the first version of augment_me on a computer with multiple screens; in November 2009, the first public version was exhibited at Artspace in Sydney, Australia as a large scale installation, using continuous, long format projection, a responsive granular synthesis soundscape[5] using multi-channel audio and video tracking (the interface between the media and the audience is through this tracking system).

Mediated Memories

Films or photos are not "memory"; they are mediated building blocks that we mold in the process of re-membering. [6]

Definitions of memory and experience are inextricably linked up with notions of place and time, notions that obviously affect our memories. As memories are increasingly mediated and thus constructed by networked technologies, the boundaries between present and past are no longer a given. [7]

A memory can be of a moment, an event, a feeling, a person, or object – existing in the past, remembered but not always reliably. Memories can be repressed, re-configured, forgotten and re-found. If, like the photographer of the Calvino story, I set out to photograph every minute of every day, I would fail to capture my internal life and the internal lives of others. How to photograph aversion? Contradiction? A lie? Can I have a memory without photographing it? Yes, of course.

My focus on memory, is not memory as the subject of philosophy, cognitive psychology or neuroscience but is specifically, about the interplay between memory and technology transforming how we create identity and memories – and possibly miss, in that process, the elusiveness of identity and memory.

I have described augment_me, in the past, as a memory machine of sorts. It tracks my relationships with people, things, places and scenarios via the use of streaming photographs and an algorithm, devised by

me and a software programmer, [8] which is used to structure the flow of thousands of photographs unfurling in horizontal film-like strips, sometimes in different directions, triggered by the movement of a viewer, under sensors, in the exhibition space.

The horizontal, moving film-like strips, other than the nostalgic allusion to super 8 or 35mm, were devised originally because I wanted to make use of western conventions of time used in Mathematics and Science: negative space or time (past) is to the left and positive space (future) is to the right; at the center is the origin (stasis). And so, with augment_me the viewer can change the film strips' velocity and direction, by moving their position relative to the center line of the installation. With a movement, the viewer can make the strips appear, at least conceptually, to move back in time or forward to the future.

Walking into the dark space of the gallery, the viewer was not always aware that their movements in the room were triggering the shift in speed and change in the direction of the horizontal strips. What I had not predicted was the oft-repeated impulse of the viewer to move closer to the individual photograph, the want to take a closer look, to stop the flow of data so they could connect with an image.

This presented an opportunity to re-think not only the interactive element of augment_me but also how I thought about memory. To take a photograph or be in possession of one, to feel that you have somehow entrapped the experience by making it still in time is a denial of the slippery nature of time.

When I began, I didn't question the "truth" of the photos, they were a record of my experiences, places and people, light and darkness. As the database grew and I was able to manipulate and alter the flow and order of the images, I was able to re-make the memories, alter the context of each individual photograph within the greater whole and to each other. My relationship to the images became more plastic, less resolute and so did the "truth" of them. I relaxed. Perhaps because I no longer feared the memory disappearing, stored as it is in cyberspace, in the cloud.

I came to see the photos less as mementos significant only to me and more as fragments caught in a digital stasis which when re-arranged could throw up new meanings and associations – not only for me but for others and how they think about their own mediation of memories.

augment_me, as a form of algorithmic memory provides an opportunity to experiment with the record of past observations and images evoking memories; I re-make them and their relationship with one another, I disprove, for me, their fixed place in the hierarchy of my memory.

The modularity and flexibility of media creates the possibility of an algorithmic memory: an increasingly intelligent self-organising extensible memory which can circulate independently of human intervention. [9]

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ETHERNET ORCHESTRA: INTERDISCIPLINARY CROSS-CULTURAL INTERACTION IN NETWORKED IMPROVISATORY PERFORMANCE

Roger Mills

The study of interdisciplinary cross-cultural interaction in networked audiovisual performance serves as the starting point for Ethernet Orchestra's 2010 telematic music improvisation and live cinema performance, *Distant Presences*. This paper outlines and technical facilitation of the performance, evaluation methodologies and the creative strategies employed by the dispersed musicians and visual artists to collaborate remotely.
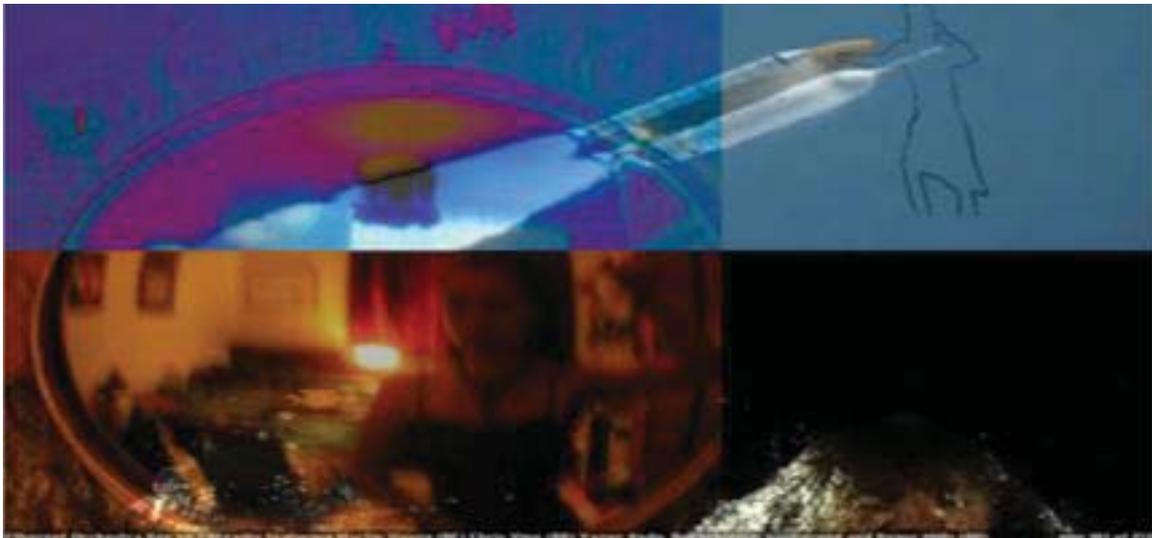
Screenshot of networked live cinema mixing by Neil Jenkins, Graziano Milano and Helen Varley Jamieson in VisitorsStudio interface. Used with permission of the artists.

Introduction

Technical and creative strategies involved in collocated audiovisual performance have to be reconsidered when performers are separated by large geographic, cultural and "acoustical distances." [1] While a burgeoning knowledge of eclectic network performance has illuminated many of the inherent technical issues involved with dispersed interaction, there remains poignant issues of intercultural perception and cognition in interdisciplinary, networked collaboration. This paper seeks to address these concerns by examining the strategies that the remote musicians and visual artists utilized in realizing this improvisatory, telematic audiovisual performance. Considering differences in perception across the dispersed collective, it adopts a semiotic perspective focusing on the role of metaphor in understanding signs in improvisatory musical and visual interaction. Viewed through the framework of distributed cognition, the interface and use of video is examined as features of a "conceptual field" [2] for evaluating collabo-

ration across artistic disciplines and cultures. The collaboration combined intercultural musical improvisation and online image mixing spanning four continents and time zones. Networked musicians were located at the University of Technology, Sydney (AU), Kunstmühle gallery, (DE), and Londrina (BR) with visual artists in Sydney, London and Munich. The performance was broadcast by FBi Radio, Sydney, and streamed on the Internet as "Radio You Can Watch", allowing listeners to view the accompanying live visual mixing to the radio broadcast. This form of cross-cultural, interdisciplinary collaboration affords unique opportunities to investigate the technological and creative strategies involved in producing a live, networked audiovisual performance for radio, which as far as it is known, unique for the medium.

Ethernet Orchestra is an international network music ensemble comprised of skilled musicians from a diverse range of cultures and improvisatory traditions. The instrumental make up of the group includes, Turkish oud & bendir, Mongolian horse fiddle, throat singing as well as guitar, trumpet (played the author) and Max/MSP electronic processing. The collaborating visual artists are also known for their work in a range of audiovisual practices, however in this performance they would be best described as live cinema artists rather than VJ's. The term VJ initially described video jockeys presenting videos on MTV (Music Television), but as Makela (2008) argues "metamorphosed to include video performance artists who create live visuals for all kinds of music." [3] However, the term also carries associations with club culture in which the VJ's contribution is to mix visual projections to accompany a DJ's music set. While these distinctions are somewhat diffuse, live cinema or real-time audiovisual performance is seen as routed in narrative art practices, with a history dating back to lantern shows and shadow plays. Network artist, theorist and participant in this performance Helen Varley Jamieson notes how problematic these terminologies can be, but adds that a more succinct term CJ (Cyber Jockey) has emerged recently to describe Internet based audiovisual performance.

Networked Audiovisual Connectivity

Connecting musicians and visual artists across four time zones with low latency and high audiovisual fidelity required a combination of network interfaces capable of synchronizing dispersed collaboration without interruption. While documented networked audiovisual performances have employed bespoke interfaces on high-speed research networks, Internet2, KAREN, CERNET2, the multifarious configuration of regional networks, participant addresses and the machines being used in this performance required accessibility rather than speciality. This was particularly necessary for the performers participating from remote locations with domestic connection speeds. Player communication between the audiovisual interfaces was also paramount for synchronization and the demands of a live a radio broadcasting schedule. This was achieved by a combination of IRC (Internet Relay Chat) and interface text windows coordinated at the central hub studio at the University of Technology, Sydney. Although a radio broadcast was the principal performance medium, the station studios were not technically equipped to facilitate the performance. It was therefore decided that the University of Technology, Sydney would best provide the technical hardware, sound requirements and network to run two bandwidth hungry interfaces needing fast up and download speeds.

While a number of network audio interfaces could have been employed, it was decided to use the 'plug-n-play' platform eJamming, a proprietary multi-user interface, using peer-to-peer architecture that transmits 44.1 kHz 16 bit (CD quality) WAV files. The interface sends packets (signal as digital information including its destination) via UDP (User Datagram Protocol), making it a fast, high fidelity platform for synchronous connectivity. Its low level latency is achieved through compression algorithms that

shrink the file size for high packet flow, and its peer-to-peer configuration allow it to route the signal directly to players rather than via external servers. This transforms large network latencies of up to 150ms down to approximately 11ms (imperceptible) in the interface, effectively creating collocated acoustics for the networked players. Player soundcards are connected via USB, and audio in-and-out parameters control monitoring levels. A text window provides communication between musicians facilitating synchronous dialogue between performers.

The "live cinema" mixing was performed in the multi-user audiovisual interface VisitorsStudio, a Flash based environment, enabling artists to "upload sound files and still/moving images (jpg, png, mp3, flv, swf) to a shared database, mixing and responding to each other's compositions in real-time." [4] Performers upload images, short animations or movie clips, which are then selected and looped in a mix window. Images and clips can be synchronously manipulated, changing parameters such as size, perspective, contrast and filters. Artists improvise with collages of static and moving images responding to each other and the audio stream in real-time. Figure 1 shows a screenshot of the networked live cinema mixing in the VisitorsStudio interface.

As the hub studio was located some miles away from the radio station, the networked performance was streamed from eJamming to the station studio via the Internet broadcasting platform Nicecast. Nicecast is a client-server platform that broadcasts audio as a compressed Internet stream to other machines via a URL (Universal Resource Locator) or web address. This allowed the station to then re-broadcast the stream on their terrestrial frequency 94.5 fm, along side the stations own Internet stream. Both local and international listeners were then able to watch the live cinema mixing via the url http://www.visitorsstudio.org. For artistic and evaluation purposes the visual mix was recorded and archived through the interfaces sequenced file playback system, and sound and video of the musician's performances was also recorded. The complete audiovisual performance can be viewed at http://www.eartrumpet.org/distantpresences. Despite the array of dedicated network interfaces, the humble telephone served the purpose of tele-communication device between the station studio and the university in a pre-performance interview with the author.

Collaborative Networked Performance

As an area of research, collaborative, networked performance has become a point of considerable interest in recent years. As far back as the 1970s LAN (local area network) computer music experiments of the League of Automatic Composers to contemporary WAN (wide area network) performances of the Stanford SoundWire group, Pauline Oliveros, Avatar Body Collision and Furtherfield, musicians, artists and researchers have been developing technical and theoretical frameworks to enhance and evaluate interdisciplinary, dispersed networked performance. While the examples provide a small contingent of practitioners worthy of inclusion in any networked performance review, they represent a cross section of contemporary interdisciplinary approaches to it. This includes diverse practices such as network acoustics and technology research, composition, improvisation, theatre and social activism.

Gesture and Dispersed Perception

Within the ocean wide area network linking Sydney, Londrina, Braunschweig, London and Munich, three of the musicians were collocated in the hub studio at the University of Technology, Sydney. All participants recorded their individual performances on video providing useful data to contrast the gestures of the collocate group to that of the remote musicians who were unable to see each other. It should be

noted that participant observation and analysis of gesture in this paper is applied only to the networked musicians. Evaluation of the video recordings revealed that where musicians could see each other, they rarely used the opportunity to coordinate their ensemble collaboration. This is in line with previous research where the video relay of networked performers primarily assumes "the purpose of providing an experience for the audience," [1] and that dispersed musicians usually don't visually monitor their collaborators during a performance. The role of gesture in improvisation and musical performance is well documented, and has often been seen as a principal problematic for musicians collaborating in the non-visual networked environment. However, in the context of the networked improvisatory performance, the use of a live video stream does provide participants with what Hutchins (2005) describes as a "material anchor" in their "interaction of mental…and material structure." [2] Viewed through the lens of distributed cognition, material anchors are also present in the appearance of collaborators names or cursors in the interface.

Multimodal Improvisation

The primary focus of the Distant Presences performance was not only intercultural and interdisciplinary improvisation but to explore this as a multimodal radiophonic performance. Theoretical musings on the interplay of sound and image in audiovisual arts and experimental film are historical in their weight and depth, however recent discourses have centered on "concepts of interactivity" [5] and montage, veering away from the model of a linear celluloid medium. Live cinema mixing with music and sound art has also caught the attention of technologists keen to create novel interactive interfaces, and artists wanting to re-imagine or "redefine what cinema can be." [6] While the collaborative domains of live cinema and music are born out of collocated gallery spaces and club culture, it is the spontaneous entwining of the two that informs its methodologies. Makela (2007) argues "what differentiates live cinema from normal cinema is the ability to improvise the narrative or concepts, to alter their course as the performance progresses." [3] In networked audiovisual performance it is this same "interplay of the audiovisual, performed and improvised in the momentary negotiations of the participants"[6] that shape this experience.

Significant in *Distant Presences*, is how these negotiations are shaped and mediated across disciplines and between cultures. Analysis of post performance interviews and audiovisual instances reveal similarities in approaches between musicians and visual artists collaborating in cross-cultural interdisciplinary improvisation. While there are obvious differences in the creation of content, i.e. pre-performance selection of images versus spontaneous creation of music and sound, what emerges is the use of metaphor as a signifier for perception across the audiovisual spectrum. As Chion (1994) suggests, "listening with the ear is inseparable from that of listening with the mind, just as looking is with seeing." [7] From a semiotic perspective, the research identifies what Lakoff and Johnson (1980) refer to as "ontological" and "orientational" metaphors as potential experiential signifiers in dispersed interaction. They argue that ontological metaphors give us a way to refer to experience as "ways of viewing events, activities, emotions, ideas, ect., as entities and substances", which allow us to "refer to it, quantify it, identify a particular aspect of it [….] and act in respect to it. [8] Analogous to their given examples, rhythm, timbre and melody can be considered entities in demonstrating a musician's experience of tele-musical improvisation. The examples illustrate ways in which dispersed collaborators can think about, and refer to such experience.

That *rhythm* is *pushing* the music to a *climax* at that point.

The *timbre* of that sound was so *cold* that it made the *melody* really *stand out*.

 Orientation metaphors, relate us to our "spatial orientation: up-down, in-out, front-back, on-off, deep-shallow, central-peripheral", however they do not "structure one concept in terms of another but instead organize a whole system of concepts with respect to one another." [8] This gives a spatial orientation to concepts, for example "happy is up; sad is down." [10] Applied to networked, multi-modal improvisation, such associations are significant in communicating emotion and meaning across cultures and disciplines. Examples of this emerge from the analysis of post performance interviews where musicians and visual artists reflect on their awareness of metaphor during the performance. This often occurs during complex, cognitively demanding situations in what Schön (1995) describes as reflective practice in action. Musicians and visual artists appear to process their perception and creative expression, while producing spontaneous audiovisual dialogues, revealing "a capacity for reflection on their intuitive knowing in the midst of action […] and further to "use this capacity to cope with the unique, uncertain, and conflicted situations of practice." [9]

This is exemplified in the opening 10 minutes as electronic musician Martin Slawig performing from Braunschweig, Germany illustrates "intuitive knowing" and awareness of spatial orientation to musical concepts, "I played a cymbal *in* time but *lost* timing inspired by the section before […] I liked the *growth* of this moment because of the multi-layer patterns and rhythmic *speed up*, everything was there, guitar loop, bass pulse and at 12'34" *brake down* everything *deleted* and *flatline*". Slawig is describing a section of group dynamics where the music and visual mixing build to a climax, and then suddenly drop. Sensing this same collective crescendo, Turkish bendir player Yavuz Uydu remembers, "I start playing an increasing metered 2/4 beat, I think this is what triggered everyone to *build up*". Although most of the live cinema artists reported a cognitive priority to the visual mixing before the music, Helen Varley Jamieson also related an awareness of spatial metaphor to concepts in her strategies during the performance, "I consciously chose images that spoke to the theme in some way […] to include the idea of temporal distance as well as spatial". Contributing to this, fellow visual collaborator Graziano Milano notes, "it's timbre, tonality, pace, atmosphere, melody that triggers in me visualisations of what kind of general mixes/visuals may work". The author also argues that timbre plays a pivotal role in the perception of meaning in intercultural, and interdisciplinary improvisation. Sacks (2007) also suggests, "timbre constancy is a multileveled and extremely complex process in the auditory brain that may have some analogies with [visual] colour" [10] and this is corroborated by examples where qualities of sound appear to guide participants perceptions of audiovisual events. What starts to emerge in these statements is a relationship between metaphorical signification in sound and the creative responses of collaborators to it.

Conclusion

Distant Presences is an illustration of a successful cross-cultural interdisciplinary collaboration, achieved by combining audiovisual interfaces for an innovative performance outcome. It demonstrates the creative and cognitive challenges facing musicians and visual artists who foray into the liminal collaborative terrain of live, improvisatory, networked performance. Approaches to audiovisual improvisation are discussed and chosen examples illuminate the role of metaphor in signifying meaning in intercultural, collaborative perception and creative interaction. Evaluation of gesture within the non-visual network performance environment suggests that collaborators replace visual signifiers with extended listening practices, in which melody, rhythm and timbre become entities of meaning, fashioning metaphors of experi-

ence and expression in the minds of the participants. Viewed through a perspective of distributed cognition, visual representations of dispersed collaborators primarily act as "material anchors" [2] for the "conceptual integration" of "a shared physical and socio-cultural human experience."[2] These representations are also present in the networked environment as interface text boxes or moving cursors.

As a model for cross-cultural collaboration, networked improvisation is unprecedented in its ability to create dialogical exchange between musicians and artists from diverse traditions and cultures. While developing technologies can facilitate these unique experiences, collaborators are faced with new creative and cognitive challenges in negotiating synchronous intercultural improvisation. This paper is intended as a contribution towards an understanding of dispersed cognition and the nature of representation in non-visual networked improvisatory performance, recognizing the need for new methodologies to mediate these emerging topographies.

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PERFORMATIVE ENCOUNTERS IN MEDIA ART: AN UNSITELY AESTHETICS

MARIA MIRANDA

Traditionally public art has been associated with work that is, to quote Claire Doherty "permanently sited, monumental and commemorative." I present work that is made for and in public space but in contrast is neither monumental nor fixed. They work simultaneously across a number of sites, both online and offline, and utilize a range of media strategies. These practices create a different aesthetics that I call unsitely.

Traditionally, public art or art in public spaces has been associated with work that is, to quote Claire Doherty "permanently sited, monumental and commemorative." Today I will present and discuss work that is made *for* and *in* public space but in contrast to these descriptions or definitions is neither monumental nor fixed. Rather the practices I am concerned with play out in public spaces, including the internet, but are not considered public art. They work simultaneously across a number of sites, both online and offline, and utilize a range of media strategies and interventions. They are ephemeral, networked and performative and through their mobile and ephemeral nature they create a relationship to their audience that is profoundly decentred and asynchronous. In presenting us with such different forms of engagement they are, of course, creating a different aesthetics - an aesthetics that I call 'unsitely.'

Before presenting the artworks I will briefly outline three of my key terms, these are: unsitely aesthetics, network culture and performative space.

Unsitely Aesthetics

In my PhD research I developed the term unsitely aesthetics to refer to recent work that plays simultaneously across sites, both online and offline. Unsitely refers to works characterised by their disruption of traditional approaches to site and by their unsightliness. They can often utilise a DIY approach unconcerned with issues of beauty or traditional notions of spectatorship – sometimes inciting laughter and humour to get at something else. In this sense it is a pun, referring to both the unsightly or unspectacular nature of the work while at the same time pointing to the rich history of site specificity in contemporary art. That is, unsitely pivots on the traditional history of site – from the site/nonsite of Robert Smithson's "Spiral Jetty" to the decades long experience of site-specificity – Miwon Kwon's book "One Place After Another: site specific art and locational identity" is an exemplary guide through this tangled and contradictory history. [1] In this way site-specificity is folded into the notion of unsitely, both acknowledging its importance and unfolding a new moment as network culture disrupts our common notions of place and of being in one place at one time. Unsitely refers to the paradoxical multi-sited-ness and situated-ness of these uncertain practices – thus calling attention to their lack of presence in any traditional sense, but rather calling upon a more "horizontal logic." [2]

The 'un' in unsitely resonates with Freud's notion of the uncanny or the unheimlich, in particular the uncomfortableness and the 'not at home' feeling, which some work evokes, and that can provoke the question of 'where' is the work as well as 'what is the work?' This sense of the unheimlich can produce

both unease as well as an attendant laughter. Following John Dewey and his notion of art as *an* experience, unsitely/unsightly suggests a shift away from a focus on the visual to work that invites participation or engagement through media. [4]

Network Culture

The second important term is 'network culture,' a term I have borrowed from Kazys Varnelis. [3] With the growth of the internet and mobile telephony across the world we are witnessing new configurations of public space and public culture. In his conclusion to the book "Networked publics," Kazys Varnelis describes this new state of affairs as "network culture" and argues that network culture has replaced the logics and periodisations of both modernism and postmodernism. For Varnelis, network culture describes a world where there is a simultaneous superimposition of real and virtual space, many-to-many distribution, peer-to-peer social networks and participatory media. These are the salient conditions of network culture, a paradigm shift away from the commonly understood idea of the information age. As Varnelis argues, today "the network has become the dominant cultural logic" replacing the digital abstractions and reductions of pure information with networked relations. [5] Following Varnelis I consider network culture as the context for the uncertain art practices I will present – as well as the context for the performative tendencies that characterise unsitely aesthetics.

Performative Space

The last term that I will briefly describe is 'performative space.' In his book "Loving Big Brother" John E. McGrath outlines an alternative way of understanding surveillance than the traditional account of crime prevention or the traditional critique which posits surveillance as either an invasion of privacy or part of the apparatus of a spectacularised society intent on total control. [6] Instead, McGrath proposes a surveillance space – this is in contrast to the common idea of the surveillance image – where public and private are no longer appropriate terms and our relationship to it is performative. Following McGrath's argument for a more productive understanding of surveillance through the notion of performativity I'd like to suggest that our current condition encapsulated in the term network culture is creating a performative space of encounter.

The Projects

MTAA

The first project I will present is MTAA's "One Year Performance Video (aka samHsiehUpdate)" from 2004. This work shows immediately the enormous shift in practice and aesthetics from traditional performance art of the 1960s where the presence of the body was of supreme value, to the layered and networked sense of 'presence' we live with today. As James Meyer suggests, it was the expansion of telecommunications and increasing mediation that brought forth the well-known 1960's obsession with presence.

Presence became an aesthetic and ethical cri de coeur among the generation of artists and critics who emerged in the 1960s, suggesting an experience of actualness and authenticity that would contravene the depredations of an increasingly mediated, "one-dimensional" society. [7]

MTAA's elegant and humourous project demonstrates this shift not only in art practice but also in the larger social world where the idea of presence and what is "live" have become blurred, extenuated and layered. Media is now part of the everyday to such an extent that the once easy separation between (authentic real) life and the mediated is quite impossible.

In the early noughties MTAA (M. River & T. Whid) made a series of works called "The Updates." These works riffed on seminal performance art from the 1960s and 1970s, "updating" them for our current networked era. The update "One Year Performance Video (aka samHsiehUpdate" reworks Sam Hsieh's "One Year Performance 1978 -1979 (aka Cage Piece)." Like the logic of Liam Gillick's 'What if' scenario-thinking it asks, what if Tehching Hsieh made this piece today, in the public space of the Internet? [8]

In the original work by Hsieh, the artist lived in a cage for an entire year. The cage was built in his down-town New York studio. Hsieh committed himself to a regime of extreme deprivation where for the entire year he didn't talk, read, listen to the radio or watch TV. To pass the time he took photos of himself and marked the wall of his cell – like a prisoner in solitary confinement. His physical needs - food and sanitation - were attended to by an assistant "with whom he did not exchange words." In contrast to MTAA's Update, the work was enacted in an essentially private space, that of the artist's studio, with no audience. MTAA's update was commissioned by Turbulence in 2004, and has been available online since then. However, whenever you access this work the artist statement announces the date you logged on as the start of the work. In other words, the work begins when each viewer commences to view the work.

For MTAA, the work has shifted from the "act of living in a cell" to "images of ourselves living in a cell."

We've transferred the onus of a 1 year commitment to the work from the artist to the viewer. The piece will be realized fully only when a viewer runs it for one year. … In the work, we mimic endurance without doing the labor. We also know the audience can just close the browser and walk away. No one needs to suffer on this one. [9]

This is a crucial shift – but doesn't necessarily mean that mediation is merely the viewing of images. If McGrath is right, rather than images this performance creates a performative space between the viewer and screen events – one that is open to possibilities, just like Austin's happy performatives. This sort of media artwork accessed and experienced through the internet can be understood as creating a performative space. This is distinct from previous understandings of the internet as cyberspace, where the internet was a separate space apart from everyday life, a space that took you into another realm. Instead MTAA's updates operate as a constantly dynamic space of play, and one which sits beside or even inside the everyday domestic and work spaces of one's life. As McGrath points out in relation to "uptake" and surveillance space, there is a productive gap between the work and the person experiencing the work, thus allowing for an open and dynamic relationship rather than a closed work of set meanings or merely documentation of past events. It is this gap that is productive, as it creates the possibility for a space of performativity "a space between the possibility of sense and the possibility of tyranny of sense." [10] In other words it brings a sense of freedom from the tyrannies of representation that call for absolute truth.

With MTAA's straight-faced performance new questions arise. What is the relationship of audiences to online distributed work? What is the value and importance of documentation historically and today as it is being reconfigured with online performance? And crucially the work throws out a challenge - is this a documentation or a 'live' performance? What can 'live' mean in such a mediated situation where the

time of the performance is totally separate from the time of the viewing? The dislocations and performative nature of the work that these questions imply also make this work unsitely – its existence dispersed across time and space.

NEVER BEEN TO TEHRAN

In the project "Never Been to Tehran," Andrea Grover and Jon Rubin invited twenty nine international participants to contribute photographs of the city of Tehran as they imagine it to look – on the condition that they themselves had never been to Tehran.

Imagine a city that you've only seen in reproductions or perhaps have merely heard about. A place, like many others, that only exists for you through indirect sources & media; the nightly news, hearsay, literature, magazines, movies, and the internet. Using these second-hand clues as firsthand research materials… Contributors will upload their photos daily to an on-line photo-sharing site, which will be projected as a slideshow simultaneously in galleries and public spaces around the world (including Tehran). [11]

This project utilises a sort of reversed site-specific logic where participants imagine a place, a specific place that they themselves have never seen or visited, through another place, which is their own. In contrast to the previous work where the visibility of the artist was a central pivot of the work, the artist is not visible in these photos. Rather than the artist's body as a phenomenological body of presence, this project works from and through the many different artists' global positions that make up the mosaic of images. The photos, all 408 of them, evoke a place through landscape, decorative motifs, ephemeral objects from daily life, the flotsam and jetsam of the everyday as well as the monumentally built environment. It is a networked collaboration that creates a dynamic shifting mosaic of images of not just an imagined Tehran, but conversely, of the people and places that participated. The specificity of where-in-the-world each image was taken is highly significant. In the work, Tehran can be the stony mountain landscapes of New Zealand, the deli windows of Brooklyn, the carpet sellers in Italy, the diamond-shaped paving stones in Denmark, or stacked supermarket shelves in Japan. This very tension between the pictured Tehran, the imagined Tehran and the 'real' Tehran can create, for viewers not in Tehran, a range of responses – at times the images evoke a sense of the absurd, they can seem uncanny, artful and inventive, wistful, melancholic or simply delightful and oftentimes they provoke a laugh out loud response. In this way the images are obviously not 'real' representations of Tehran, rather they perform the place called Tehran by calling forth images and scenes from the immediate world of each artist, in a non-stop kaleidoscope one could call 'performing Tehran.'

SEARCHING FOR RUE SIMON-CRUBELLIER

The last work is a work I made in collaboration with sound artist Norie Neumark called "Searching for rue Simon-Crubellier." It is the first project in a trilogy of work exploring actual and imagined relations to place and in particular mediated, networked public space through performative encounters. It was begun in Paris in 2004 while on a residency at the Cité International des Arts.

"Searching for rue Simon-Crubellier" takes as a point of departure the experience of being Australians in Paris and reading George Perec's book "Life a user's manual." In this book Perec creates a puzzle of a novel set in a building located in the 17th arr. at number 11 rue Simon-Crubellier. Early on in "Life a

user's manual" Perec describes in detail exactly where this street would be. [12] Following Perec's directions we set out from the Cité and began our search in the 17th arr. In the first part of the work we 'performed' the encounters of Australian travellers in a foreign place looking for a particular street by stopping strangers in the street to ask directions. We were directed to one official location after another – the local council, the national archives, the library of maps, the planning department etc, until a month later, we ended up at Boulevard Morland, one block from the Cité, at the Commune de Paris in the department in charge of map-making for all of Paris.

In the course of this project – it was a month long process – we came to understand our ongoing activity as "performative encounters," rather than performance art or conceptual art, and the video and audio material as no longer to be considered material just to make a work later – it too was the work. In a sense we were not documenting a separate event. The documenting was the event. It was at this point that the significance of media in public places became apparent. We realised that the media we carried was essential to having these sorts of encounters, and the audio and video apparatus created a performative space of encounter. For McGrath, non-performative representations allow the viewer an external relationship to the represented via representation, performative space brings the viewer into the space constructed. As in performative language, … the space does not exist without the viewer/auditor's implication." [13] And so it was with us.

This project has been exhibited several times, displaying the accumulated artefacts of its ongoing search, which makes each exhibition of the work distinct, prompting the question 'where is the work?' Is it the performative encounters on the streets of Paris? Is it the online Google searches that are undertaken for each exhibition? Is it the exhibition of the accumulated artefacts? The performative encounters invited people to play for a moment. It was an intervention into public space, yet we didn't consider it a participatory project. Rather our interest was in the possibilities of encounters with strangers – thus performing our own sense of Paris, in other words *performing Paris*.

In Conclusion

In using the art historical term "site" to understand these works that are now playing out across public space, including the internet, I want to point to a paradox that looms into view in both current practice and our actual lived experience – the paradox of being in a place and not in a place; of being located and elsewhere at the same time. I have used "site" to focus on this paradox as on the one hand it foregrounds the lived experience rather than the technology, and on the other it troubles the notion of "place" as it is used by writers intent on a singular or essential relation with place. Although site suggests a fixed place, I am using unsitely to unhinge this fixity and to suggest a troubling and opening of the place of the work of art. Hence I use unsitely to evoke a space of tension, ambiguity and potential.

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PLAYGROUND GAMING WITH WII, KINECT AND PROCESSING

Grethe Mitchell & Andrew Clarke

This paper is a case study in the design and development of the "Game Catcher" - an interactive application produced as part of an AHRC "Beyond Text" Major Grant project that uses open source software (Processing, libfreenect) and hacked games hardware (Kinect and Wiimote) to create a low-cost motion tracking system that allows the recording, playback and analysis of children's playground games in 3D.

Fig 1. Hand positions in a clapping game (© Grethe Mitchell & Andy Clarke)
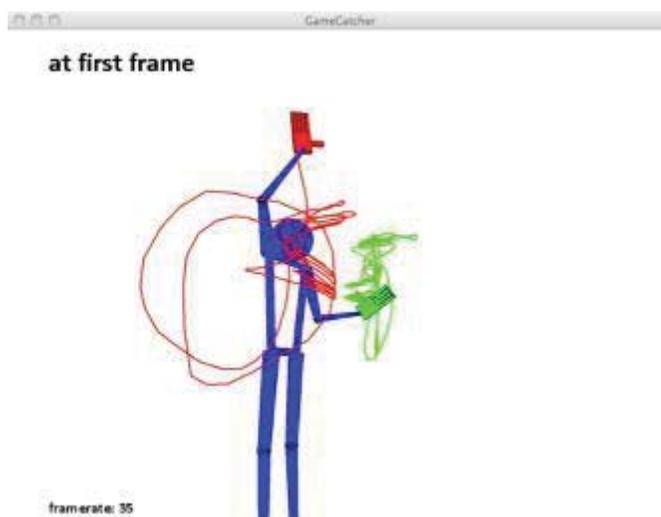
Fig 2. Visualisation of the path of the hands over time (© Grethe Mitchell & Andy Clarke)

INTRODUCTION

This paper is a case study in the development of the Game Catcher, a low-cost markerless motion tracking system produced as part of "Playground Games and Songs in the Age of New Media", a two-year project funded by a large grant from the AHRC as part of the Beyond Text Programme.
The Game Catcher uses open source software (Processing, libfreenect, DarwiinRemote, OSCeleton, Simple-OpenNI) and hacked games hardware (both the Microsoft Kinect sensor and Nintendo Wiimote) to

create a low-cost markerless motion tracking system that allows the recording, playback and analysis of children's playground games and movement in 3D.

The following paper focuses on some of the technical aspects of the project, particularly the advantages of using videogame hardware and open source software to produce this application. Readers requiring more information on the archiving and visualisation aspects of the application are directed to our other papers [1] [2] and to the project report. [3]

The development of the Game Catcher was supervised by Grethe Mitchell of the University of East London (now at the University of Lincoln), and the final version of the application was developed by Andy Clarke.

PROJECT AIMS/CONTEXT

Recording movement for archiving and analysis is a common task in the Arts and Humanities. Approaches include written descriptions and drawing. Video recording technology is also commonly used, but although it is cheap and easy to use and therefore has advantages at the recording stage, it is more cumbersome when it comes to analysis. For instance, it may leave some details lost (though being out of shot, filmed from too far away, or obscured (either by the subject's other limbs or by other participants). Motion capture has many advantages over video, in that it allows the movement to be viewed from any angle or distance, not just the one that it was recorded from. There are, however, also negative aspects – such as price, availability, and the complexity of configuration and operation – which make them generally unsuitable for use in Humanities research projects.
We felt that a low-cost markerless motion tracking system would be able to combine the price/ease of use of video with the benefits of motion capture. Also, having researched and written about the appropriation of videogame hardware and software, [4] we felt that the new forms of motion sensitive videogame hardware (such as the Wiimote) could be adapted to form the basis for such a system, particularly as this approach would build upon the other advantages of videogame controllers such as an extremely favourable price to performance ratio, easy availability, robustness, familiarity with users, and so on.

The Game Catcher was developed as a fully functional proof of concept application, designed to address the preservation, visualisation and archiving of movement and to fill this price/performance gap between video and motion capture. In parallel, we also wanted to create a playable game which would allow a child to record their (movement-based) game and then play "against" this recording. Our aim here was that the computer game and the research tool could form a virtuous circle, with the playability acting as a reason for children to keep playing with the Game Catcher, thereby also providing more data for the researchers. The process of making the Game Catcher playable as a game also made us look at the issues involved in bringing "real world" playground activities into a computer environment, and made us think more consciously about what makes real life playground activities – and computer games – enjoyable.

TECHNOLOGY

To fulfil its stated aims of allowing the recording and playback of clapping games, the Game Catcher had to perform two different tasks: (a) track the position of the hands in 3D space; and (b) detect the orien-

tation of the hands. From this information, the path of the hands could be determined (and reconstructed in "playback" mode) and claps could be identified – whether they were player to player, player to computer, or computer to computer claps. This all had to done with a sufficiently high frame rate and accuracy, and sufficiently low latency, for the data to be useful as research material and enjoyable during play. In addition, the Game Catcher had to be usable by researchers "in the field" – meaning that it had to be simple, robust, not require an excessive amount of technical knowledge to set up and use, and provide resilient tracking under a variety of lighting conditions and environments.

Processing was chosen as the programming language for the Game Catcher because of its ease of development, its focus on creative computing, and its extensive collection of pre-existing contributed libraries (and active development of new ones). If we had needed a C-based alternative, we would have probably used OpenFrameworks, for the same reasons.

During the course of developing the Game Catcher, we used a number of different solutions before adopting a "best of breeds" approach which used the Kinect sensor to track hand position and Wiimote controllers to track hand orientation. This proved ideal, exploiting the strengths of each system.
One of the issues that we came across (and perhaps failed to fully appreciate in drafting the proposal) was the difference between a controller like the Kinect that does motion tracking and one like the Wiimote which is merely motion sensitive. The Kinect detects hand movements by tracking changes in their position whereas the Wiimote only sensing changes in acceleration and therefore has no idea of where the hand actually is.
The Nintendo games are designed to minimise or conceal these limitations, but no such workaround was possible with the Game Catcher. As a result, it was necessary to adopt a hybrid approach which used the Wiimotes for the task that they were most suitable for (determining the hand orientation) and explored alternative solutions to the issue of tracking where the hands were in 3D space. This gave the Game Catcher a theoretical performance of around 3mm in the XY axis, 1cm in the Z axis and 1° in orientation. In practice, unavoidable system noise in the Kinect depth map reduces the XYZ accuracy slightly from these ideal figures, though it still remains well within acceptable levels. The accuracy with which depth is measured varies, and when an object is far from the Kinect, its movement is measured in larger steps than when it is close. The figure for orientation is likewise the raw measurement and in some hand orientations the Game Catcher makes the hand snap to 90° to avoid gimbal lock issues.

The authors have previous experience in video tracking, having used applications such as STEIM BigEye and Danny Rozin's TrackThemColors Director xtra within the context of dance and technology. As a result, they were aware of the shortcomings of video tracking – being too easily affected by outside conditions such as the brightness and colour temperature of ambient lighting or the clothing of participants.

As a result, we rapidly switched to an innovative approach which used Wiimotes not only to sense the orientation of the hands, but also to track their position. We attached an infra red LED to the Wiimotes in the player's hands and used a third Wiimote as a camera pointing at the player to track the position of these LEDs. The advantage of this approach is that it is very fast as the Wiimote has a dedicated chip optimised to do this image analysis in hardware. The tracking is also robust and resilient to lighting conditions, etc. as it is tracking infra red light, rather than visible spectrum. The LED point source does not allow tracking depth and we therefore planned to use triangulation to determine distance, an approach demonstrated by researchers at the University of Cambridge. [5]

Although the Kinect was hacked on its first day, it took a while before Processing libraries by Daniel Shiffman and Paul King became available. These only provided access to the raw depth map, not to the

player skeleton, so bespoke hand tracking code was necessary. This approach provided an extremely high framerate – up to 100fps, even when tracking two hands – though self-occlusion was an issue, with the tracking becoming confused and tracking the wrong body part when, for example, a hand was temporarily hidden behind the other arm.

Because of this, we switched to OSCeleton as soon as it was available as this provided access to the player skeleton. OSCeleton ran as a separate command line program, communicating with Processing using the OSC protocol. This added additional complexity in setup/use and was felt, in the end, to be inappropriate for the Game Catcher if it was, as intended, to be useable by researchers in the field. For instance, when OSCeleton experienced a segmentation fault, this could leave both it and the Game Catcher frozen. We therefore switched to the Simple-OpenNI library.
As both OSCeleton and Simple-OpenNI can track multiple users, we developed and tested a multiplayer version of the Game Catcher, focused on other movement-based playground games such as skipping, hopscotch, dance routines etc.

ISSUES

There were a few issues with the Wiimote from a technical point of view. It does not, on its own, track rotation about the Y axis and suffers from a gimbal lock problem when pointed vertically upwards. This meant that we could not distinguish between two key hand positions: the palm out, fingers up (position 3 in large image) and the similar position with the palm facing sideways (position 5). In addition, the rotation could flip uncontrollably by 180° when the hand was in these positions.

Normally, the Wiimote relies on the Sensor Bar and/or the Wii Motion Plus to solve these problems, but neither was suitable for the Game Catcher. The first would require the user to keep their hands pointing at the bar, which clearly unsuitable for a clapping game, while the latter added too much additional bulk and weight.

An alternative approach was used. By paying attention to the previous position/orientations of the hands and the limits of human anatomy/physiology, we could add an additional level of interpretation to the raw data received from the Wiimotes and eliminate hand orientations which were either physically impossible or made no sense given the context of a clapping game. For instance, when the hands are vertical (fingers pointing up) in a clapping game, it is unlikely that the player's palms are facing their body as this is not a common move and even if they were in this "palms facing body" pose, they would have gone through some clearly identifiable intermediate positions to have arrive here.

This "filtering out" of non-used positions in the electronic environment is one of our "design solutions" of the development, based on the "perceived affordances" [6] of the system and the properties and affordances of the clapping movement ("real" and electronic), as well as on the affordances of the "real world" environment.

The other main technical issue that we faced was the relative weakness of Processing in rendering certain types of 3D graphics. In computer games such as the Wii Sports boxing game, the player's avatar is seen from behind in a ghostly form. This is an established convention which we wanted to use in the Game Catcher when the player is clapping with their recording, but we found Processing unable to render the semi-transparent 3D graphics needed for this effect. A workaround, using a wireframe avatar was felt to be sub-optimal.

The Wiimotes are convenient for holding, but are a little large to be comfortably mounted on gloves (so as to track clapping, for instance). Having done our prototyping using the Wiimotes, we are now looking at using the Seeeduino Film to engineer a smaller alternative.

VISUALISATION AND ANALYSIS

The raw movement data is saved in a plain text format and records the X/Y/Z/roll/pitch/yaw of every body part in every frame along with a timestamp (a sound file is also recorded of the clapping rhyme/song which plays back in sync with the movement). This data file is used in replaying the game, and is also designed to be easy to analyse. The Game Catcher provides an example of this analysis, having a built-in "visualisation" mode (see small image) which shows the path of the hands throughout the entire game. This image can be rotated and viewed from any angle and played, paused and rewound at will.

A natural extension of this would be to be able to view two recordings side by side for comparison or to superimpose the paths of one recording over another. Both of these would assist greatly in identifying similar clapping games or spotting when a variant of a game has emerged. Currently these are difficult, time-consuming, tasks relying on the manual comparison of video recordings, which may have been taken at different angles or be of clapping games performed at different tempos.

Computer analysis is also possible. Identifying clapping games from the analysis of video footage is complex, [7] but doing the same from motion data (such as that collected by the Game Catcher) is feasible as claps can be identified from changes in the velocity of the hands, changes in direction, or proximity to one another. These same principles and solutions can be applied to many different movement-based activities.

CONCLUSIONS

The Game Catcher is a fully functional prototype, working both as a computer game and as a research tool. It has proven the viability of a tracking solution "in-a-suitcase", an exciting development as it means that ephemeral movement data can be captured, analysed and conserved at low cost, without extensive technical knowledge.

This has interesting outcomes for research in the Arts and Humanities. In terms of development, the Game Catcher allows for a low-cost visualisation mechanism allowing performers of all types (dance, music, theatre, circus etc) to see the shape and position of their activity in 3D space, thus opening up new avenues for artistic development and performance improvement.
In terms of research, the Game Catcher is particularly interesting to the arts and humanities disciplines, where research often takes place in-situ, rather than in a pre-determined, specially designed space as is the case for some medical or sports movement research, or in the entertainment sector (e.g. film and videogame production) where high-end (and expensive) motion capture studios are commonly used.

The above outcomes – and overall process of developing the Game Catcher – have led us to consider more deeply how movement is studied across disciplines, and whether these techniques are shared. From our research, it would seem that the techniques for recording and documenting movement are patchy, with bodies of knowledge siloed within certain fields and little known (or little used) outside of that particular field. For instance, formal movement notation systems such as Labanotation are used

within dance, but not outside of it, even though it could have application elsewhere. Commercial motion capture systems are likewise used in the entertainment industry and in high-end medical or sports research and development, but are not generally used in the arts and humanities.

A follow-on project by one of the authors (Grethe Mitchell), also funded by the AHRC, is addressing this issue. It will organise a symposium and book allowing the exchange of best practices across all disciplines with regard to the recording, analysis and archiving of movement-based activities (in all their forms).

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NEW AESTHETIC ENERGY INFRASTRUCTURE AND THE LAND ART GENERATOR INITIATIVE

Elizabeth Monoian & Robert Ferry

The Land Art Generator Initiative addresses public art within the urban fabric of the sustainable city. The goal of LAGI is to design and construct a series of large-scale site-specific installations that combine art with utility-scale clean energy generation. The artworks utilize the latest in renewable energy science and innovate the application of new technologies. www.landartgenerator.org

Fig 1. Freshkills Park, Staten Island, New York City, Spring 2011. View of East Park from North Park. Site of the 2012 Land Art Generator Initiative Design Competition. Photo by Robert Ferry.

Fig 2. Windstalk (2010) Atelier dna: Dario Nunez Ameni, Thomas Siegl; New York City, USA.

Fig 3. PV Dust (2010) George L. Legendre, Emanuele Mattutini, Jean-Aime Shu, Alfonso Senatore; London, UK.

Imagine yourself walking in a large park at the edge of the city. In the distance, an object appears to rise organically from the landscape. Its armatures and folds relate to the composition of the setting. Looking closer, the large object makes you think of the complexity of patterns that exist in the natural world while at the same time it inspires an awe of human invention and ingenuity. The geometries of the sculptural elements seem to respond to the sun and the wind.

When you reach the observation platform the vision comes into perfect form, like a painting in a frame. As you watch the way that it reacts to the forces of nature, you think about the interconnectedness of human activity with the earth and the delicacy of our shared ecosystem.

You are surprised to learn that the beautiful object that has so captured your attention is also a power plant harnessing the energy of nature in the creation of carbon-free megawatt-hours that are at that very moment providing electricity to thousands of nearby homes. You stay for a while listening to the energy conservation discussion that is going on there that day, stealing glances toward the artwork as it moves to follow the sun.

Is it possible that in the future, all human endeavors could be fuelled by clean renewable energy? And that the systems which generate the energy could be designed to be beautifully and seamlessly integrated into the fabric of our biotic and cultural ecosystems?

While contemplation on the condition of our planet can be dispiriting, it is important to remember that remedies exist. At our most optimistic we can even see ourselves in the midst of a new revolution—one that puts sustainable resource management above planned-obsolescence consumerism.

To get there, we're going to have to convince a great number of people to embrace the ideas associated with the change, clearly understand the need for it, and see its inevitability. This takes a heightened awareness of the cultural drivers of change. The investment in time and economic resources that change requires should be justified in the great return in cultural and economic wealth that the change brings with it.

We've placed our focus on one part of the equation—that of energy generation—because it is critical to accomplishing a harmonious transition and because democratized access to clean energy has the potential to dramatically increase the standard of living of everyone.

When most people think about renewable energy a few things come to mind. We might picture dark blue solar panel arrays or large wind turbines in the ocean and lining mountain ridges. The form of these objects is derived almost entirely from the engineering processes that have made them function more efficiently through each generation of technological advancement. Consideration of efficiency and cost per kilowatt capacity has driven the appearance of renewable energy technologies for two reasons. First, the cost of energy is relatively low in a global market that subsidizes non-renewable fossil fuels and writes off externalities, [1] and renewable alternatives must strive to compete on those terms. And second, large-scale energy generation facilities (i.e. coal-fired power plants) have historically been located far enough away from the city that aesthetics were not of utmost importance.

Functional and mechanical considerations should always remain an important priority of good technology design, and it is imperative that we implement strategies that will ensure universal access to affordable energy. At the same time, we may be wise to question the ability of advances in renewable energy technologies to reach their greatest potential if their physical forms continue to exist entirely outside of aesthetic and cultural considerations. This question is reinforced by the fact that the process of harnessing renewable resources such as the sun and the wind often requires that energy generation facilities be located in more visible locations.

The science of renewable energy may soon find the way to cost parity with conventional fuel resources, and by some measures, they already have. But the popular adoption of new sustainable technologies will require that they have the ability to appeal to people on an emotional level. It will require a popular appreciation of the value inherent within a shift in energy resources and not just of the dangers inherent in not shifting.

Meanwhile, the dangers are quite real. With climate, environmental, and health effects of extraction and combustion on the one hand, and the finite nature of fossil fuels and uranium on the other hand, it is imperative that the next few decades see a rapid transition to renewable alternatives. One of the leading obstacles to greater adoption is the indifference or lack of understanding of policy makers, stakeholders, and community leaders. We therefore should look to all means with which to educate and influence popular opinion.

Every advancement in technology comes with its own complex set of risks and potential consequences and should be well considered ecologically before being applied universally. [2] The incredible bounty of the Earth, if managed sustainably and in harmony with nature's balance, can lead to a heroic triumph over poverty, starvation, and suffering.

Instead, our ability to tamper with the balance of nature and to squander the precious resources available to us has been a tragedy of epic proportions. A short-list of the damage done includes all of the polluting effects of mining and extraction industries, the "resource curse" stifling freedom and progress in post-colonial nations, effects of airborne and waterborne toxins on human health, habitat destruction and species extinctions, wars waged over resources, increased risks to coastal populations, loss of freshwater resources, agricultural instability, increased desertification and deforestation, ocean acidification, and global economic instability.

This list of 20th century tragedies is in great part due to the historically brief anomaly of easy access to conventional crude oil (~1860-2060). But it also has to do with the corresponding cultural memes that proliferated with and as a consequence of the technological and scientific expansion that was fueled by oil economies.

All along the way art has had a pivotal role to play although it may be often overlooked. In 1909, the Futurist manifesto, [3] along with other contemporaneous movements, gave added momentum to the sentiment of the triumph of man over nature. Europe was gripped by a collective progress-euphoria, as it reveled in the excesses of its scientific and industrial triumphs. It was that same year that humans reached the North Pole, and six years previously the first successful flight had heralded victory over the sky. The world had been mapped and catalogued and ideas about time and space were being challenged. This euphoria of progress is an addiction from which 100 years later we are still recovering. The Futurist manifesto itself was a seduction to the thrilling and fleeting ecstasies that come from narcissistic cultural self-evaluation, environmental destruction, squandering of resources and the waging of war. Above all, its lesson is the ability of art to contribute to change in the world.

While declaring the greatness of speed and progress, Futurism also equally declared the greatness of humanity. But what it did not bring into the fold of its political message was a concern for the well-being of the planet or notions of "humanity" as being defined by a sense of empathy or compassion.

The intellectual profundity of the idea of "Greatness-In-Newness" that was born of those first decades of the 20th century played a critical role in art and design theory that was to follow. On the positive side of the bargain, this grand movement that has seen various iterations and reinterpretations over the last century has consistently questioned the nature of art. The application of its higher ideals has given us the ability to invent spectacular otherworldly creations by fusing together disparate existences into wonderful or shocking manifestations.

On the negative side of the bargain, artistic glorification of mankind's triumph over nature has arguably contributed, if not to the neglect of our obligation to nature, at least to a distraction from it. In the meantime, we have arrived in the 21st century at a somewhat desperate place in which an updated vision of our future may have no place for human life at all on a planet that has been heated up by our combustion and raked clean by our endless mining for metals and fuels in our insatiable and un-moderated quest for speed and convenience.

A countermeasure of serious import to the Futurist ideas of "Progress for the Sake of Progress" and the "Greatness In Newness" has been the dawning awareness, since the middle of the 20th century, [4] of the serious situation that our addiction to unabashed industry and the fast life of unbridled consumption has placed us—and the planet. Artists have been pivotal in expanding this awareness to the critical mass required for action.

This use of art to expose truths and influence solutions continues with the expanding reach of eco-art, environmental art, and art as social practice. Artists are using the tools at their disposal to educate the viewers, readers, and users of their work about the ethical considerations that are so relevant to popular human behaviors. Art and design have been able to enlighten people about a broad range of social and environmental issues and to instill awareness about the products we buy, the foods we eat, and the energy we consume.

In no small part this is being done through art that employs technology, for example visualizations of climate data or air pollution. [5] Technology is being glorified and used in art with a new purpose and with awareness of the potential harming effects of human behavior on the delicate balance of the natural biosphere.

Meanwhile, the growth of social practice art presents a path to overcome the limitations of didacticism. It is good to teach, but the best methods of teaching have always been demonstrative. How can art 'do' as well as 'be'? With the application of social practice to infrastructure art, the 'do'ing certainly implies a partnership with technology.

Renewable energy technologies have the ability to rise to the occasion that is provided by these two conditions of the contemporary art world: social practice and technological integration.

The Land Art Generator Initiative is creating a dedicated platform for public art as sustainable energy infrastructure. [6] The project offers the opportunity for collaborative teams of artists, architects, landscape architects and designers, working with engineers and scientists, to create new ways of thinking about what renewable energy generation looks like and how it relates to the overall fabric of our constructed and natural environments. It calls on interdisciplinary teams to conceive of large scale site specific artworks that provide renewable electricity to the city at a utility scale (equivalent to the demand of hundreds of homes)—offsetting thousands of tons of CO_2 and providing an iconic amenity for the city.

The outcome of the 2010 design competition exemplifies how interdisciplinary teams can come together to create truly innovative and pragmatic solutions. Hundreds of submissions came in from over 40 countries around the world from design teams that included many top international artists and design firms.

The Land Art Generator Initiative has partnered with NYC Department of Parks & Recreation for 2012 to hold an international design competition for large-scale works of site-specific public art for Freshkills

Park (the former Fresh Kills landfill) in New York City, which, once reclamation is completed, will be a cultural amenity almost three times the size of Central Park.

Jurors include: Dr. Henry Kelly, Acting Assistant Secretary and Principal Deputy Assistant Secretary for the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy; Bjarke Ingels, Founding Partner of BIG | Bjarke Ingels Group; Patricia Watts & Amy Lipton, Directors of Ecoartspace; the Public Design Commission of the City of New York.

Following are two examples from the 2010 Land Art Generator Initiative design competition that illustrate the potential for innovation that lies in interdisciplinary collaboration.

The Windstalk team, led by Atelier dna in New York City, [7] arrived at a solution to harvesting the power of the wind that had never before been considered. They were inspired by their observation of nature, specifically the way a field of wheat or tall grass blades wave in the wind. Rather than relying on a rotor with blades attached, they conceived of a set of stalks that would move under the power of even the slightest breeze coming from any direction.

By placing piezoelectric generators along the stalk and a torque generator at the base, the Windstalk design has the potential to generate more electrical output per square meter of land area than a conventional horizontal-axis wind turbine (HAWT) array. The reason is that HAWTs must be placed far enough apart so that the wind disturbances and vortexes that each turbine creates in its wake do not affect the efficiency of the other turbines. Windstalks can be placed in close proximity to one another.

An innovative solution for solar power came from the PV Dust project from an interdisciplinary team in London. [8] By utilizing a new solar product called Sphelar(TM) by the Kyosemi Corporation, the team conceived of a three-dimensional array of spherical solar receptors that increases the incident surface area of the installation.

The result is that the design requires 57% of the land area per KW capacity output when compared to an array of flat photovoltaic panels, while maintaining use of the ground for other purposes such as farming or recreation.

These designs go beyond their conceptual and aesthetic innovation to include engineering innovation. But even short of that, the application of existing technologies in new and artistic ways creates cultural innovations, which can be equally powerful as drivers of change.

Because the renewable forms of energy generation such as solar and wind do not pollute in their daily operations, they are more likely to find their way into proximity with residential and commercial neighborhoods. As this has already started happening, there has been some push back from local communities in terms of aesthetics, for example with neighborhoods rejecting wind turbines that they can see from their backyards (the so-called NIMBY effect). [9]

For while such installations do not billow smoke, the argument can be made that visual pollution is no less an impediment to the proliferation of clean energy insomuch as detractors can point to "not in my backyard" examples of installations that have negative impacts on real estate values and community cohesion.

Cultural innovations via infrastructure art can provide new tools for city planners with which to integrate renewable energy systems into the built environment while addressing such public concerns. And they can provide investors with new opportunities to capitalize on projects that provide multiple revenue generating engines (a power plant that also generates money from tourism for example, or that is partially financed as a cooperative by the community.

We can envision a day when renewable energy generating artworks will add cultural and economic value to public spaces around the world, while giving us cause to feel good about our creative stewardship of the environment.

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FROM ARCHIVE TO RETROSCOPE AND BEYOND – PUSHING FORWARD RESOURCE DEVELOPMENT

CATHERINE MORIARTY

This paper presents a chronology of image digitization projects undertaken by the University of Brighton Design Archives and discusses the relationship between this work and archival description in a conventional sense. It suggests a coalescence of, and describes a tension between, information management standards and the curatorial and user innovations that networked archives might provoke.
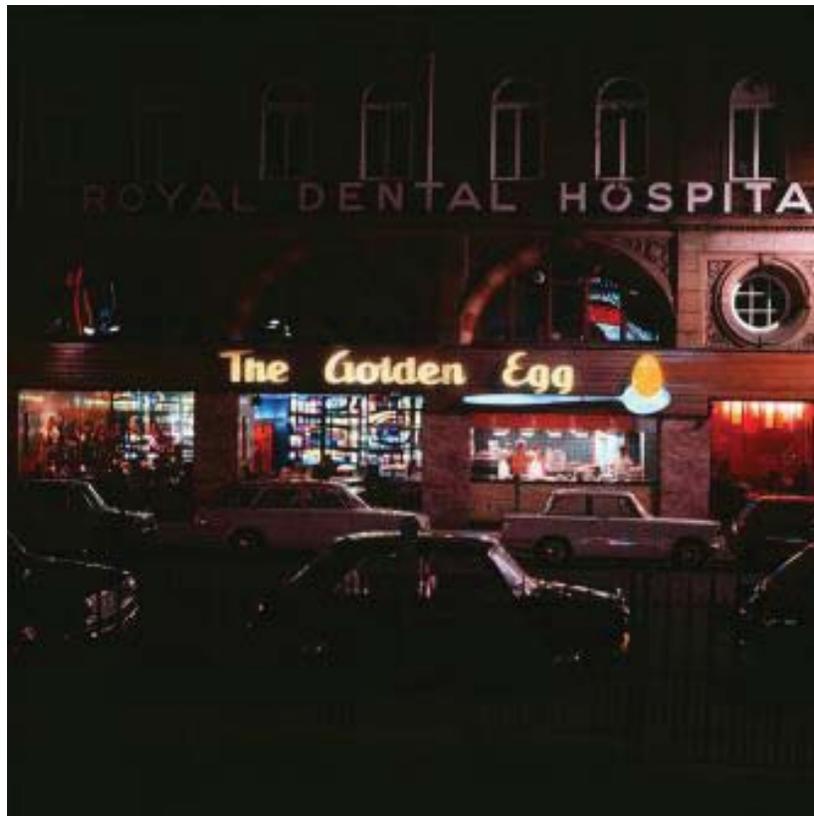
The Golden Egg Restaurant, London, 1966. (University of Brighton Design Archives).

The intention of this paper was to discuss the outcomes of a collaborative project between the University of Brighton Design Archives and the independent web resource, The Retroscope. However, the project is yet to attract funding and so the following takes the form of a discussion setting out the thinking behind the project and its background. It focuses on ideas about location; of archival photography as described in hierarchical arrangements; as distributed electronically in the form of digital surrogates; and, ultimately – doubling back on itself, so to speak - as the representation of things in the real world at a

particular time and place. It suggests a coalescence of information management frameworks and curatorial innovation of a radical order.

I first saw analogue photographs from the University of Brighton Design Archives represented online in 1999. It was an extraordinary feeling to see these digital images. 100 or so photographs from the archive were scanned for a project in Scotland, the Scottish Cultural Resources Network (SCRAN), and four things struck me immediately: the greater value of our material when located alongside that from other archives and museums; the immediate visibility of photography usually accessible by appointment only; the scale of the potential audiences who could now see it; and, significantly, the importance of place. The latter requires some elaboration.

The photographs contributed from the archive to the SCRAN project depicted Scottish products displayed at the 1947 Enterprise Scotland Exhibition held in Edinburgh. The supporting caption information on the back of each print was incorporated in the metadata of the corresponding digital file and this included the name and address of the manufacturer of each represented product. It became immediately apparent that this information could present a map of manufacturing in Scotland in the postwar years, and that this location data would be of considerable interest particularly to local and business historians. The photographs that had been acquired as part of an archive of design now became re-activated in a new digital environment, with material from other collaborators and as part of a project with a mission to reach wide audiences. Since then, however, the issue of location has re-appeared consistently, sometimes as a dilemma, and more recently as a great opportunity. This paper maps this process.

In a similar way to the initiative described above, subsequent educational digitization projects in which the Design Archives participated involved delivering sets of images scanned from our photographic holdings that were then added to an amalgamation of material from different sources principally the Visual Arts Data Service and more recently, the Joint Information Systems Committee Media Hub. In the agglomerated pools of data offered by these services, we envisaged our images appearing in the results lists of varied research enquiries and reaching audiences with whom we would not have engaged alone. However, an issue that soon became apparent centred on the context of each digital image. For unhitched from the analogue parent, it was difficult to understand the place of the photograph in its home archive; indeed, its archival arrangement – to use the proper term - was never explained. These images were orphaned, detached from their original context and offered-up as separate digital objects.

It became clear then, that the dynamism that digital surrogates of archive photography enjoy is both a blessing and a curse. Indeed, in some ways they seem too free, in that they are removed from their archival hierarchy and presented in a flattened 'chocolate box' thumbnail arrangement, from which the viewer cannot navigate back in order to understand the object in its home environment. In other words, the viewer cannot understand which print or negative is placed before or after it; or how long the sequence is and what its overall purpose was; or, which series or collection group it forms a part of. This is precisely what the International Standard of Archival Description ISAD(G) was established to explain. Building on established principles of archival practice, it is an information architecture that is a flexible matrix, that accommodates a vast array of different multi-level scenarios, from small collections relating to the life or work of an individual, through to the complex structures of huge government departments and their transforming shape over time. Yet though fluid, the ISAD(G) standard has limited possibilities for correspondence or creative linking, in other words, establishing relationships between different archives, and matching a detail in one with detail in another. While the field 3.5.3 'related units of description' can act as a link to associated records, the item, for example a document or a photograph in

its file, or the file itself, and the series in which it sits, and the collection group to which it belongs, remains largely as a self-contained whole. These relationships might be visualized as a tree with numerous main branches, off which smaller branches stem, eventually leading to clusters of foliage made of individual leaves, yet the tree stands separate from others, rather than within a forest, close to and intertwined with its neighbours. Thus, while an ISAD(G) record might sit alongside other archive descriptions, it does not really provide a means of extending beyond itself (in a more creative sense). Despite this, it is undoubtedly the best mechanism for explaining the arrangement of archives and adopting this standard drives a level of consistency at an international level.

At the Design Archives we describe each of our eighteen archives according to the ISAD(G) standard and we deliver these descriptions through the Archives Hub, an online portal to agglomerated archive descriptions relating to British university archives, and other archives outside the sector, numbering 180 institutions in total. As part of the Archives Hub, our multi-level descriptions of each archive unfold beautifully before our eyes replicating how the material was originally generated or collected. By clicking on 'full record', the top-level collection description can be seen to have several sub-sections or series that then, as one clicks on the folder icons, reveal further nested sub-sections, and each of these, further files within, that can be opened-up, right down to item level, i.e. we can see, for example, the place of the photo in the file alongside all its neighbours. Even more of a development is the way in which, during the past year, the Archives Hub has introduced the capacity to attach digital images to item-level records, so we can see the photo alongside the description of it. This means it is now possible to attach the Design Archives images produced for other digitization projects (by this time we had amassed a collection of over 6,000), to the correct place in the archival hierarchy, so viewers can see their proper arrangement. This re-attaching of the orphaned digital images to their archival context represented, certainly for the Design Archives, a dramatic alleviation of the symptoms of disassociated digital objects. Yet, this being the case, it raised another idea for it makes clear how the viewer cannot jump from the item level record to explore the greater context of what a particular photograph or document represents. We see the micro-geography of its archival arrangement (its local context as object) but however detailed the scope and content description, we cannot appreciate what this image represents in time and space, i.e. the macro-geography of what it represents, we cannot put it back in its place in the world.

In order to develop this idea, an example might help. In the archive there is file of photographs relating to each edition of the periodical 'Design'. The February 1966 issue of the magazine included a feature 'Eating Can be Fun' with some highly evocative colour images of the Golden Egg restaurant located in London's Leicester Square. In 2001 some of this photography was digitized and included in an online learning resource, one of seven published by the Design Archives as part of the project 'Designing Britain'. [Fig. 1] Authored by Matthew Partington, the photograph of the interior of the restaurant was included in a study of British crafts of this period, and the project placed this image in a new context, it had escaped, so to speak, from the box of 1966. How, now, might this action be developed beyond conventional research methodologies? Might there be a way to re-conjoin other digital objects relating to Leicester Square in 1966? Might there be a way to place this object alongside other represented moments, and see what else was happening at the same time, in the restaurant, or across the road, or elsewhere in London, and if we had a photograph of a visit to the restaurant, or a scan of a diary entry or of a receipt, could there be a way to bring these objects together? Could there be some type of digital environment, a matrix or mesh, which facilitated the space and time curation of digital objects? Might there be a way to create a more poetic navigation of digital objects beyond the frames of information management? Indeed, how could we use the indispensible organizational frame of ISADG as a jumping off point? While images or items accessible from a portal harvesting data from many collections might be

searched by time and place 'Leicester Square, 1966', it still would not be possible to perceive the spatial relationship between them. And it is the spatial that is, it seems to me, a critical element in how the past is perceived. Jorge Luis Borges, in 1941, wrote of time in a spatial sense and in a way that presages the potential of digital environments, 'That fabric of times that approach one another, fork, are snipped off, or are simply unknown for centuries, contain *all* possibilities.' Indeed, the theme of time and space is taken up in various places in his writing as a means of challenging perception, and it is this concept to which, I believe, Chris Wild is alluding when he describes his project, the Retroscope, as a 'perception'. And it is to this that we now turn.

By 2011, to recap, the Design Archives had created several thousand digital images from one of the largest libraries of industrial design photography in the world. Now, in the process of being added to their respective archive descriptions on the Archives Hub, the digital images are no longer disassociated from their context. But continuing to repurpose and re-arrange these images to enhance their research and learning potential remained an ongoing ambition. Early in 2010, a proposal entitled 'Design Mesh', with the aim to reconstruct electronically one of the pavilions of the 1951 Festival of Britain site as a frame for positioning digital archive objects, was discussed with the staff of the Visualisation Unit at King's College London. Though nothing more came of the idea as a collaboration with the Design Archives (the project was taken up by students later in the year) a colleague who learned of this proposal arranged a meeting with Chris Wild who was busy working on an idea called The Retroscope, a 'visual time machine' that intends to offer a way of surfing time online by integrating images, moving images and sound in chronological and spatial arrangements for people to explore, add to and curate.

The Retroscope is a development of the Retronaut website which since it was established in 2010 has had more than 1.4 million page views per month. While the Retronaut site delivers content (largely images and film) from one source at a time in a conventional editorial format, the aim of the Retroscope is to bring material from different archives together and to facilitate the potential coalescence of their holdings in a dynamic user-driven environment. The project has attracted the interest of many leading archives, including Getty's Hulton Archive, the Bridgeman Art Library, the Central Office of Information and the BBC. Attracting a great deal of attention, it was described by Ed Vaizey, Minister for Culture as 'the next big thing' and by John Mitchinson, Director of Research, QI as 'one of the richest uses yet for the web'. This was exactly the type of project that could move on how the digitized material from the Design Archives was searched, rendered and indeed, curated. Collaborating with the Retroscope suggested a way in which a University collection could work outside the educational sector to extend its visibility and currency and to make more porous the perceived boundaries between conventional educational environments and other, more public, less formal, venues for learning. Indeed, joining forces with The Retroscope would present a high prolife opportunity for Design Archives resources to reach audiences unimaginable alone. We were curious about the advances in digital curation this might bring about, and the convergences between things that have led separate lives until now. What might this mean for arts education and research and for cross-sector dialogue? How could the placing of archival data in a shared spatial and chronological delivery environment (as opposed to the rigid conventions of archival hierarchies) inform new thinking in the arts and humanities? How might a collaboration of this kind provoke research challenges and opportunities? Already, as part of the JISC-funded Media Hub project we had started to add location data to our metadata and were interested in the possibilities of mapping and GPS technology. In 2010 we received funding from the Arts & Humanities Research Council for a doctoral project with the Chartered Society of Designers which centred on mapping membership data. What would happen, we wondered, with an information architecture, a tool such a Retroscope, that invited user participation in such a way that the unofficial would meet the unofficial. Here, it seemed, could be a project where none of the outcomes are prescribed, or could be predicted, where dormant

possibilities might emerge. Indeed, the National Archives in the UK, are busy considering the possibilities of mapping, or 'space exploration', among its suite of 'Labs' projects where various rendering options are being trialed. Will it be the case then, that the common elements of these systems, connected by their locational data, might one day converge, that the Retroscope could overlay the National Archives map, or the National Archives 'Digital Vaults' project in the United States, and that others could overlay these, and we could experience those multiple, forked stories, that excited Borges seventy years ago, that have inspired our sense of possibility, and which technology is now partly able to facilitate.

Acknowledgements
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THEORIZING NEW MEDIA IN A GLOBAL CONTEXT

SORAYA MURRAY

New media provides contexts for global-scale interaction, but theorization around new media rarely intersects with globalization discourses. In a field largely driven by technological innovation, critical theory may be seen as unproductive and thus extraneous. This paper examines the intersection of digital media's practice and criticality, moving away from theories of form and procedure, and situating its scholarship in a global ethical context.

Few contest the idea that advanced computational and communications technologies play a definitive role in today's global economic, social, cultural, political and even ecological orders. The evidence of this exists in technologies used to implement the internationalization of management, the globally shifting labor pools, the enabling of a cosmopolitan managerial elite, transnational banking and other such signs of economic globalization. It lives as well in social, political and cultural manifestations of globalization such as WikiLeaks and the social-media fueled Arab Spring.

While new media forms have a transnational impact, and profoundly influence globalization, one sees little critique or consciousness around issues of globalization as the context in which new media discourses take place. What is the disconnect between new media's global impact, and new media's discourses, which maintain little engagement with theorization of larger social and ethical concerns? In the context of rapid technological evolution, should the study of digital and electronic culture mirror ethical concerns, given the urgent social and political work that needs doing in the world? For example, universal rights discourses might be one key area where computational and communications technologies have contributed to major shifts by increasing the fluidity with which global subjects move across traditional nation-state borders, in keeping with shifting international demands for both the managerial class and labor. Considering the rights of diasporic, transnational and migrant subjects requires greater attention as their global numbers increase.

How can these and other issues of social uplift extend to an area that is fundamentally concerned with perpetual innovation, and often situated in a profit-oriented context? If we are to attempt an approach to electronic and communication technologies that contains within it a self-critical apparatus for contemplating the effects of those works we make and use, then what critical tools can we implement to greatest effect? Moreover, is the discourse of digital media the place to advance these and other theoretical concerns? I should make clear that I make this critique on the meta-level; it is not aimed at individual artists, many of whose works persistently address the important questions of their day. New media is not a unified discipline, but what one might more generally call an 'area' or 'movement' in scholarship, but it does possess a kind of centripetal pull of ideas that requires careful consideration 'as though it were' a discipline. This discussion is aimed at the level of discipline, and to safeguard the future relevance of what we as new media scholars do. Innovation and profit does not assure lasting significance, and in this regard our fledgling movement has serious problems.

This conglomeration we call "new media" is a truly interdisciplinary undertaking that has no fixed academic home, and by extension no organized intra-disciplinary self-regulating value system or ethics – in other words, no cohesive philosophical discourse. D.N. Rodowick's *Reading the Figural* [1] and Mark Hansen's *New Philosophy for New Media* [2] and the interventions collected in CTheory.net form three

examples of scholarly interventions into philosophical engagement with new media, but these are asymptomatic of the more dominant practice-oriented sector of new media scholarship.

In 2008, the worth of theory for digital media was explored in a public discussion between Ian Bogost and Jay David Bolter at the Georgia Institute of Technology. During this debate, entitled, "The Value of Theory in Digital Media Studies," both scholars pointed to the fundamental tension between what Bolter identified as the "procedural" side of digital media and the "culturalist" or critical theoretical side. Bolter asserted that critical theory is not designed to help make things; that it is not in effect "productive" in the sense of resulting in a product. Rather it is there to make an intervention in the form of critique. On this point there was no dissention from Bogost, who likewise indicated that, "theory's purpose is to change perspective, not create output." [3] And they were absolutely correct in this from the standpoint of measurable outcomes—the critique critical studies offers could be characterized as a drag on productivity, a kind of noise that disrupts the flow of creative efficiency. This is because its concerns are not with production, but with honing a set of critical tools that vigorously assess the products of a given society for their underlying meanings and ramifications. In its questioning and self-reflection, it can be seen to slow immediate results.

Bogost and Bolter debated how the procedural and critical culturalist aspects might better dovetail, a question that hounds combined theory-practice programs. Bogost suggested that the two elements mesh well in digital art production; others suggested this is demonstrated in design, or that it may be the role of scholarship to integrate the two. This seems to configure the coming together of theory and practice as the purview of artists and other 'creative' types, to relegate it to the aesthetic or the academic, as opposed to centralizing its importance for the procedural.

What is this apprehensiveness around theory? For me this question, with its attendant procedural / culturalist tension are connected to a larger contemporary crisis of higher education, particularly the conflict between the classical understanding of the university as cultivating intellectual acuity, versus the more neoliberal iteration of the university as training ground for capitalist enterprise. Writing on this crisis of academia, Gregory Jay characterized it as such:

[a] fundamental tension arises between the academic mission of preparing students to be critical citizens and neoliberalism's demand that they subordinate themselves to the dictates of the market. Obviously, neoliberalism has no need or desire for academic research that questions its operation, as such criticism creates 'inefficiency' in the market. [4]

Even the tools themselves beg not to be analyzed. The clean, abstract shapes of laptops and mobile devices, inscrutable and minimalist, disguise their histories and origins. This is often only ruptured by accident or technical glitch, for example in the famous so-called "iPhone girl" photos snapped of a young Asian factory-line worker that went out on the new device, discovered later to the delight of its owner. [5] That amusement is only possible because of the seemingly insurmountable distance between the phone's assembler and owner, which those images instantly broached. This factory image again masks another representation: that of the waste management and reclamation issues that plague mass production. On the back end of the technological cycle, is the ecological crisis of e-waste; armies of unfortunates must contend with the tidal wave of obsolescent technology, and run the gauntlet between spaces of production and capitalist excretion that mar the environment.

Indeed, there are many ways in which theoretical contemplation seems not to mesh well with production. Setting these aside, I would argue that theory's presence in new media scholarship chafes at sensitivities that arise out of an overarching shortcoming in the area: we lack an ethos. That is to say, we may refer to ethics-based theory in our products, but that is very different from having an ethical grounding that guides, provides purpose and articulates a code for the movement. Theory provides the tools for ethical debate and self-critical reflection, and surely serves to articulate concerns that have ethical ramifications. Yet is often seen as an external punitive force, and hence side-stepped. However, rejecting the influence of theory as secondary to production does not displace the central importance of ethics. Ethics in the disciplinary methodologies of new media should and do precede theorization; ethics should act as agreed-upon fair and honest practices in advance of whatever our diverse disciplinary outcomes may be.

Technological development is ideologically configured as ultimately good, necessary and fundamental for progress; that the moral obligation to pursue innovation outweighs the ensuing sacrifice. It carries with it the promise of social betterment through technology, including but not limited to true democratic inclusion, a global web of consciousness and the outstripping of bodily limitations such as mortality. [6] However, there remains the matter of bodies, and how advanced technology imposes itself upon subjects in the world. An array of activist scholars have challenged the ethical neutrality in technology discourses and their visual cultures, including among others: Lisa Nakamura, María Fernández, Thuy Linh Tu, Wendy Hui Kyong Chun, Jennifer Gonzalez and Coco Fusco. "For all the celebration of mobility and fluidity," Fusco has written, "digital technology organizes a world economic order that thrives on a global labor pool of poor non-white people—for whom 'access' to many critical signifying practices— legal, symbolic, and electronic—is diminished and even denied." [7] Fusco along with many others argue for a more equitable set of relations between a global North and South, calling into question the duress of technological production on the bodies of disenfranchised laborers. These scholars are undertaking important work that deconstructs the present-day continuation of imperialist expansion and the rhetoric of technology as progress. They importantly tackle the issues of post-colonialism, hybridity, mobility, migration and Diaspora as they intersect with new media.

My inquiry here, however, is not a cultural studies-based critique of technology. Rather, in a larger sense we have to ask ourselves as members of a common set of interests: what is important about what we do? What is so consequential that intellectuals from other fields would look to our theorists to identify key ethical concerns related to technology in the world and, more importantly, derive useful reasoning that can have impactful resonance outside the hermeneutic specialty of new media? What is it that new media studies produces that is different from what Silicon Valley does? How can our field of collective interests have global relevance—or, lacking core values—even sustain itself? What do we hope to achieve if we do not have ethics?

Consider one lynchpin of internal ethical conflict at play in new media: the imperative to constantly innovate drives technology forward—and this drive is embodied both by those who undertake the challenge of developing new technologies, as well as those who intercede, such as hackers and other interventionists. Alexander Galloway describes this imperative as a part of a larger discussion on the political dimensions of network architecture. "Hackers," Galloway explains, "don't care about rules, feelings, or opinions. They care about what is true and what is possible. And in the logical world of computers, if it is possible then it is real. *Can* you break into a computer, not *should* you or is it *right* to...In fact, possibility often erases the unethical in the mind of the hacker." [8] Galloway refers to hackers and their relationship to code and specifically protocols, but the paradigm of "possibility eras[ing] the unethical" is quite

apropos to other areas of technological development, where the pursuit of innovation demarks a frontier to be discovered as an inevitable form of progress. Technological innovation races toward the promise of a horizon where the better, modern, efficient and more functional purportedly hold libratory potential for culture. As a result, technological industry seems to function largely autonomously from a self-critical apparatus beyond that demanded by capitalism, to guide its aims. Hackers react to institutional systems, certainly tangle with the machine, and are ideologically configured as having an antagonistic relationship with capitalism. But as Galloway points out, this is separate from having an ethical framework to guide them. And in the end, their efforts may ultimately and inadvertently contribute to the strengthening of the controlling logics of protocols, by pointing out the loopholes and backdoors that are eventually sealed. Certainly, Galloway's perspective generalizes; still, it illustrates its point well. It is this question of the ethical (as opposed to merely the possible) that requires a critical foundation, one built from sound theoretical building blocks.

I have here characterized a series of challenges, each nested inside the next: new media exists within a context of globalization, while its theorization seems not to acknowledge major ethical concerns of that context. Meanwhile new media studies is currently driven by its procedural side, while its diminished critical culturalist side seems to contradict the logic of production. However, without critical examination and contextualization, much of what new media does is indiscernible from research and development — a compromised position in the face of the tech industry and its resources. When subject to the accelerated expectations of technological innovation, such production can only temporarily impress audiences, before facing the certain doom of obsolescence. Armed with an ethics and a set of critical tools with which to self-evaluate, new media scholars and producers social actors with agency to affect global outcomes, and whose cultural context is inextricable from their innovation.

One need make no argument about the connectedness between cultural context and the tools that form the object of study for new media scholarship. Noted sociologist and scholar of globalization Saskia Sassen, in example, contests the dominant understanding of the relationship between digital and non-digital spaces. Sassen argues that the dematerialization associated with digital media is largely myth, and in fact the goings on of the datasphere are deeply bound to the material world.

The digital is imbedded in the larger societal, cultural, subjective, economic, and imaginary structurations of lived experience and the systems within which we exist and operate. At the same time, through this embeddedness, the digital can act back on the social so that its specific capabilities can engender new concepts of the social and of the possible. [9]

The feedback loops that she describes between the digital, the non-digital, the social and the possible evidences an interplay that is mutually influential; it potentially opens up new and fertile territories for conceptualizing our sphere of activity not as hermetic but rather engaged with context and subjectivity.

This is one of innumerable possible perspectives, the lenses for which already exist in the array of disciplinary approaches associated with critical studies such as sociology, philosophy, political science and media studies. Seyla Benhabib, a venerated political theorist, utilizes liberal democratic philosophy to reason through the ethical challenges heightened by globalization. Benhabib emphasizes moving from the rights of citizens as defined by national identities and borders, to universal human rights, which acknowledges the increasingly porous nature of borders as a result of global flows of capital, products and bodies. [10] Manuel Castells, arguably one of the most important living sociologists studying the impacts of globalization and advanced communications technologies, has recently published *Communication Power*, which ambitiously undertakes to characterize sweeping impacts of both online social media and

traditional mass media—what he calls "mass self-communication" and its reshaping of global power. [11] Clearly discourse of advanced technology is inextricable from ethical conversation. Technology implements ethics, whether or not its makers self-consciously select or even recognize their ethical positioning. In fact, I would go so far as to say that forms of technology are ethical philosophy in practice. Hence, it is imperative to bring sophisticated language and critical frameworks that enable ethical conversation to take place, within discussions of new media.

As a relatively young area of interest, new media studies need only look to another recent disciplinary struggle, namely that between art history and visual studies, for a cautionary and instructive example. Mieke Bal, a noted cultural critic and theorist, has written of art history and its notorious lack of "methodological self-reflection," which led to a profound crisis around its object of study, and the subsequent formation of alternative approaches to visual and material culture. [12] The emergent scholarly discipline, visual culture studies, promoted analysis that brought rigorous self-criticality to the table. This radically reconfigured the objective of study not in terms of a pedigreed object, but always with a skeptical relationship to the object in its various webs of relation. Meaning, then, does not issue only from the form in itself but also context—and the analytical tools possess a kind of 'self-sharpening' feature. In time, the academy has seen the melding of art history with visual studies; many departments now bear both names and support both approaches as a means of ensuring the contemporary relevance of art history, while grounding visual culture in the object to some degree.

How can we, by developing a problematized relationship to our own material, continue to evolve what we do as new media experts? Now that we are finally moving beyond defining what new media is or isn't we are free to move on to possible tasks such as probing technological essentialism in its many forms, unveiling the workings and political urgencies of advanced technology in context, and advancing a commitment to new internationalism as constitutive of technological experience.

I would like to return once more to the conflicts of the "procedural" versus the "critical cultural"—a dualism that falsely divides the intellectual labor around technology, and that needles the anxieties of both theorists and technologists, particularly those occupying the academy. Theorists are anxious that they aren't understood to be 'making' anything, that they aren't productive, per se, and more likely slow the process of production. Further, in the cases where theorists are not also 'makers,' their contribution may be diminished as navel-gazing and interloping into a conversation occurring between producers. However, contrary to the idea that critical theory produces nothing, the intellectual discernment and criticality developed from training in critical methods is measurable as well, however along much longer timeframes and long-tail effects. The rigor of the resistance criticality provides refines the procedural dimension, but also introduces theoretical and ethical self-regulation to its operations. One senses, in kind, the angst of technological producers who are constantly anxious that they don't make anything important or lasting. Innovation is always overtaken by the subsequent innovation, seemingly without end. The solution to this quandary lies in the development and valuing of a theoretical feedback loop regulated by an ethical framework that takes into account the context and players through which technological progress is made possible, and through which it enacts itself. This should be a rigorous, systemic part of the scholarship that influences the outcomes of production. The digital media we use are not neutral tools, but enact social, ethical and moral worldviews. Theorists and producers needn't worry: the work we do is relevant; but before we study digital materiality, presentation, aesthetics or evolution, before we theorize the algorithmic or the informational, we need core ethics. For a disciplinary sense of self-assuredness that can enable digital media theory and production to do good work in intellectual culture and in the world, it requires a strong ethical philosophy.

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HUGGABLE NATURE WORKSHOP

Hye Yeon Nam

*Huggable Natur*e is a public workshop in which participants create wearable interfaces using simple arts and crafts materials to express playful affection towards nature. Specifically, participants design and construct tangible interfaces, which enable them to leave voice messages that play back when they hug trees wrapped with fabric interfaces.

Motivation and Background

MOTIVATION

In the past, when various workshops entailing mechanical electronic parts, including software and hardware, were introduced, organizers often encountered difficulties. For example, at times, their participants felt that they needed to have an equivalent knowledge of computer science or electronic engineering prior to attending the workshop. [6] Simple micro-controllers such as Arduino and Lilypad facilitate participants' engagement with interaction design. [7] However, with such platforms, users still need to have a basic knowledge of programming.

The *Huggable Nature* workshop is intended to provide participants with playful interactions with nature. Because *Huggable Nature* entails the use of simple arts and crafts, with which most participants can use easily and quickly to create interfaces, it is designed for general audience. *Huggable Nature* is a forum for providing playful experiences and for examining participants interacting with nature rather than producing refined results.

BACKGROUND

Do-it-yourself (DIY) practices have been explored in several fields such as sustainable design, fine arts, politics, and health. [1] The general definition of DIY in design and arts is making a product oneself. Broadly, when people create, fix, reuse, and assemble materials, we call it DIY. Popular culture has reflected these movements in TV series and magazines. However, recently, the meaning of DIY has often been used for sharing information, following printed instructions, and collaborating actively. It includes not only the final outputs but also the experience of sharing knowledge and techniques with others. [7] Through DIY, activities become more like playful leisure. People become more engaged and creative when they are enjoying themselves. Such an enjoyable environment is embodied in *Huggable Nature*.

- Popular Culture

The British television series *Barry Bucknell's Do It Yourself* and *Bucknell's House* in the 1950s and 1960s and American action adventure television episodes such as *MacGyver* (1985) and *The A-Team* (1983-1987) played an important role in the popularization of DIY activities. [6] Fan magazines (fanzines) are

also DIY activities, but ones that actively build underground communication channels related to music and sports. [10] A number of fanzines were generated during the first wave of the punk movement in the United Kingdom (1976-1979). Psychiatrist Frederic Wertham has described fanzines as "a special form of communication" in *The World of Fanzines* (1997), and the American writer and academic Stephen Duncombe has characterized fanzines as small publications in which producers create their own unique culture. [2] As independent, self-published publications, fanzines build identities of freedom and resistance in their contents and graphics influenced by the self-empowerment aspect of DIY activities.

- Do-It-Yourself practices

Traditionally, *leisure* has meant the opposite of *labor*. Leisure is regulated by the individuals themselves, whereas labor is structured by other supervisors. British neo-Marxist scholar Edward P. Thompson describes how people's understanding of leisure time changed as a result of industrialization in the late eighteenth-century. He states that "In all these ways - by the division of labor; the supervision of labor; fines; bells and clocks; money incentives; preachings and schoolings; the suppression of fairs and sports - new labor habits were formed, and a new time discipline established (p.394)." [9] American author Steve Gelber points to the value of DIY activities as hobbies or creative endeavors, noting that "the ideology of the workplace infiltrated the home in the form of productive leisure (p.2)." [4] In this context, he claims that labor could be viewed as leisure. Creative DIY activities bring all the qualities of leisure to labor. Participants in *Huggable Nature* do creative activities individually, share opinions with each other and design arts and crafts to express their affection towards nature. In these activities, they are self-motivated; they do not experience it as labor, but as leisure.

- Playful Interaction

Interaction designer Bill Gaver states in his essay "Designing for Homo Ludens" that "play is not just mindless entertainment, but an essential way of engaging with and learning about our world and ourselves." [3] He emphasizes the importance and the power of engaging in and learning from play that accompanies intrigue and delight at all ages. For example, in one of the *Huggable Nature* workshops in an Istanbul high school, a senior high school student designed interactive lingerie for hugging trees, thoroughly enjoying the process of creative design. Sometimes she shouted or giggled with her friends while she created and interacted with her devices. In another *Huggable Nature* workshop in the Atlanta Mini Maker Fair, a five-year old boy participated. As he was too young to sew fabrics, he painted conductive inks onto pre-cut wearable devices. After he finished his paintings and left voice messages on the trees, he was excited that his voice messages played from the trees. He commented, "The tree is talking to me." He seemed to treat the trees as conscious beings. Because the *Huggable Nature* workshops are based on creative ideas and physical activities applicable with all ages or interests, participants are excited about expressing themselves, connecting with nature, and interacting with one another.

Workshop Principles

The *Huggable Nature* workshop is designed to accommodate participants with different abilities and skill levels. The beginning of the workshop leaves time for the exchange of opinions among participants. Then, participants rapidly and easily create playful devices that interact with trees using arts and crafts within a limited time frame. The workshop follows two general principles:

- Openness and collective ideas

People sometimes take nature for granted. In the *Huggable Nature* workshop, participants look for ways to appreciate nature. For example, participants often say that they have never communicated their affection and appreciation to trees before *Huggable Nature*. Also, when they discuss their experience with nature in the workshop, they exchange their ideas and improve their designs. With the success of open software such as *Processing* or *Openframeworks* and web participatory models such as Wikipedia or YouTube in Web 2.0, [8] we can see the evolution of "shareability" and the power of openness in other media. The concept of shareability is similar to Henry Jenkins' "collective intelligence" or the ability to pool knowledge and compare notes with others toward a common goal. [5] The *Huggable Nature* workshop reflects the concepts of shareability and collective intelligence through active discussion and collaboration, both of which create synergy. As the workshop progresses, unrefined ideas are articulated and implemented into concrete outcomes. Since the *Huggable Nature* workshop is held outside in a park or community garden, more people participate in discussing ideas and creating wearable devices to interact with nature.

- Simple processes and immediate feedback

The *Huggable Nature* workshop focuses on enjoyable and creative designs that are interactive with nature. Simple crafts and DIY practices allow participants to concentrate on their prototypes and minimize the fear of and the need to learn extra technologies. When participants see immediate results, they maintain their interest. In the workshop, they use conductive threads, yarns, fabric or ink to create wearable devices. While touching and hugging trees with their own devices, they close electronic circuits. When the circuits close, participants immediately hear their own or previous participants' recorded voice.

Workshop Structure

The *Huggable Nature* workshop has been developed over the past two years and presented in three different countries. *Huggable Nature* consists of four steps: set-up, discussion, design, and interaction.

SET-UP

Before the workshop, organizers wrap fabric interfaces around trees. The wrapped felt fabric contains micro-controllers, sound recorders, and speakers. Some interfaces are decorated with words such as "I Love you" or "Hug Me" or with figures of smiling or whispering human faces (Fig 1).

DISCUSSION

In the beginning of the workshop, participants talk about their interactions with nature in their daily life and discuss how they make their surrounding environment happier.

DESIGN

Participants create devices crafted from art materials that they can wear to touch or hug the fabric on the trees while expressing their affection. Some make bracelets or gloves, and others create t-shirts or masks.

INTERACTION

The participants leave voice messages on a recorder attached to the fabric. Then they put on their own designs to touch or hug trees to listen to their own or other participants' messages.

Workshop Results

The *Huggable Nature* workshop has been held in four places: Washington Square Park in New York City on October 9, 2010, as part of the Conflux Festival, the Sao Paulo Cultural Center in Brazil on July 19 and 20, 2011 as part of FILE (Electronic Language International) festival, at the Georgia Institute of Technology in Atlanta on September 10, 2011, as part of the Atlanta Mini Maker Fair, and at an Istanbul high school in Turkey on September 12, 2011 as part of the ISEA (International Symposium on Electronic Art) conference. The first and the third workshops lasted about three to five hours and were attended by about 30 people, including families and local community members, all of whom spontaneously participated in the workshop. The second and the fourth workshop were spread over five hours in one or two days and were attended by around 10 people. All the participants were pre-registered. The following section contains a selection of workshop results:

INTERACTIVE BRA

In the Istanbul workshop, a senior high school student designed an interactive bra for hugging trees. It had two fabric pieces connected with two strings. One was tied in the middle of the back and the other tied behind the neck like a swimsuit. She designed heart shaped conductive fabric and attached it to the printed fabric. After she finished her interactive bra, she recorded her voice messages to the trees. Then she put on her conductive bra. When she hugged the tree, the conductive fabric closed the circuit in the interfaces wrapped in the trees to play her voice messages.

INTERACTIVE GLOVES AND MITTENS

Participants created various gloves and mittens in the workshop since most participants touch the trees with their hands. Some made mittens to avoid sewing a space for each fingers, while some fashion major participants decorated their gloves with letters from "LOVE" or added complicated designs or fasteners (Fig 2).

INTERACTIVE BRACELETS

When participants made interactive bracelets, they needed only rectangle shaped fabric and Velcro tape. Since this is the easiest way to contact trees, young children who are too young to sew fabric as well as adults who do not want to sew paint conductive inks on the pre-cut bracelets (Fig 3).

After they made their designs, they recorded messages, including "Hello trees, I love you and I love hugs," or "You are the earth and so am I." Then, they put on their own designs. When they hugged or touched the trees with their designs, they heard their recorded voice. Some of them became excited

and shouted. Other participants giggled. Many of them urged their friends to participate. After their interactions, the participants gave feedback about their experience. Most said they felt closer to the trees or at least had a positive experience.

Conclusion

The goal of *Huggable Nature* is to have participants reflect on their feelings about nature. By including easy to use arts and crafts materials and techniques, participants can comfortably get involved in the workshop. Whereas many other similar workshops focus on groups of people with similar abilities, the *Huggable Nature* workshop is open to all individuals regardless of their experience, age, income, or technical skill. Currently, participants can only interact with trees in limited interactions. In future workshops, we will add other objects in nature and other modes of interaction.

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AN AMORPHOUS IMAGE PROCESS

Kevin Sarmiento Navarro

This creative and constructive process is based on a different approach toward thinking, in admitting if the image to build expects to determine what reality is and what amorphous reality is, or to produce a series of "images" with a correlation into an amorphous concept.

Fig 1. The Saltropomorphous

Fig 2. Night morphous

Fig 3. Image Transformophous

"The Saltropomorphous" (The jump of an amorphous landscape), is the imaginative idea of a sub real abstraction of a linear moment of form, colour and volume; Beginning from the concept of an isolated landscape inside of a real or imaginary boundary of "amorphous space" that because of being in the light, generate a shadow or "mirror image" with opposite properties. Two ways to allow each an intermediate step to be an equilibrium state, and produce in a sense the "jump" of the amorphous body into its own unchangeable notions of time and space(s).

AN AMORPHOUS IMAGE PROCESS

This creative and constructive process is based on a different approach toward thinking, in admitting if the image to build expects to determine what reality is and what amorphous reality is, or to produce a series of "images" with a correlation into an amorphous concept. The possibilities are endless, because amorphous thinking in visual terms is an inextricably bound up with sensation and perception. In many ways, how we think is how we see and vice versa. The same mechanisms operated on both the perceptual and the intellectual level, so, these inevitably terms like concept, judgement and conclusion, have to be applied to the work of senses on the use of a method for an amorphous image creation.

Process art attitude may be direct as far as possible toward the perception of "image as such" and closer as possible toward a perception of "amorphous", to visualize a conception of boundary and form, a brewing scenario for an intuitive vision of an amorphous space, a lapse of time of constant flux where energy and information coming into existence, light and shadow, harmony, a form of animism, the unpredictable on the observer visual sense, the emptiness of absolute identity, an 'inherent existence' – perceived and thought to exist 'from their own side' exactly as it appear.

In the process of creating, the image environment has the constructive idea of "amorphous space", to create the capacity of finding different approaches, generating themes around space and time, thus springing the changes where the image shape is subdued by the external elements that make it.

Amorphous *thinking* in the form of amorphous images, will transform those amorphous spaces resembling a boundary that never exists inside of it; observer only will see a bit of an image that cause his senses to produce images that make visualize amorphous image shapes.

If the process undergoes a cycle, whether it becomes a larger space, or smaller, then it will have the same amount of image space each time it returns to a particular point. Nevertheless, the open flow of image event is another transfer mechanism, a quantity of image which is independent of any particular process.

For an amorphous image with a few space, the variations in the image parameters become larger than the image processed, and the assumptions of an image process is meaningless. It is an expression of the fact that over time differences in an image process, its place, and results tend to even out an image process which is isolated from the observer.

Therefore, An Amorphous Image Process has its own laws of construction, with problems representing the process of amorphous thinking in visual terms. Though, instead of being formulated the medium of image language, is embodied in visual terms the medium image and process form elaborated, a visual reasoning or visual language, an inquiry based on the constructive and creative process, the cognitive knowledge, instinct and intuition, to encourage and to explore the speculative and the experimental nature into the notions of image place, image space and image event.

AMORPHOUS IMAGE SPACE-RELATED EFFECT

When two amorphous images are in visual contact with each other, there will be a shapely between these unless or until this are in equilibrium. It is not a good idea to create an amorphous image space without any mirror image support. This is a conservation of an image connection. It may refer to the two ways that a closed space transferring to and from its surroundings, by the process of intuiting (or construing) an amorphous space. The real or imaginary boundary in an amorphous space of an image shape is determined by the image event of these two processes. The amount of an image place in a constant process cannot be greater than the space showed.

Seeing moving space as an image event, if a space moves in a forward direction and one, as a moving image on space, observer will never see the image reform. Images are "jumping" all the time, but never reforming. Therefore, the constant of any unique image place stage is zero. If an amorphous image process happens to have half-image face about quickly, there are two images stages, related by an image-reversal-symmetry, so the dimensionless image constant becomes the record of two images. That is the image for the whole space on any amorphous image. Basically, an amorphous image can not reach an absolute zero space.

Accordingly, images with large associated forms take long time to visualize. For an image of any complexity some of the realization in the amorphous image process could be a two-view image system. The image *viewed* through a first space, to excess image elimination, generating a mirror image which is

stored in a shape. The second process sorts the mirror image, which is then shaped in a quicker image to be visualized.

This alternative approach is to use a concise image form together with indirection spaces. This will reduce shape requirements and performance time. It is convenient to re-use a constant image space form used as in excess of space elimination. The previous space is reduce and convenient. There are two new images and deleting the excess of shape will keep a constant image space form programmed associate for a faster generated image.

In the development of an amorphous image process there is a similarity to the development of feeling from reason, of emotion from language. Emotion = image; language = process. Image shape comes about as the result in return action of two or more intellectual emotions; an amorphous image process occurs from the image impinged of two or more image processes.

Consequently, an amorphous image space represent the possibility of expressing a new image world, because it offer a brewing scenario of an intuitive vision, and during the lapse of the image process, it transform artistic intuitions without having to change images, only transforming it for the benefit of harmony.

Meanwhile most people cannot discover what matter about an amorphous image process and its space-related effect; I can consider what matter about it, as an original and authentic question for a research and experimentation on images transformation.

IMAGE TRANSFORMORPHOUS

An amorphous image process as the begins of an endless line of continuous transformation of an image place, a mirror image space for everyone image event, continuing without stopping, or being interrupted in space or time

References and Notes:

Image Theory

DIGITAL TECHNOLOGY, SOCIAL MEDIA AND EMERGING TRENDS IN FILM PRODUCTION METHODOLOGIES

JODI NELSON

I am interested primarily in how the new paradigm shifts in digital technology and the democratization of the filmmaking process allow filmmakers to connect to an 'expert' global niche audience with more immediacy through the internet, engaging virtual communities, crowd funding and fan building initiatives and a variety of social media landscapes.

DIGITAL TECHNOLOGY, SOCIAL MEDIA AND EMERGING TRENDS IN FILM PRODUCTION METHODOLOGIES

With the new paradigm shifts in the film industry, cheap digital technology and the democratization of the filmmaking process, filmmakers now can connect to an 'expert' global, niche audience with more immediacy through the internet; engaging virtual communities, utilizing crowd funding support and fan-building initiatives through a variety of social media landscapes.

NEW PRACTICE METHODOLOGIES

My own work has revolved around two kinds of practice; the first, a traditional methodology invented by the Hollywood studios, which, from a small independent filmmaker stand point proved futile at best. With little to no resources to pull off a production like the big studios do, with their huge studio budgets, political backing, global media support and accounting practices, today it seems a waste to pursue an independent film production in this manner. The second practice is participatory filmmaking. This method enables others to articulate their experiences through my artistic vision via cheap digital technology and social media. It is through this process, they have just as much (or little) control as possible as the filmmaker. But, why you ask would filmmakers want that?

"What defines the documentary genre is also at the root of its limitations...here, I shall call for a different perspective on documentary form: not with a view to discussing what documentary is, but to make some suggestions of what it could be." (Knudsen, p. 109)

In creating the participatory film project and case study entitled: *Single Girl in a Virtual World: What Does a 21st Century Feminist Look Like* my practice aims to engage multiple social media communities such as; Facebook, Twitter, MySpace, Wordpress, YouTube, Kickstarter and IndieGoGo and ask people to participate in the film project itself with a sense of creative input. During the production, I have asked the communities to read the film site's blog, watch podcasts, comment on news feeds and follow me on Twitter. These efforts are the practicalities necessary for audiences to participate in the film project itself – either creatively, financially or both.

The project's content has begun to emerge and appears in its raw shape as a video diary of sorts, with participants weighing in on the topic of the week, freely giving their insights, thoughts and feedback through the multiple social networks – either in video, textural or both. For the filmmaker, this serves as a rich valley of resources that can be integrated in the film's narrative. However, when attempting to construct a narrative thread by gathering content in this way, it brings up many potential problems. "Recording a video diary, if you don't want it to become public, is a risk; perhaps more so than a written diary, because the medium of video implies a mass audience." (Rothwell, p. 154)

One of the exciting things about these new possibilities for filmmakers and audiences alike, despite the potential ethical pitfalls, is the creative flow of information, access to resources and sharing of content. Independent filmmakers who are limited on budget, time and production technologies can gain a tremendous amount of quality production value by sourcing content in this way.

Whichever way they came into the community, the goal is to keep them there, involve them in the production efforts and keep them just as excited as you are about the project. And to do that, there must be a transparency between the creator and the fan-base participating in the project itself. This covers a multitude of scenarios such as; copyright issues, ethical boundaries, life-rights, video-audio rights and original content ownership. By simply asking for their permission seems to be fair enough for their participation. "Key to the success of that relationship is that it demands a responsibility for the consequences of the filmmaking that go beyond the film itself." (Rothwell, p. 155)

When I started this case study, I had an overall fear of intellectual property thievery; which stemmed from my traditional, Hollywood studio practice experience. "Rather than oppose this "illegal activity," we welcomed the pirating and began distribution directly to the pirates at production cost value." (Blagrove, Jr., p. 176) Delightfully, once I began my practice in this participatory way, I could begin to see it actually had many benefits of being 'stolen' and shared virally. The more I blogged and podcasted calls-to-action the more activity my social networks would see, more members would sign up for my news feed, follow me on Twitter, 'Like' me on the *Facebook* page, and read my *Wordpress* blog. Then of course, the whole idea of this process was once they were fans within my social networks, they would participate and share content I could then use freely in my film.

VIRTUAL AUDIENCES

"The on-going conversation with your audience can be a source of inspiration, motivation and ideas. It's this powerful new link with the audience that the old power players don't understand." (Kirsner, p.4) I can no longer imagine going back to a traditional filmmaking practice hoping to make a modest living, or even attempt to have a sustainable career by playing by the old rules of the studio production and delivery system. The windows of financing and distribution are just to complex, too expensive and too long of a cycle to have any hope of quick returns on investments or to gain access to huge marketing budgets for global exposure of film product.

"By empowering ordinary people to speak as experts, they question the basic assumption of dominant ideology, that only those already in power, those who have a stake in defending the status quo, are entitled to speak as if they know something" (Juhasz, p.304). It is with this notion that is measuring how social media, digital technology, alternative production methodologies and various new delivery strategies

are providing information on the impact of the film's message and its creative process. Does this mean the film is suitable for a theatrical release?

My practice is showing that audience participation does, in fact, impact both the audience and the filmmaker inherently by creating art in this way. Instead of outsourcing functionalities to other resources in a traditional sense, I had to become an all-encompassing expert. But, one now asks the question - who is in control? Who is the 'auteur' with the vision? What happens if the film's narrative thread goes off-track? Who are the performers and what ethical considerations are at stake?

How can I draw an audience into the reality of the situations being dramatized, "to *authenticate the fictionalization*?'…what are we to make of films where real people apparently 'play themselves' (or variations on themselves), or hybrids where a combination of actors and non-actors improvise in a documentary-like scenario?" (Ward, pg. 192) It is the originator's role to ensure that the participatory environment also abides by the community rules of transparency, honesty and attributes of authentic form. "Notions of performance in documentary are therefore potentially controversial – accusations of people 'not being themselves' or 'playacting' are rife, and are deemed to be a central problematic for a film's documentary status or credentials." (Ward, p. 192) Otherwise, not seeing these participants in person; looking them in the eye – how is the filmmaker to know what is factual or fictitious?

A greater embrace of innovation and experimentation in this method is needed in leveraging these projects with the ability to fail without showing loss of value. Technological knowledge and new creative approaches to build communities and better business models that filmmakers and artists alike are needed. It is possible to achieve a quality film production with inherent.

By engaging in filmmaking practices in these fundamental ways, a shift of power away from the larger powers of the studios, and back into the hands of the creative filmmakers and their loyal fans should be embraced, not feared. "The question for makers, consumers and scholars of moving images are what distinguishes documentary online from documentary made for other channels, and whether the internet has any distinct, useful or unique characteristics that offer documentary anything more than just another means of distribution." (Birchall, p. 279) A process of creative flow, execution and community outreach is a necessary part of this practice and to maintain a sense of shared community.

TECHNOLOGICAL SHIFT

A profound new shift in mindset was needed to set off on a new course of practice; even though outcomes are uncertain. "First, in organizing geographically diverse individuals around a common interest in watching or making documentaries, there are new forms of community; second, new means of creation and distribution…to seek to change people's minds or reinforce a viewpoint; third, we have increased access to 'dirty reality' in the form of footage of current events and violent conflict; and fourth, video diaries and other moving images give us an increased range of intimate access to the lives of other people." (Birchall, pg. 179) Differences in workflow patterns, a means of gathering content, and a creative approach within high production value considerations, compromises and technical limitations stretch limits on what is possible.

Thousands of entries, news feed comments, tweets, sharing of videos and user-generated content (UGC) from YouTube and other rich video sites by community members fill the coffers of content. Skype interviews became a relevant resource of production activity for capturing remote interviews, even though the media is still not high value. During this process, I discovered because I was developing a rich social network, people I knew in my personal social circles; friends, family, co-workers, business associates, etc. suddenly became keenly aware of the project I was making and were eager, or at least willing when pressed, to participate in the project.

User generated content (UGC) has been the most pervasive amount of content, shared and streamed by my community members so others can comment, share and watch within the framework of the film's websites. "By contrast, the easy availability of material to work with online is matched by the ease of remixing and redistributing." (Birchall, p. 280) This aids the independent filmmaker who need open-source, archival clips in order to create a film narrative. There are ethical and intellectual rights considerations, however that must be mentioned.

It is also important to note, because technology is cheap, social media pervasive and artistic democracy entering the creative fold, doesn't mean the value of the art or the filmmaker behind its creation should be valued any less. "People made information about themselves available on the internet in such a way that theoretically anyone could see it, but in practice few did." (Birchall, p. 281) The reality of the new entrepreneurial filmmaker is not only making just a film project, but rather building a community of like-minded people who want to support a film project and future projects – in essence building a sustainable brand. This takes an inordinate amount of time, effort, management and technical trouble-shooting. Not to mention, technological requirements, necessary to connect all of these networks in a functional and significant way - once they are functional and put in motion, should self-perpetuate. This is an ongoing resource of time and labor that must be considered.

The benefits in making art in this way far exceed the amount of time and effort it takes to build an online brand and identity. Other filmmakers too, are building sites with the intention of creating a sustainable business model, as well as attracting a built-in fan base that can't be bought with traditional advertising and press campaigns by the larger studios. The case study of *Four-Eyed Monsters* by Arin Crumley was a forerunner for this social media movement. Films are now being made everywhere and there are audiences out there who are looking for them. Audiences, however, are fickle, but entrepreneurial filmmakers have a distinct advantage over the big studios by creating art that is meaningful and creatively autonomous, while building a loyal fan base, which will enable the artist to self-sustain.

PARTICIPATION

Does the 'audience' participating in the early stages of a creation raise expectations for the audience? What about for the filmmaker? Does it impact the artist's methodology of creation itself?

Participation between audience and filmmaker enables each to develop a relationship that goes deeper than merely one from a consumer or isolated artist's point of view. It becomes a two-way process; although being auteur and the creator of the project, driving the subject matter, its pacing and narrative criteria, provided an overall control and direction for the project. It is important to note, that

its subject or method itself wasn't diminished in value, nor did it have the perception of being an amateur product. In fact, it's been the opposite, which emphasized stronger value for both the filmmaker and the project being created with the audience. The process has allowed a more authentic, accessible and transparent relationship to develop amongst the community, which makes the film's subject, and experience, more tangible. Having the film aimed specifically towards a key, niche audience, seems to make them keen to be involved and stay invested for future projects. It is the script or narrative and production value which must be the best possible so there is a perception of professionalism throughout the production.

The community does, in fact, communicate amongst themselves and will certainly 'police' any activity that does not acquiesce within the group. This 'policing' by the community assures transparency, trust, authenticity and protection against spam and unwanted advantages a filmmaker or other community member may seek to squeeze information and/or money out of its community for personal gain. "The immediacy of new online forms should not be mistaken for a lack of mediation…authenticity is highly prized by audiences." (Birchall p. 282-283)

There are certain sacrifices that must be made outside of the normal filmmaking agenda; such as engagement in crowd sourcing campaigns, new technological learning curves and social media training, traditionally hired out (i.e. media partners, technology programmers, sales/fulfilment houses, marketing firms) must be learned. There are many perceived benefits, as well as challenges in this new era of digital technology and social marketing tools that are advantageous for both the filmmaker and their audiences.

Measurable changes in production practices must also be adhered to by utilizing these online tools and cheaper production technology. How does this change the storytelling process?

Technological considerations must be made for the lack of financing and a large crew. The entrepreneurial filmmaker is now essentially a 'one person crew' where every single shot, direction, post-production/ editing, writing, producing, marketing and digital online development and management can be achieved with the sole artist. Aesthetic compromises are also at stake. However, it is worth noting that with small cinema, mobile and online video distribution choices that are growing every day, there are many outlets of distribution that do not require a 35mm or HD production aesthetic to tell a story. Ultimately, the script is still at the heart of every film – it is only the methodology and system of delivery that has changed. "The film business remains a single product industry. The product may be available on many different platforms, but it is still the same thing." (Hope, 2010)

With the attraction of crowd funding sites such as, Kickstarter and IndieGogo, financial resources are now available for filmmakers, who don't have access to rich uncles, mix with the Hollywood investor crowd, or can fund their projects across a mass of credit cards. "Expectations have changed considerably, probably completely. Buyers and audiences behaviors are different, those that still remain that is. Products are valued at different levels. We live in a new world. Our strategies must change with it." (Hope, 2010) The production and fundraising of a film in this style is beginning to produce a more valuable, sustainable, niche-market product and is changing the traditional market structure of distribution and delivery for independent filmmakers outside of the Hollywood system. It is also providing a platform for artists in countries without the support of film communities, government subsidies or fundraising activities. This enables a global access to films and stories that might otherwise never be told. "On the face of it, *Kickstarter* is pretty harmless, and I think the founder's intentions are good. It's great that people can raise money for cool things from the crowd. It's hard to raise money, especially for the arts, and

there have always been a lot of gatekeepers in the way. Now, the people can decide what gets funded." (Newman, 2011)

Still, further questions for scholarly and industry debate continues. Will it be profitable? How can a filmmaker, who makes a film online for free ever hope to see a profit, much less sustainability? For Hollywood, what affects the bottom-line ultimately, is the question they [studios] are waiting to see emerge profitable.

CONCLUSION

If it is profitable, how will this change the open democracy of the 'wild west' we see now in this new trend? Will it continue to be available and 'free' to all or be monopolised, packaged and sold as IPO to the highest bidder forcing filmmakers to go through yet another middleman to make their films? Will these online, participatory, transmedia interactions incentivize the audience to buy the finished product and any subsequent ancillary products associated with the creative product? What about future projects the filmmaker produces? Can there be added sustainability in this model? These questions and more that arise through research and practice will continue to merit further question and research. With arts funding continuing to dwindle, such as the reduction in grants and lottery funding, filmmakers have turned to crowd funding to finance their livelihoods – but will the audiences enable that to become a reality, or will the studio systems in place prevail?

"Creators, Distributors, and Marketers have accepted a dividing line between art and commerce, between content and marketing. By not engaging the filmmakers in how to use marketing tools within their narrative and how to bring narrative techniques to the marketing, we diminish the discovery and promotional potential of each film." (Hope, 2011) On a larger scale, projects in this realm will emerge answering the question of how this new methodology of filmmaking relates to a wider economic, cultural, environmental and social scale.

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AESTHETICS OF VOICE

Norie Neumark

This paper introduces key themes in relation to vocal aesthetics: voice as intersubjective, paradoxical, uncanny, intimate. It asks how voice is determined by and determining of spatial relationships and the way this affects memory and place. The paper explores specific examples from media arts to explore the performativity of voice and an 'authenticity effect' of media voices.

A number of key themes reverberate through the aesthetics of voice: paradox, uncanniness, intimacy, intersubjectivity, performativity, and memory and place. I'll begin with a brief introduction to these themes, turn next to modalities and techniques of voice in media art, and finally end with a discussion of voice's 'authenticity effect.'

Theoretical Introduction

Media artists have long been exploring the potentials and complexities of electronically mediated voice. From Yoko Ono screaming and coughing; to Alvin Lucier sitting and stuttering in his room; to Janet Cardiff leaving the room and the building to take us on sound walks; to Susan Philipsz with her locational singing – to name but a very few. Despite the richness of media art and the resounding way that sound studies burst into prominence in the 90s, vocal aesthetics has remained rather sub voce. And, although it has been several decades since Roland Barthes first invited attention with his concept of "grain of the voice," strangely, little general theoretical work on voice followed.

There was of course Derrida's significant work in the seventies, when he deconstructed the "self-presence, immediacy, identity, interiority" of vocal speech. [1] While this moved past invocations of voice as true, unmediated and authentic, the attention to vocal speech in relation to writing may well have played into a sort of binary, which inadvertently diverted theoretical attention. In recent years, however, critical writing has sidestepped such a binary, attending instead to an ambiguity of voice, a supplementarity, which resonate with Derridean concepts and draw out potentials of voice on which Derrida himself did not focus.

Key figures in this critical revival are Adriana Cavarero, Mladen Dolar, and Steven Connor, who share a sense of the complexity, the uncanniness, the difference and the paradox of voice. They recognise the in-between quality of voice – hinging between the physical (sonorous) and non-physical (signifying). [2] [3] As Steven Shaviro explains, in relation to Dolar's work: [4]

"Dollar... argues and demonstrates that the phenomenon of Voice is in fact far more uncanny and slippery, and already inclusive of difference, than Derrida gives it credit for. The voice always stands in between: in between body and language, in between biology and culture, in between inside and outside, in between subject and Other.... the voice is both what links these opposed categories together, what is common to both of them, without belonging to either." [5]

In its uncanniness – in Freud's sense of unheimlich or unhomely – voice carries a trace of its 'home,' the body of the speaker, but leaves that home to perform speaking. Steven Connor is particularly intrigued by the uncanny voice of the double; he works with the doppelganger figure of the ventriloquist's speech because for him it evokes "the imaginary production of a secondary body, a body double: a 'voice-body.'" [6] [7]

The doubling of voice undoes a 'unitary' subject – not just in relation to an individual subject, but it also disturbs a separation of two 'unitary' subjects. Here the work of Adriana Cavarero is particularly relevant, empahisizing the relationality of voice, in order, as she says, to prise apart any 'unitary' quality in Derrida's figure of Speech. Cavarero engages with the alterity, relationality, and intersubjectivity of voice in order to get past the presence, which rightly, in her view, worried Derrida. [8] Relationality also resonates with the spatial relationship that voice creates, a shared space, a relational space, a doubled space – to which I'll turn next.

Spatiality: Voice, Memory, and Place

While it's a basic understanding within sound studies that sound operates not only through time but also in space – performatively in/forming the space it traverses – once again too little attention has been payed to how this plays out with voice in particular. Just as voice can be thought as a hinge between the sonorous and signifying, it also hinges between bodies and the spaces they inhabit: "...bend[ing] and connect[ing] rather than dividing.... facilitat[ing] openings and intertwinings (of doors, concepts, subjects, experiences, materials) rather than discriminating one side or one thing from another." [9] And so voice hinges bodies and spaces, mediated and personal memory, memory and place; it connects speaking and listening bodies physically and affectively with each other as well as/through the spaces they share.

To explore this, I'll discuss two works at Cockatoo Island, Sydney – a location resonant with its history as a prison and an industrial site and now an art and event site, tourist destination and camping ground. The first work is Susan Philipsz' "The Internationale," originally sited in an underpass in Ljubljana, during the 1999 European Biennial, Manifesta 3. The work was restaged in Cockatoo Island for the 2008 Biennale of Sydney ('Revolutions - Forms that Turn') in Turbine Hall – a large, abandoned post-industrial space. This is one of those works that takes you by surprise: What is the work? What is it doing here? Almost instantly, however, it seems completely sensible and at home. Yet, uncannily, of course, not at home, and thus disturbing our own location in the space. Philipsz' singing of the classic workers' anthem taps into the Hall's physical memory, echoing through the space and through us. We feel ourselves differently in that space, sensing, somehow remembering its industrial history, as her frail, obviously recorded voice re-inhabits the space as if with workers' memories – as if those memories haunt her voice, as if those memories haunt those enormous spaces, as if we overhear it in that space – a private, intimate voice wafting on that memory.

As always, Philipsz sings in a lone (lonely?), unaccompanied, palpably untrained voice – thin but reverberant. Here, it is an electronic voice emerging from one lone old speaker, calling you into the space as you approach. The effect of Philipz' recorded voice, evidently with little or no 'art' or 'professsional' postproduction and no deployment of sophisticated speakers, is almost like an old radio abandoned somewhere in the Hall.

"When I make the recordings, it is important to keep the breaths and pauses in between, so that the song sounds natural and intimate. The idea is that when you hear a voice taken out of context in this way, your own sense of self becomes heightened while at the same time, you begin to experience your surroundings in a new way." [10]

For Philipsz this sort of production gives listeners the possibility to imagine it as their own voice. [11] For some it is a melancholy lament for revolutionary workers' hopes, for some it is exposed, fragile and brave, for still others, stirring and sad... Like any "cover" version, Philipsz is inhabited by and inhabits this song, bringing her own emotional response to it, but leaving us room to have our own.

Another, very different work – though like Philipsz', complex and ambiguous thanks to the voicing as well as being strangely in and out of place – is Richard Grayson's work, Messiah, in the 2010 Sydney Biennale. Messiah is located in one of Cockatoo Island's long tunnels – a transitional, hinging space, moving from the expansive and bright outside into a dark, intense, echoic domain. Off that tunnel, in a small low ceilinged dark room, plays Grayson's sound/video work.

Richard Grayson, who is interested in belief systems and the way that he sees Theology taking over from enlightenment rationalism, had emailed The Midnight Amblers, a group of musicians from Erskinville, Sydney, to rewrite and perform Handel's Messiah as country music – revoicing and rescoring it so that we could hear the words anew. He asked the band to perform the work in a back yard, recording it with various DIY video cameras. When Grayson edited in Berlin, the sync turned out to be a bit off. He embraced this 'failure,' which served well to "foreground the artifice," He wanted to "bring back the weirdness and the spookiness... of something we take in a way as granted." [12] In its room strewn bizarrely with classic country and western hay bales, the out-of-sync mode – where sound does not seamlessly sub-serve the visual – add to the disturbance and heightened sense of awareness of the materiality of each sense. Itself dislocated from concert hall to suburban back yard to funky Berlin and now to this 'art' space, Grayson's Messiah is dislocating – mediating and enhancing our sense of the layered memory of the work and of this place.

Performativity

In both of these works the voice is not just performing, it is performative – performatively bringing forth memory of the place in which we find ourselves. The concept of performativity helps to take us beyond voice as straightforward performance or as the emission from some fixed unitary subject. Performativity is suggestive of the way voices DO and create, the way they change something rather that present or represent. Recalling Cavarero's attention to the relationality of voice, I would suggest that voice performatively evokes this relationality, bringing it into being rather than expressing it. What I'd like to emphasize here is the complicated and intimate intersubjective relations, which are staged as performative electronic voices lure the other, across space, even across the familiar space of the Internet.

The example I'll present is the networked performance of visual artist Barbara Campbell. The title of her durational project, 1001 nights cast, [13] played with the Tales from 1001 Nights (The Arabian Nights) and with the fact that the net cast of this performance involved a webcast and a cast of over two hundred writers, who submitted their stories online for Barbara to perform each night. When you logged on to her evening performance, you saw only her mouth, giving prominence to the voicing, which story-telling involves. Framed by a story of a bereft bride wandering the world and greeted by strangers who give her stories "to heal her heart," the webcast opened with a view of Barbara's tongue, pierced and

wounded – like the heart of the bride – with a numbered tongue stud that signaled the number of the day/performance. I was fascinated by that mouth and tongue – a bit like a Chinese acupuncturist, searching it for deeper meanings, to see what it told about her, as it told her/other's stories. I asked Campbell about the choice to frame her mouth and foreground her tongue, in a conversation we had for Maria Miranda's forthcoming book, Unsitely Aesthetics. We discussed the mouth as visceral evidence of the physicality of the storytelling, and the importance of voice.

"Barbara Campbell: Of course the other thing about my tongue was that it had the tongue stud in it which had the number of that night … I previously didn't have any kind of piercing…. that was another kind of reminder to me that I was carrying the project around or that it was inhabiting me or I was in-habiting it because to have a piercing in your tongue is very much like carrying an open wound because the tongue with all those enzymes from the saliva is always trying to heal itself…" [14]

This pierced and wounded tongue not only performed the stories but also performatively brought forth an intimate and wounded affective space that inhabited us and that we inhabited together during the ephemeral nine minutes performance.

Modalities and Techniques of Voice

Technique is somewhat like performativity – it shapes the object and technologies to which it ostensibly responds. Elsewhere I have discussed a number of bodily techniques or habits that shape voices as well as various modes of voice that throw the normal voice into relief – from the broken and stuttering voice to the scream.* Here I'll focus on the 'ground zero' of voice, breath.

Breathing is both a technique that enables and shapes voice as well as a mode in the whispered or breathy voice. As an example, I'll reference my own collaborative artwork. For a number of years Maria Miranda, and I have been working on a project called Talking about the Weather. In this work, we've been collecting breath, beginning with performative encounters with strangers on the streets. The pro-ject was animated by a desire to get the world's biggest collection of breath and use it to blow back global warming.

As Tim Flannery said in a few poetic lines, which were the inspiration – literally and metaphorically – for this project, the intimacy of breath is not just between people but also between people and the planet:

"The air you just exhaled has already spread far and wide. The CO_2 from a breath last week may now be feeding a plant on a distant continent, or plankton in a frozen sea. In a matter of months all of the CO_2 you just exhaled will have dispersed around the planet." [15]

Breath is a particularly intimate and alluring mode of voice. Like full-throated voice, of which it is an es-sential condition and part, breath is compelling and intriguing in that it is both bodily and not – it starts in one body and then connects to and communicates with another. I should emphasize that I am not talking here about the commodified intimacy of TV ads that have become all too familiar. Rather the performative intimacy and breath that I am interested in and that I hear in a range of artists works, is more strange and in-between. It is a way of speaking about a shared affective, inter-corporeal space that is beyond that of two separate unitary subjectivities. Following Alfred North Whitehead's idea that "'the body is only a peculiarly intimate bit of the world,'" cultural geographer Sarah Whatmore under-stands the way in which "the corporeality of the body and of the world fold through each other." [16]

Breath, in its affective movement, performatively calls forth the space around us – it is "the very engagement between body and world from which these feelings arise." [17]

Returning to the streets where we collected breath... With the weather feeling so frightening when we started this work in 2006, we needed to talk about it – obsessively, incessantly – to connect with people through this talk. We were asking people to contribute the breath they would use to talk about the weather to our project. The project felt to us like a very intimate communication in that we were asking people to contribute something personal and vital. We asked first for a minute of their time and then for their breath. We were calling upon and calling forth their generosity – and doing it in the middle of their everyday life, going somewhere on the street or in the park – we were inviting strangers to enter an imaginative, performative zone with us.

As you can imagine, gathering the world's largest collection of breath is a big task and we realized we needed to extend our search as widely as possible, so in 2008 we took it into Second Life. Not having played in such worlds as a gamer, my experience there was unexpected. While at first appearance, and certainly if you haven't been "in world," Second Life may look like a familiar cartoon world, but this fails to account for the strangely magical, compelling and intense feeling of being there, including an intimacy with avatars, one's own, and others'. While preparing for the breath collection events, I wandered around Second Life and noticed its voice activation mode. However after one attempt, I quickly realised that I did not want to use it, because it actually broke the intimacy of the connections between me and my avatar and others' avatars. That is, voice activation, my own voice and others', took me out of the world. In a sense, this is obvious – the avatar has its own specific materiality and therefore needs its own voice. The implication of this is that in order not to break the intimacy of the Second Life experience, what is needed is either a silent voice, full of potential, but not actualised, or a particular voice for your avatar, that you choose or make, like all its other body parts and clothing. That voice would speak from the avatar's 'embodiment,' not 'yours', and thus maintain the intimacy. Thus, in our own work in Second Life, which we experienced as a public place in which to collect breath, we chose to work with the specificity of avatars' connections and still have the affect of voice by using only breath rather than spoken word.

Authenticity Effect

To end, I'll briefly discuss what I call an 'authenticity effect' of voice. Although in the heyday of postmodernism and in the early days of the Internet, artists and everyday users seemed to revel in the disruption of identity and authenticity, now with social media and YouTube, there has been a prevalence of direct address and 'at home' videos that many read as a desire for and return to authenticity. What I sense in this, however, is a performative voice, and, as Cavarero would remind us, when voice works performatively, it is not necessarily a call to (or from) essentialism or authenticity. What we have here instead, I suggest, is voice performatively evoking authenticity – an authenticity effect.

Contemporary artist TV Moore provides my final example here. Timothy Vernon Moore delightfully invokes the network between subject and machine as he goes by his very own, proper name's initials, TV – 'no pun intended', as he says. In his work, we can find stunning examples of what Nicolas Bourriaud insightfully understood as 'postproduction' (Postproduction, 2002) or what Mark Amerika inspiringly explores as remix culture (REMIXTHEBOOK 2011). After months of playing around in the Australian Broadcasting Corporations archives, TV Moore found a documentary about marginal people, earlier recog-

nised as 'vagrants' or hobos. In the 60s, they were a different sort of nonconformist or outsider or prototypical artist-- alienated youth outside 'normal' structures of work, family, home. What TV Moore did for the work "The Forgotten Man" (2006) was perform the script of all the people in the documentary, from the snooty bureaucrats to the youth themselves to the ABC narrator. He re-performed their words, lip-syncing with amazing closeness. And so you watch this video in wonder and wonderment... whose voice are you listening to, why do they all have the 'same' voice? Is it the same? The lip sync is so neat, so 'authentic' yet...

And then you wonder, what has become of these characters, now ventriloquized, haunted, inhabited by TV Moore – or is it he that is inhabited by them? 'Inhabiting' is one of the key ways that Bourriaud understands the working of Postproduction artists.

"Artists actively inhabit cultural and social forms.… By refilming a movie shot by shot, we represent something other than what was dealt with in the original work. We show the time that has passed, but above all we manifest a capacity to evolve among signs, to inhabit them." [18]

TV Moore voices an inhabiting of the forgotten man and all who discoursed around him, to mediate them and our memory of them, but also to displace them and himself. In this way, TV Moore's work not only provokes wonder – about the forgotten man, about history, about documentary and about authenticity – but also provides a stunning final example of the intimate, uncanny and paradoxical aesthetic potentials of voice.

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SKETCHES OF AN INTERDISCIPLINARY PRACTICE

Kim Newall & CHARLES WALKER

Fig 1. Kim Newall, "Roosting" (2011), interactive public installation, The Edge theatre, Auckland.
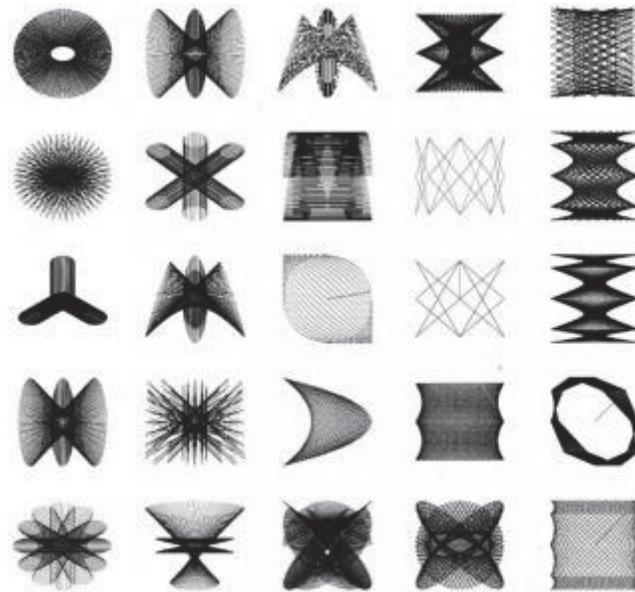
Fig 2. Kim Newall, "Circle Hacking", (1989).
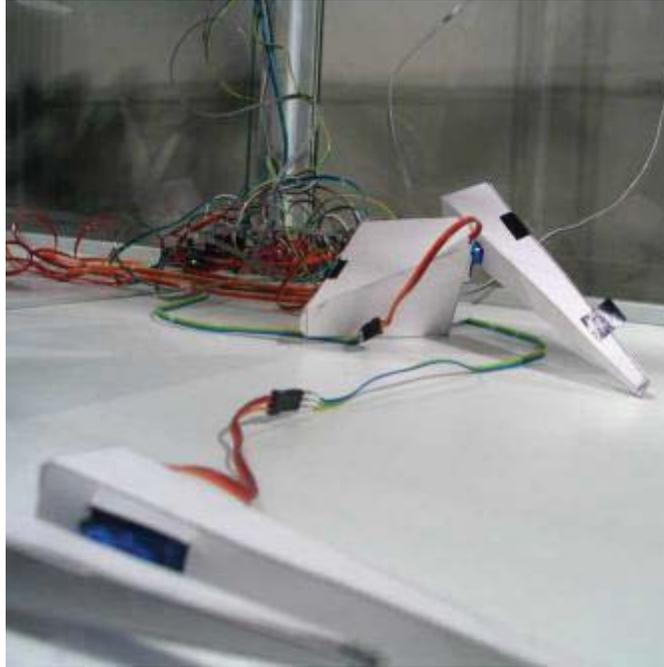
Fig 3. Kim Newall, "Evolutionary Experiments" (2010), interactive public installation, MIC gallery, Auckland.

Introduction

This paper by Kim Newall and Charles Walker presents part of a larger, practice-led research project to develop a new understanding of sketching as a methodology for creative practice in the post-digital age. It will be presented through a reflective critique of the researchers' own hybrid, interactive, public performance-based practice.

The presentation will explore the concept and nature of sketching as a methodology utilizing a variety of media and operating across normative disciplinary boundaries. The research involves defining notions of the sketch as it relates to historical and contemporary practices; speculative design, documentation and critique of methods for sketching in differing media, material formats and contexts, and; the critical conception, development, application, execution and performance of sketching in the context of the researcher's own creative practice. The work draws on recent research in mathematics, physical computing and cognitive science to suggest that sketching shares with these disciplines properties that can externalize cognitive processes or reveal categories of thinking. [1] [2] Through linking sound and video-based work, hacking, physical modeling and archival material with traditional drawing techniques, the presentation itself takes the form of a real-time, improvised sketch. The accumulation of such sketches (archived in "sketchbooks"), in turn, informs further conversations between differing modes of knowledge and expression.

Defining Sketching

Definitions and descriptions of sketching have remained relatively constant throughout history and have emphasized its "speedy, exploratory, spontaneous, abbreviated, unfinished, indeterminate, fiery, contingent and/or disordered qualities often characterized by loss of control or openness to the unexpected." Frederik Stjernfelt notes that elements within modern art have can also be seen to have focused on certain features of the sketch, "to isolate them, cultivate them and see them as just as essential – or even more so – than the finished work of art." [4] In design disciplines, sketching is commonly seen as an interim activity; making images to assist in the creation of something more real.

The sketch has also been widely understood as an interim stage in the design process in different disciplines. In design-based or visuo-spatial processes, such as architecture and product design, sketching is frequently defined as "the making of images used to assist … in the design of something else." [5] It is important to note here that, in such domains, the terms 'drawing' and 'sketching' can overlap in meaning and sometimes can be interchangeable. For example, Eames, suggests that "the thinking space that you move to during the working process is drawing." [6]

Yet, while Eames suggests that "drawing provides an essential means of prodding and probing, doing and undoing, glimpsing and maybe seeing and experiencing reality and virtuality", he also makes a distinction between the "high and low focus thinking" that drawing facilitates. [7] High focus relates to logical and analytical thinking. However, Eames low-focus thinking is characterized by "loss of control, creative fancy and the ability to be receptive to the unexpected or fantastic" – a description that suggests an activity that others would recognize as sketching.

Current reading has also highlighted how some of key concepts and practices of sketching have recently been adopted by or transferred to different media.

Deanna Petheridge, for example, notes that while sketches are often characterized by medium: "a musical, literary, a clay, or an oil paint", other disciplines such as mathematics, philosophy and science have also appropriated the idea of the sketch. [8] In recent years sketching has also been of particular interest to cognitive psychology, in as much as mental states and sketching "share certain properties which are imprecise, ambiguous fluid, amorphous, indeterminate etc and can reveal the thought process or externalize the cognitive" thus linking looking and thinking. [9]

Others have also used the duality of internality (i.e. mental) or externality (i.e. physical) in studies of creative practices or processes. [10] Eames similarly sees the sketch as a way of externalizing the thinking process "... putting down an idea before it floats away – or materializing an idea." [11] Bilda, Gero, & Purcell have suggested that, for the expert artist, 'externalizing' the idea may not be necessary and that the process happens internally. [12] Scientific studies on sketching (for example [13]) have compared differences between the EEG brain signals of trained and non-trained artists. Anderson & Helstrup have studied the effectiveness of mental imagery with and without drawing support (perceptual assistance) in the visual synthesis. [14]

For Simon Downs, such activity is a "two way process" that "oscillates between seeing, thinking, remembering and imagining, controlling and being controlled as the image emerges." [15] This suggests that process and product may continuously and simultaneously shift in the course of making

Defining Creative Practice

A creative practice is defined by continual evolution and change. There are many ways that an established practice can be contextualized. Reflecting upon the practice reveals that there is a method that has been employed from the start and that this method can be defined as sketching.

In Newall's practice both real and traditional media defined as analog and digital media (including computers) have developed together. The process of digital has informed the process of the analog media. While originally seen as separate; over the years they are emerging into a new hybrid space. Sketching has played a pivotal role in the emergence of this space.

The traditional analog media employed include paper, card, pen paint, watercolour, tape The digital media used include, computers, programming, microcontrollers, projection, video and electronics. Both these media domains however are constantly being augmented for different sketches to include music videos, video games, public interactive installations, VJing, live audio/visual shows, theatre shows, art gallery installations, and street art. Some of the above are formal finished works; others are works in progress that are always changing and are not seen as a piece of work. Often without a title they might happen spontaneously, in casual acts such as street art stickers.

Fundementals

Some fundamental methods were established in the early period of the practice that still drive the current work. In the 1980s, with the advent of the microcomputer the availability of the computer at home for the non-professional provided the opportunity for anyone to to experiment with computers and programming - in effect, to become a 'programmer'.

The low storage capabilities of Newall's first computers forced him to develop programming skills by working around limitation. Using what was available, with limited but evolving skills and knowledge, explorating the possibilities and gaining more knowledge and skills. In this process, Newall developed the capability we here call sketching, in which the sketch is a product or artifact in itself.

From following simple examples the practice developed to produce very simple programs that made simple drawings on green and black screens. When the computer was turned off the drawings were no longer there. They could only be reproduced from memory and in this process they did not always come out the same. These sketches were a set of commands or instructions that were executed in a liner fashion however having a visual, graphic outcome was very important. The simplicity and naivety of these 'sketches' became a defining characteristic of his practice and the basis of a new 'non-expert' expertise.

In the 1990s the Graphic User Interface (GUI) allowed computers to be used more efficiently by non-programmers. Examples of this commercial software include Adobe PhotoShop and Alias/Wavefront Maya. In recent years open source software, such as "Processing" and "Openframeworks" have again made programming accessible for creative and hobbyist enthusiasts, and has enabled programs to be sketchable.

A similar understanding of process has informed the design of a method of sketching to be explored with computer code. One result was *Processing*, a software program developed to encourage artists and designers to use computer programming as a means to create work (processing.org). The creators

of *Processing,* Ben Fry and Casey Reas, named the files that are created by the program, *sketches*, a clear signal that enabled artists and designers to relate to programming through techniques they were familiar with. The idea being that the computer program can be treated like a sketch; as something that is malleable and that can be pushed and pulled like clay, or drawn and erased like pencil. This notion that code can be put down as if by impulse, as a 'what if I do this?' kind of operation, suggests that the program does not need to be 'designed' top down, then 'executed' to perform a specific action or set of actions. Rather, programming can be used with a bottom-up approach, as tool for exploring or discovering, analogous to what happens in traditional forms of sketching.

Processing is a designed platform upon which the sketch may be made, performed or take place. It hides details that the sketcher does not need to know about. Technical requirements are minimal, so the non-technical user does not get stalled by having to deal with technology. The intention is to approximate the more familiar or 'natural' relationship of paper and pencil.

A similar concept - based on *Processing* and aimed at artists and designers rather than technical people - informs the *Arduino* platform - an open-source electronics prototyping system based on a few basic, flexible, easy-to-use components, including the microcontroller that can be programmed from an *Arduino* program language.

The tools that have been developed over the years that have allowed the non-expert access to technology, have enabled Newall to use these tools for sketching. Fostering an ability to try things out with fluidity and intuition without being hindered by the complexity of technology.

Circle Hacking

Circle hacking is another example of digital sketching. It began by using an example in a computer manual on how to draw a circle in the middle of the screen. By changing the numbers in the equations to see what would result without knowing what was happening mathematically. The images were 'Spirograph' like drawings. The process of iteratively changing small bits of the code enabled the discovery of different, but related patterns.

This was the start of exploring what would happen if things were changed without a preset plan or idea. That hacking is one of the central ideas that has also lead into or applied to the traditional media. This was a fundamental way of thinking by beginning to change things to explore the possibilities with the media that was being used.

Graham describes his method "I tended to just spew out code that was hopelessly broken, and gradually beat it into shape" then he concludes "If I had only looked over at the other makers, the painters or the architects, I would have realized that there was a name for what I was doing: sketching." [14]

Hacking can be applied to any type of code or data with include different types of media and disciplines, Wark define hacking neatly in the following quote:

"Whatever code we hack, be it programming language, poetic language, math or music, curves or colourings, we create the possibility of new things entering the world. Not always great things, or even good things, but new things." [15]

This is one of the ways of summing up the creative practice described in this paper. Hacking is a process of bringing the intangible and the abstract into the real world as Wark explains

"To hack is to release the virtual into the actual, to express the difference of the real." [16]

The process of hacking that was discovered in the hacking circles has been applied into the sketching with analog media. Changing/altering to find out what will happen. Hacking as a form of sketching applied to different media both analog and digital is key to Newall's creative practice.

Sketch Books

The following section and visual presentation summarises Newall's practice to the present time, highlighting some of the key concepts. A collection of sketches that included different media were developed in the early years, and now form the basis of current creative practice. A strong archival practice of maintaining sketchbooks also developed using traditional media or analog media such as pencil, ballpoint pen, watercolour, etc., on paper. The sketchbooks evolved using digital printouts as starting points for further sketches and the digital and analog began to merge in new ways.

In the mid-nineties, Newall explored real-time 3D computer graphics that he began to label as 'Sketches' or 'Drawings'. The idea of 'performing' came out of the act of manipulating these drawings; hours were spent exploring possibilities, often accompanied by responding to music in real time. A handful of videotapes were produced that he came to think of as an equivalent/alternative to sketchbooks of drawings. VJing was introduced to his practice at this time; this provided a way to perform live in front of any audience and could include projecting the mix of these videotapes in parallel,

The creative practice thus seeks to develop a conversation between different modes of artistic expression. He has come to realize that an original language is emerging from his search for further possibilities for interaction, mixing analog and digital together across virtual and real media, extending the "what if" question.

Animations and/from drawings, manipulated, come together as performance in the form of VJing; in turn, suggesting the performance itself as a form of sketch. Indeed, in the field of performance, the term 'sketch' and related ideas about 'improvisation' could be used to refer to a quality of sketching in terms of exploring the possible in real time.

Recent Work

The exploration of this relationship and a type of mixed reality that is 'in-formation' - always 'in process' and neither real nor virtual - has continued up to the present time. Examples include the interactive public projection work "Urban Life" (2009), the works for "Vending Machine" at Splore Festival (2010) where digital designs were sketched and materialized into real attachments for the human body and "Evolutionary Experiments" at MIC Gallery, Auckland (2010) where creatures developed from "Sketching" with software, hardware and cardboard, created and occupied a new space that would not have been possible in either digital or analog form.

The interactive work *"Roosting"* (2011) consisted of 12 birds on 12 TV screens in a 3x4 grid that reacted to movement in front of them. So how can sketching relate to the work? The answer is that the users

sketch with the work, not in the literal sense but in an abstract way. Some users would mimic the bird's booth with sound and movement on screen to see how the birds would react. This is exploration of what the work does, causing the user to improvise or sketch with the characters on screen. This opens up possibilities of how user interaction can be seen as sketching for future works

Conclusion

Many things are possible. There does not always need to be an outcome. The sketch enables technologies both analog and digital to merge. The sketch is not limited or restrained as a method. It is adaptable; it can operate at different levels and in different ways. Sketching can be done in any media with any technologies with many different outcomes. Sketching is an exploration of the possible, and can become a record of impossible. A sketch can exist in a moment of time and become an artefact. There is a time and place for the work to be what it needs to be: Sketch.

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THE HIDDEN HISTORIES OF OBJECTS: PROVENANCE, STORYTELLING AND TAGGING TECHNOLOGIES

Simone O'Callaghan & Chris Speed

As part of TOTeM, a £1.39M project based around the internet of things, this paper explores linking creative artefacts to stories of their inceptionn, using QR codes.

Introduction

This paper explores storytelling methods to follow the lives of objects from their first inception to the narratives they collect along the way. It is part of TOTeM[1] a £1.39M research project based around the "Internet of Things"[2], which opens up new ways of preserving people's stories through linking objects to the Internet via "tagging" technologies such as QR codes.

The process of appending immaterial data such as textual, video and audio stories, offers a significant additional dimension to the material attributes of an object. Hand produced creative artefacts already transcend a material value because of their individual characteristics and their reference to social and cultural frameworks. As the emerging technology of the Internet of Things supports the tagging of more and more objects, things will begin to accrue an immaterial data shadow that will begin to out weigh its material instantiation (Sterling, 2005).

Project Partners at The University of Dundee and Edinburgh College of Art have been unpacking these notions through creative practices, working both as, and with artists to embed the Internet of Things in a more social and interpersonal context

A rolling stone DOES gather moss

In April 2010, the TOTeM project team launched the web project www.talesofthings. The site offered a simple but novel approach to recording social histories and a playful critique of the tagging culture that is associated with the emerging concept known as the 'Internet of Things'. Our platform allows anybody to attach web content (text, image, video and audio) to an artefact through the generation of a unique QR barcode that the owner is encouraged to stick to their thing. When scanned by somebody else using a smart phone, media is launched and the object can be seen/heard to tell a story about the memories that it is associated with.

Our reasoning was simple, that the existing public use of tags (RFID, traditional barcodes and two dimensional) is based upon a 'read only' relationship. And although the web savvy amongst us can generate a QR code and associate it with web-based media, for many people the scanning of codes is a practice reserved for people working on super market checkouts and in passport control booths. As well as offering a place in which unique codes are generated and allow stories to be associated with artefacts,

TalesofThings allows any other beholder the ability to 'add a tale' to someone else's 'thing'. By scanning a tag through the phone App, or by visiting the website, artefacts become 'writeable' and 'open' to further association. This is a critical dimension to the projects politics, that lessons learnt through Web 2.0 should be integral to any Internet of Things.

Following our launch last April the website began accruing stories that were associated with peoples actual material artefacts. However as the immaterial database grew it became clear that we needed an event that allowed the material artefacts to become an interface to our internet of things, rather than online repository of stories. RememberMe at Future Everything offered this context. The RememberMe artwork was a collaborative project with the Oxfam shop charity shop, in Manchester. During FutureEverything 2010, a research assistant based in the shop, asked people who dropped things off to tell a brief story about one of the objects into a microphone: where they acquired it, what memories it brings back and any associated stories. These audio clips were then linked to an RFID tag and QR code and attached to the items as they joined the shop's stock. Visitors to the shop, including conference delegates were able to use bespoke RFID readers, or their own smart phone to browse artefacts that were displayed amongst the many thousands of other objects. Labels highlighted the RememberMe objects and once triggered, speakers located in the shop replayed the previous owners story, evoking a ghost from the past. Once tagged the objects were in the public domain for purchase by other members of the community, and the project's iPhone and Android apps allowed new owners to access old stories but equally importantly, add their own.

This material 'turn' in the life of the project readdressed the balance of where the immaterial data was located. Instead of being accessed through a web interface, the RememberMe work explored the potential of the TalesofThings project to manifest a social Internet of Things that is situated in the event based context of exchange. An exchange of things and stories that contests many of the habitual consumer practices that have formerly defined concepts of value, quality and the destiny of artefacts. A year later we wanted to exploit the projects 'write back' feature and see if we couldn't tip the balance between immaterial and material in favour of the former. During Future Everything 2011 the team developed a follow up project entitled RememberUs. The project consisted of two shops that acted as supernatural portals to the Internet of Things. Visitors to the Oxfam Emporium were invited to 'let go' of memories that are associated with particular things by attaching stories to our memory vessels, moments later in the Oxfam Originals shop just down the street, people were able to 'pick up' memories when they are associated with another 'thing' that they chose to buy. Upon leaving the shop, buyers found that the item that was 'new' to them was associated with a host of old memories, exploding the assumption that a rolling stone gathers no moss.

Artists Stories

When thinking about linking stories to objects, there always has to be a "first story", the one of how a thing came into being. The TOTeM project team is collaborating with creative practitioners to explore some of these first stories to establish platforms for provenance, where storytelling methods are examined for defining and capturing provenance. Looking back at the history of old objects, as well as forward to the possible futures of new objects it is also a means of providing legacies of provenance for future generations.

In tagging art, design & craft objects, the QR code acts as a "digital makers' mark" with the potential to hold far richer data than traditional marks. Inspiration for the object's creation and its maker become the key focus, rather than facts about production and manufacturing. Working in a similar way to social networking sites such as Flickr, users of TalesofThings can comment and build upon existing stories with the potential to create a crowd-sourced bank of knowledge about any individual object. This then has the potential to provide future generations with artworks, craft and design objects, which have integrity and a traceable heritage. Whilst the provenance captured by the data shadow of commercial things may be logistical: price, temperature, best for before dates etc., information provided by artists and designers has the potential to provide significantly more evocative stories that may change entirely the perception of an object.

In 2005 YBA artist Simon Starling, won the Turner Prize for his work *Shedboatshed*. It appeared to be an ordinary shed and not particularly noteworthy. However, knowing that it was a shed found in rural Switzerland which Starling took apart, made into a boat, floated down the Rhine to the Kunstmuseum in Basel and then reconstructed back into a shed, has made the work, and winning of the Turner prize for it, objects of controversy in both the art world and mainstream media. Paul Shepheard, a champion of Starling's has said of the work: "One of the interesting things about this *Shedboatshed* is that the thing you're looking at isn't the whole work. Now this is always true in conceptual art generally because conceptual art uses its artwork to illustrate some other idea. I think what's interesting about Simon's work is that he doesn't deal in concepts so much as actions - so the work is evidence of action having taken place which is slightly different." (Shepheard, 2005)

The idea that a particular action has taken place is pertinent to many objects, but we only know about these actions and the reason for something being identified as an art object if the artist tells us. With tools such as TalesofThings, there is a platform for makers to tell these stories, in an arena that facilitates the conveying and validating of peer reviewable truths. But these can also be subverted, allowing for fictions to be written and for myths arise, both about the objects and their makers. For how do we know that Starling really did float his *Shedboatshed* down the Rhine? The stories woven around creative artefacts also become a reflection of the persona or identities that a maker chooses to construct and portray in the context of their creative practice.

Such myth-making is not new but what is interesting is that by using tagging technologies that allow others to comment on an object's stories, these myths can be exploited. Take for example, Andy Warhol, around whom myths have evolved. What does artwork made by Andy Warhol actually mean? His screen-prints are iconic, but, in contrast to the Congress of Artists' definition of what constitutes an original print, Andy Warhol did not make original plates, work the stone, or in his case create even the original screens for his prints, yet he is still recognized as the artist. He did, however, add the "final touches" such as blotting lines to give a less mechanized feel in the final prints. This highlights that even an artist such as Andy Warhol recognized a need for something that resembled the touch of the artist's hand, even to the point where works were signed. Through in true Warhol style, he was not the one to sign them, his mother was, and when she tired, another artist from The Factory took over. (Buskirk, 2003)

Imagine if those artists working in The Factory were able to tell the stories of the prints they worked on through tagging the artworks, and then allowing others to add to those stories. We can assume that many of those in The Factory were bound by loyalty to Warhol, but it would only take one disenchanted

person to open the floodgates. What would Valerie Solanas done have done with such capabilities in her hands? The myths of Warhol that we are familiar with today could have been very different.

Artist, Claire McVinnie, who like Any Warhol creates artworks using screen-printing, has been profiled in a collaboration with Dundee Contemporary Arts Print as part of a case study examining printmakers using QR codes as digital makers' marks. Over the space of 9 months, Claire has written about her works on TalesofThings, tagged and exhibited them with QR codes and has been filmed telling the tales of her works. Through these activities, the identity as an artist that she wishes to convey is being constructed for an audience who, quite often, may not share the same space and time zone that she does.

Tacitly, Claire is aware that there will be occasions where people will view her telling stories in a space that her works inhabit but that she does not. This is the phenomenon of tele-presence, defined by Lev Manovich as "representational technologies used to enable action, that is, to allow the viewer to manipulate reality through representation...the essence of telepresence is anti-presence" (Manovich, 2001). The art objects become signifiers of Claire's identity as an artist, whilst the digitally mediated content delivered to a users' mobile device can be seen as one way of confirming this in the absence of her actual physical presence. Such a validation can then affect the actions of those at the receiving end, for example the telling of her story may influence the purchase of one of her prints exhibited in a gallery, which may not have otherwise been purchased had the story not been told.

When discussing the filming of Claire's work and stories, she suggested that she be filmed at the print studio where there are screen-printing beds and the tools that she uses to make prints. She also has another studio where she preps her files and works on designs before actually creating the final pieces. The print is studio open-access, often noisy and full of bustle, whilst her own studio is a calm and quiet haven. In communicating her identity as an artist she chose to be filmed in the place where she has a more public image, rather than revealing her personal space on camera. This could be seen as her way of editing what is considered appropriate to convey as a professional artist, whilst remaining protective of a space that could reveal more a more intimate aspect of her working life. Typical of artists in the print studio, Claire wears an apron, one of the many communal aprons that the artists here share, its stories smudged and smeared across it in a colourful splatter of dried ink. The ink is a testament to the numerous artefacts that the apron has witnessed coming into being and suggests a more experienced artist than if the apron were pristine and unmarked.

Through the use of digital media storytelling methods to construct a rich identity of the artist as a person, the stories can also illustrate the emotional investment of the maker in that creative artefact. In her screen-print of New York, Claire tells of how she went on a college trip there in 1995 and took photos from the Empire State Building, but was so disillusioned with the foggy weather she didn't bother to get them processed. Years later she found the film and did eventually process them, realizing that with photoshop she could claim back parts of the image that she had lost to the mist and rain. She also admits that "This is one of the first screen-prints I even did, so I was still just learning". It was also the first artwork that she chose to talk about when being filmed, which considering the strength of the image and the success she has had in selling it, suggests that the work is seminal in her journey as a professional artist.

Enhancing Aura

During the study of artists working at Dundee Contemporary Arts, the integrity of the artist as a print-maker is articulated through many of their stories and is poignant in Annis Fitzhugh's text-based entry on TalesofThings accompanied with an image of her work *Cancellation Proof: "*when a limited edition is completed, the plate or block is defaced, often with a cross, so that no more prints may be made from it. The plants represented are all on the Red List of endangered species." (Fitzhugh, 2010)

This entry implies that the edition is "authentic" because Annis created a cancellation print for her edition, a "proof" that the edition is limited. The content of the artwork, like the print itself, is endangered, rare and limited. Annis' entry also explains printmaking processes to non-printmakers and the comment following up on this by a user called "frogo" shows a discourse beginning to emerge about the work, and about printmaking practices, when they write: "That's sad that a lot of nice images get defaced in such a way :(" (ibid) One can infer that frogo is not a printmaker, but that they appreciate the print that was cancelled. This comment is also thought-provoking in how accepted norms and "good practices" in printmaking can be perceived as destructive by those outside the field, who are unaware of the critical debates surrounding authenticity and originality of the print.

By examining artefacts and the stories that creative practitioners use to express how their objects came into being, the frameworks in which they are viewed enables a privileged insight into maker's creative processes, experiences and emotional states. Through tagging technologies, this "mobile augmentation" of art and design objects, where the physical has digital and therefore multiple presences, Walter Benjamin's notion of "aura" comes into play, "One might generalize by saying: the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced."(Benjamin, 1934). In her study of Le Courbousier's archived drawings at the Le Fondation Le Corbusier in Paris, Susan Yee of MIT describes her experiences as she handles his largest drawings: "All I could think about was that this was Le Courbusier's original drawing. It was meticulously hand-drawn, but the drawing was dirty. There were marks on it, smudges, fingerprints, the marks of other hands, and now I added mine. I felt close to Le Courbusier…" (Lee, 2007). On her last day in Paris she discovers that all the drawings have been collated in a digital database and she mourns that "the scans for the website gave me nothing to touch" (ibid).

Benjamin's concepts come from experiencing the "original" work first hand, being able to see the marks that the artist has made in their exploration of the medium in which the work is created. The same applies for any object and the memories, bumps and scratches that it collects on its journey. Although the Internet of Things, and mobile tagging technologies demand a need for the digitisation of artefacts, one could argue that when an object is tagged with the previous owner's memories or a creative artefact is tagged and augmented with the artist's voice, the "aura" has the potential to be heightened and enhanced rather than lost.

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1. *Tales of Things and Electronic Memories - Edinburgh College of Art, Brunel University, University of Dundee, University College London (UCL), University of Salford*
2. *This is tagging technologies to track physical objects in the real world. Eg: Oyster Cards in the London Underground .*

NETWORK MEDIA: EXPLORING THE SOCIOTECHNICAL RELATIONS BETWEEN MOBILE NETWORKS AND MEDIA PUBLICS

Rachel O'Dwyer

Considering 'media publics' as an assemblage of ICT networks, technological devices and human collectives, this paper explores the complex conditions across social and technical spheres that influence the character of contemporary media production, consumption and distribution on the go. Critiquing the current study of sociotechnical collectives it considers tactical media as one alternative approach.

Introduction

This paper concerns the sociotechnical relations between Mobile Information and Communication Technology (ICT) Networks and 'Media Publics', using a term to describe collaborative and non-proprietary practices emerging around the collectivised production, consumption and distribution of digitally networked media. In light of the ongoing integration of ICT networks into cultural practices, this paper calls for a critical theory of sociotechnical networks.

The following discussion critiques the epistemic frameworks available for the study of networked media, and in particular the intersection of technical and social apparatuses occurring around online culture. While the network as a cultural trope is prevalent in critical theory, the technical characteristics of network media (Infrastructure, topology, protocols and standards) are frequently 'black-boxed' in favour of overarching discussions of an immaterial network culture as it relates to broad frames of governance, subjectivity and political economy. By eliding a deep consideration of the material substrate of the network and subsequently the many ways in which media publics are generated in diverse relations between a range of actors, contemporary theory has failed to explore the complex ecologies of sociotechnical networks. Instead, in the literature of social media, we continually encounter linear causal models of analysis that all too easily equate centralised systems with proprietary cultures and decentralised networks with democratic media practices, failing to attend to the many nuanced ways in which the apparatuses of a communications network constrain or alternatively enable the formation of autonomous cultural collectives. If we really wish to explore the possibilities to design, implement and scale networks that support collaborative culture, we require a theoretical framework that traces agency through all layers of the network. Such a framework is still absent from network culture.

This theoretical gap will be illustrated with reference to an obviously sociotechnical assemblage, drawing on recent prototypes for episodic networks, a species of mobile ad hoc network that uses human proximity rather than fixed infrastructure to distribute data packets. Superficially these networks represent an ideal platform for the kinds of user-generated practices commonly associated with utopian accounts of media publics, suggesting a network topology that is fully distributed, supportive of peer-to-peer communications and dynamically self-organising. However, through an iterative analysis of the relations between different layers of the network, this paper explores how algorithms immanent to the substrate of the network expropriate user-generated content, monitor activity, shape future network behaviour and ultimately produce the network in ways that might advance proprietary interests and limit the agency of media publics.

This study demonstrates the need for appropriate frameworks and methods for research into networked media. While a number of approaches from technology studies and complexity are useful for the formation of a network media theory, this paper will conclude with a consideration of tactical art projects as one suitable approach.

Network Cultures

This discussion is situated within the disciplinary remit of 'network cultures' understanding new online media practices as endemic of a broader societal condition in which a distributed network topology supplants centralised and hierarchical models as the dominant cultural, social, political and economic organisational logic.

It is necessary, therefore, to begin with a brief disambiguation of the term 'network' as it is used within this paper. There are growing ambiguities around the term 'network' arising from its application across different disciplines: referencing a technical assemblage such as transport or electricity, or in the sociology of organisation, used to quantify institutions, markets and states, whereby the network represent an informal way of associating together human agents. In the context it is applied in this discussion, which draws from Manuel Castells onwards, the two meanings merge, since the 'network' becomes a privileged mode of organisation thanks to the very extension of Information and Communication Technologies. [1] A 'media public' therefore, as an assemblage formed around the production and distribution of online culture, is an example of one such network, including the producers and consumers of content, the content in question comprising text, voice or rich media, and the underlying technical assemblages which facilitates its transmission. This is comprised of contingent logical and physical strata; the higher level protocols and services implemented in software, and the lower substrate network, comprising tangible hardware such as user devices, transmission technologies and the available physical resources such as spectrum, bandwidth, real estate, man power and energy.

Its clear therefore that the 'media public' is a complex assemblage comprising not only human relationships but a whole range of logical and physical resources. These may be mutually supportive, but just as often they are structurally contradistinctive or otherwise opposed. Where the media public as a progenitor of a rich online culture is contingent on technical infrastructure, our analysis should also proceed towards the complex and iterative relations between network layers, in particular the mutual enforcements or structural antagonisms that might alternatively constrain or enable the emergence of an autonomous cultural collective.

Media Publics

Common terms for media publics such as Howard Rheingold's 'Smart Mobs', Mimi Sheller's 'Mobile Publics' and Kazys Varnelis 'Networked Public' model all converge on the idea that recent technological transformations inherent to ICT architectures herald a correspondent shift in the collaborative media practices developing over these. [2] [3] [4] The 'media public' emerges as a counter-capitalist ideology whereby technical affordances in the network are thought to disintermediate controlling interests and facilitate an autonomous networked information economy. [5] These affordances include a consumer electronics culture that places the means of immaterial production in the hands of a majority, the primacy of distributed topologies and non-discriminatory protocols over traditional centralised communications, and a consequential shift from the audience as passive consumer, towards the ambiguous subjectivity of the 'produser' as an active agent in non-proprietary culture. [6] These broad transformations

are in turn associated with peer-to-peer economies, an inherently democratic mode of governance, an invigoration of the public sphere, and the emergence of an online collaborative culture sustained through voluntary production over the network.

With the emergence of Web 2.0 platforms that emphasise collaborative production and content-centric architectures, and the subsequent progression of these activities beyond the desktop to mobile and pervasive contexts, the advocates of online collaborative culture identify a relative increase in the role of nonmarket practices taking place around the collective exchange of mobile information, knowledge and culture. These include frameworks such as Open Source, User-Generated content, DIY Production and Grass Roots Media. These theorists see the immaterial culture of the media public progressing outwards into hybrid space, as an online culture that has potential social, juridical and economic implications for real world cultures and material economies. Mobile networks are a space in which this intersection is thought to be particularly prevalent, representing a point of intersection between virtual and physical practices.

This paper identifies certain issues with the theoretical frameworks that underpin the dominant ideology of media publics. These are based on two interrelated criticisms:

The first claims that cultural studies of online media publics avoid a full consideration of the technological infrastructure underpinning online culture. While ICT technology is the necessary precondition for a networked public, its physical concatenations are again and again rendered immaterial in favour of the generalised tropes of links, webs and globalised interconnectivity. Network cultures frequently fail to take into consideration the politics of the material substrate, its counter purposes, proprietary origins and deep structural organisation, promoting instead a benign equivalence between superficial traits of the technical architecture and modes of autonomist social organisation. Too often the technical system is taken at face value and its agency is not fully explored.

Tensions frequently emerge between an online culture based on voluntary production and loosely woven collaboration and the organisational and economic logics of the material systems that underpin these media publics, such that a non-proprietary culture at a content layer might be subsumed, expropriated or otherwise conflicted by proprietary or controlling interests underpinning the network. An example of this can be gleaned from a consideration of current mobile networks. On the one hand, the distribution of networking capabilities within everyday spaces and contexts is frequently associated with new forms of collaboration, political economy and public activism. At the same time, it is increasingly clear that these networks are also aligned with new economic frameworks and powerful forms of governance that thrive on decentralisation, monitoring behaviours, extracting surplus value from user-generated content and otherwise surveying, exhausting and constraining online cultural activities. The reality is not a dialectic in which dominant or subaltern forces are externally located. Proprietary and non-proprietary, liberatory and controlling agencies are endogenous to the network, and frequently operate in symbiosis, producing complex and emergent behaviours.

Which brings us to our second criticism, namely an identification of alternatively social or technologically deterministic analyses in the literature on media publics. Research in social media continues to employ linear-causal models of analysis that all to easily equate centralised communication technologies with proprietary frameworks and the distributed topologies of communication networks with inherently democratic media practices, failing to attend to the many ways in which collaborative online culture is generated in diverse relations between human and non-human actors. Even as the research pays lip service

to the language of complexity or critical reflexivity, studies fail to account for the dynamic and iterative qualities of sociotechnical networks.

Episodic Networks

The complexity of the mobile publics can be illustrated with reference to an obviously sociotechnical assemblage: forms of mobile ad-hoc, and delay tolerant networks that are often termed episodic, opportunistic or pocket-switched networks. 'Episodic' describes a network whose topology is constantly performed and negotiated through pair-wise connectivity between mobile devices. Unlike the majority of networks that rely on relatively stable material infrastructure in the form of fibre-optics, cables, base stations and routers etc., episodic networks are by definition contingent, their elements dynamically reconfiguring based on necessity and circumstance. Episodic networks route data through a network of mobile peers. Each peer (human) forms a node within the network, transferring data from device to device without the aid of a centralising relay structure. Nested in human interaction, the concept of the 'people as network' is increasingly resonant. These networks utilise everyday patterns of mobility and varied and sporadic forms of connectivity between strangers and familiars in dense environments to leverage a dynamic network topology for the distribution of media content. The value of the system is correlative with the user's social connection to others in a networked space. In principle they facilitate the production of self-organising groups, bypassing the hierarchical structure of traditional mobile communications to form peer-to-peer reconfigurable communications with individuals in proximity to a user.

The episodic network is discussed here more for its heuristic value than its relevance to current network architecture. However, there is evidence of the increased relevance of such topologies in future mobile networks, with 4G and LTE supporting various mesh-like topologies that resemble ad hoc modes of connectivity. Initially theorised in the 1970s as an emergency service and valorised in the early noughties, they are increasingly discussed as a viable component of future mobile media architectures. Principally designs for episodic networks concerned the exchange of text-based files or operational instructions for proximate devices in a user's environment, but more recently following the exponential growth of content-centric activities on mobile and wireless networks, the episodic network has re-emerged as a potential strategy for the dynamic exchange of rich media content in real spaces and a form of data-offloading for increasingly congested wireless network spaces.

Undersound is a proposal for music exchange on the London Underground. [7] It utilises an episodic network topology within the transport system itself for the opportunistic exchange of audio files. These files are associated with static terminals in train stations throughout the city. Users can upload and download tracks at these centralised points and exchange them using software on mobile internet devices such as a phone. Users on the tube can browse each other's playlists in transit and choose to share and distribute music between devices. The system also includes algorithms for monitoring media consumption/distribution patterns and the propagation of files throughout the network. When a user re-connects to an upload point at a station, therefore, metadata concerning file exchanges and relational patterns are also automatically uploaded to the network and subsequently used to model sociality and media-exchange occurring within the underground. The designers of Undersound theorise this data as informative to the future design of social media networks that utilise context-aware information to enable file transfers and opportunistic sharing. [8]

At first glance these networks are every promising architectures for the kinds of user-generated practices that are typically associated with optimistic accounts of media publics. It can be argued that the distributed topology of the network and the nesting of technical agency in everyday environments leverages a public brought together around the dynamic exchange of information and rich media content. But such an easy analysis fails to account for the complex characteristics of the network that emerge through the relations between the social and the technical. Through an iterative analysis of the episodic network, we can explore how social behaviours and everyday habits are aggregated by proprietary devices and platforms and subsequently utilised: as valuable metadata for proprietary interests, as dynamic information that informs decisions at the logical layer of the network, and as quantitative research that informs the design of future network architectures.

A large amount of information can be gleaned from episodic networks. These include a whole range of user-generated content both consciously and unconsciously produced from demographic, geographic, social and even biometric data. In terms of social network analysis, information about everyday sociality; who we come into contact with and for how long, what value we, as individuals, offer as a node in the network and broad mobility dynamics concerning our movement as a group are all important data for determining the reconfigurable topology and routing protocols implemented by the network, its efficiency, and overall performance. Secondly, meta-data collected through often deeply embedded processes running on proprietary devices or fixed points of infrastructure are lucrative forms of user-generated content. Just as this data forms the economic base of fixed internet conglomerates such as Facebook and Google, this mobile data is associated with a significant market value, further leveraged by context and geo-spatial data provided by a mobile network. Mobile episodic networks therefore provide ideal platforms for the expropriation of contextual metadata that can be sold to external corporations looking to enhance, rationalise and personalise marketing and advertising,

This raises some questions: How do these systems quantify human sociality as inherently productive of valuable? What kinds of collaboration or sociality are subsequently encouraged or normalised? How is the production of user-generated content on such a network used to advance the interests of corporations, expropriate the value of creative practices and ultimately constrain the formation of an autonomous culture?

The situation we witness therefore is not only the creation of new social practices, but furthermore, the controlling, monitoring and expropriation of these through mechanisms facilitated by the architecture of the network itself.

Conclusion

In the highly mediated spaces of online culture, it's clear that we require a critical awareness of the sociotechnical geographies of enablement and constraint operating across all layers of the network. The previous illustration still only gestures towards this complexity. We require approaches that can move across methods and trans disciplines traditionally aligned with the humanities or the sciences and appropriate complex, emergent behaviours.

While a number of approaches from the Philosophy of Science and the Science of Complexity provide useful starting points, the previous discussion points toward the need for practical methods that are themselves immanent to the network. Described as an intermediary between artistic and ethico-political activism, tactical media provides a frame from which to categorise a variety of extra-curricular methods

through which a sociotechnical system might be made visible. These include practices such as the tracing or mapping of connections, the fictionalisation, inversion or reflexive exploration of networks, and the misuse, recontextualisation, exploit, or abstraction of economic, social and political processes through technological media.

Umbrella.net for example is an episodic prototype developed by a team of artists working in the Network and Telecommunications Research Group in Trinity College Dublin[9]. The work in question comprises a coincident network in which everyday items, in this case an umbrella, activate an ad hoc network when they are deployed in public. The network itself, from a commercial perspective, can be theorised as a solution without a problem, (why would you need a network only when its raining?) but from a heuristic perspective it allows a user to trace the layers of contingency between social circumstances, and pervasive technologies, to expand forms of assembly and ultimately make mediators of constituents that would otherwise be intermediaries. While it is beyond the scope of this short paper to explore the spectrum of relevant work in detail, the reader is referred to a number of tactical media practices useful to the study of mobile publics such as work across Locative Media, 'Hactivism', forms of data sonification and data visualisation, and critical Net-Art. These propose oblique ways of critiquing, imagining and dissembling the mobile public in the character of the techniques and apparatuses that came to structure it.

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PARTIALLY BURIED UNIVERSITY

Karen O'Rourke

Robert Smithson realized one of his first works of Land Art at Kent, Ohio in January 1970. *Partially Buried Woodshed* (1970) was an example of the process he called "entropy made visible". At the time, Smithson said he had always wanted to bury a building. For my part, I have always wanted to unearth a Smithson.

Fig 1. Partially Buried University, 3D interactive application, 2010. Karen O'Rourke, production: CITU.

Fig 2. Partially Buried University, 3D interactive application, 2010. Karen O'Rourke, production: CITU.

Fig 3. Fig. 1. Site of Robert Smithson's Partially Buried Woodshed (1970), photograph: Karen O'Rourke (2005).

Robert Smithson realized one of his first works of Land Art at Kent, Ohio in January 1970. *Partially Buried Woodshed* (1970) was an example of the process he called entropy. At the time, Smithson said he had always wanted to bury a building. For my part, I have always wanted to unearth a Smithson.

The Centre Saint Charles has a problem with rain water collecting on the roof and infiltrating the lecture hall just below. Inspired by two of Smithson's projects, "Partially Buried University" involves creating a garden on the roof terrace to absorb the residual water, reduce our carbon footprint and contribute to sustainable development. Since the roof was never intended to support the weight of growing trees and shrubs, it is likely that at some point it will collapse. The garden may then develop on its own, with weeds springing up throughout the building.

A 3-D model of the roof was built, simulating weather conditions and plant growth, thanks to models developed by engineers and scientists at the ECP-INRIA.(i) The visitor stands in front of a 3-D VR projection of the building, on the second floor overlooking the roof which has been made into a garden. She chooses a seed, putting it in a basket, then moves through the garden to plant it. After a number of people have sown poplars, cypresses, pines, maples and chestnut trees, the garden grows quickly, the roof just may give way and visitors suddenly find themselves climbing over rubble in the lecture hall below.

I will document the creation of *Partially Buried University* from preliminary research on Smithson's conception of entropy, and the public reception of one of his earthworks, to the realization involving artists, scientists and developers.(ii)

Partially Buried Woodshed

On January 22, 1970, Robert Smithson "partially buried" a woodshed by having twenty backhoe loads of soil dumped on it until the central beam cracked. Usually artists and theoreticians are concerned with the genesis of the art work. How did it come into being? From his interest in entropy and what he called "the dialectical landscape", Robert Smithson focused on process, the long-term and medium-term evolution of sites before and after the artist's intervention.

Smithson had been invited to spend a week as artist-in-residence at Kent State University by the organizers of the Creative Arts Festival. Self-taught, well known in avant-garde circles, shown in Europe ("When attitudes become form", 1969), published in *Artforum* and *Arts Magazine*, he had begun to realize his first earthworks in brownfield sites. On the Kent campus, he intended to pour mud down a slope as he had done with asphalt a few months earlier in Rome. Yet that winter in northern Ohio the ground was frozen solid: there was no way he could pour anything. Suffering from the flu, the artist was ready to return to New York. The students gathered around him at Professor Brinsley Tyrrell's house were not willing to see him go so soon: What else could he do? Upon reflection, he mentioned the idea of burying a building.(iii)

In an old farm the university had just bought at the far edge of campus, one of the students spotted an abandoned woodshed, filled with dirt, gravel and firewood. While the artist made sketches, the teacher and the students spent the day carting away most of the wood. A local contractor was hired to move twenty bucketloads of earth from another site on campus and pile them on the shed. According to a witness, "the earth was put on scoop by scoop, like applying paint with a brush".(iv) When the center beam cracked, the work was completed: it announced the beginning of the process of entropy. Smithson took snapshots with an instamatic camera. The local newspaper ran the headline "It's a Mud Mud Mud World".(v)

Partially Buried Woodshed was one of his first works on a large scale in the landscape. On January 22 he wrote a deed, giving the structure a title and a monetary value (it was Dwan, the artist's New York gallery, who came up with the price). He donated it to the university to prevent it from being bulldozed. "It was given a $10.000 value because if we were going to try to preserve this thing, then we could argue money," said Brinsley Tyrrell, "The money thing was all a game...to convey its importance to people to whom you couldn't talk about aesthetics."(vi)
Thus began the slow decline of the woodshed, which gradually lost its logs, roof, walls, as the work was gaining notoriety. Estimated at ten thousand dollars at the time of its completion, it was worth two hundred and fifty thousand dollars at its demise fourteen years later. Today the object itself no longer exists, while the work has become legendary. Its bibliography contains dozens of titles.

In April Smithson was in Utah to build *Spiral Jetty* at Rozel Point on the shores of the Great Salt Lake. At about the same time, Kent State University was the scene of protest against the American invasion of Cambodia. The Ohio National Guard was called in. On May 4, guardsmen opened fire on demonstrators, killing four students and wounding nine others. The campus was evacuated, twenty-five students arrested. Some time after the university was closed, on the lintel of the shed appeared a graffiti painted in large white letters: "May 4 Kent 70". As Nancy Holt remarked later, "the students obviously recognized the parallel. Piling the earth until the central beam cracked, as though...the whole country were cracking. It was the end of one society and the beginning of the next." (vii). It certainly divided Americans into

two camps, the peaceniks and the war mongers. Kent State was thought by many to be the last great nationwide protest, the swan song of sixties' era student revolts, paving the way for Ronald Reagan's "conservative revolution" ten years later.

On July 20, 1973 Smithson was killed in a plane crash in Texas while preparing his project *Amarillo Ramp*. Although he had specified when he made the work that he wanted it to be allowed "to go back to the land", his widow, Nancy Holt, considered it an important work and petitioned for it to be preserved, and maintained.

In the years following the killings, Kent State's reputation was tarnished. Eager to attract students and alumni donors, the University administration invested in sports facilities. Oblivious of the work's growing importance, Kent State President Glenn Oldsasked the university architect to prepare a project for enhancing the campus which would involve the demolition of the woodshed. It now stood near the new entrance to campus, on the way to the football field. To make matters worse, in March, 1975 during spring break, an arsonist set fire to the shed. The left side was destroyed, while the right side, where the earth had been piled up, was spared. This gave university officials added reason to demolish the entire structure: it was not the original, they argued, it was dangerous (visitors could be injured by the debris), it was ugly. A group of art professors objected. In the contemporary art world, *Partially Buried Woodshed* had become an object of pilgrimage: visitors came from afar to admire one of the earliest works of "Land Art". The University Arts Commission voted to preserve the work. After much negotiation, a compromise was reached: the shed remained, but the gardeners who maintained the campus were allowed to cart off debris that fell on the ground. Later the university would plant a grove of conifers around it, a barricade meant to hide the view of the "eyesore" from the road.

Visiting Kent State in 2003 I was struck by the beauty of the spot where Smithson had caused a chain of events nobody could have foreseen.[fig. 1] The process contines even today. Nancy Holt believes that it is characteristic of works of art to provoke a cascade of effects: "Works of art tend to be focal points and centers of energy that other people spin off of, and that's because works of art have no other reason for existence. They are not there for any functional reason: so they get right to the heart of things."(viii). For some today (like Dorothy Shinn), Smithson's work continues to live its life, while others, including Brinsley Tyrrell, believe that beyond a certain point the art work no longer exists: for them the site is a ruin with only archaeological value.

Partially Buried University

At first sight *Partially Buried University* (fig. 2] has little in common with its namesake. It was designed in the framework of the project Terra Numerica which developed "new tools to model the 3D city and explore new forms of urban representation". Whereas the Smithson work was experimental, more or less improvised to fit the situation, my project was more of a top-down, highly planned affair that took two years to conceive and several months to model. Smithson was inventing an art form he called "earthworks", I was interested in imagining artistic uses for technologies developed for the military and industry.

The concept of "competitive cluster" (pôles de compétitivité) is part of an industrial policy launched by the French Interministerial Committee for Planning and Development (CIADT) in 2004 to increase

France's capacity for innovation. It aims to foster an active partnership between industry, research centers and training organizations from both the public and private sectors in a strategy "designed to create synergies around innovative projects conducted jointly in the perspective of one or more markets." Led byThalès, Terra Numerica mobilized seventeen partner organizations (all members of the cluster Cap Digital) for four years to represent the large urban areas: "urban heritage in 3D for the benefit of sustainable cities."

The context is that of a large, "top down" project driven and supported by the governmental bodies to increase the attractiveness and visibility of France in the field of information technology and communication. As a member of Cap Digital, the CITU laboratory focused on scenarios using augmented reality and virtual reality. A 3D application was produced by the CITU with the help of partners at the ECP-INRIA.

In my scenario, the visitor stands on the first floor of the Centre Saint Charles. She can move around the area on the terrace set aside for the garden, visit the rooms and corridors that overlook the terrace, move down one floor to the lecture hall, move up to classrooms on the higher floors. At the entrance to the terrace, a shelf contains several varieties of seeds for her to plant. After choosing one, she must move around to place the plant where it will begin to grow. As the number and size of the plants increase, the terrace becomes fragile and collapses into the lecture hall below.

For Smithson, entropy meant not only the deterioriation of order, but more importantly, "the clash of uncoordinated orders".(vii) He told an interviewer "entropy contradicts the usual notion of a mechanistic world view. In other words it's a condition that's irreversible, it's a condition that's moving towards a gradual equilibrium.... Perhaps a nice succinct definition of entropy would be Humpty Dumpty. Like Humpty Dumpty sat on a wall, Humpty Dumpty had a great fall, all the king's horses and all the king's men couldn't put Humpty Dumpty back together again."(x)

Yet the action of entropy over time is contradicted by other processes. "Scientists have long been baffled by the existence of spontaneous order in the universe." writes mathematician Steven Strogatz. "The laws of thermodynamics seem to dictate the opposite, that nature should inexorably degenerate toward a state of greater disorder, greater entropy. Yet all around us we see magnificent structures -- galaxies, cells, ecosystems, human beings -- that have somehow managed to assemble themselves. This enigma bedevils all of science today. Only in a few situations do we have a clear understanding of how order arises on its own."(xi)

In *Partially Buried University* the viewer can see a projection in time (accelerated): the evolution of the garden, the collapse of the terrace, the invasion of the biosphere. The whole process has been greatly simplified, but users can continue to plant trees even after the collapse. The idea of collectively maintaining a garden on the terrace above the lecture hall to absorb the excess water could provide a functional solution to an architectural problem. The process creates a tension that must be taken into account, to ensure perhaps that the garden does not collapse. I would like to maintain the tension between the work of "entropy", the possible collapse of the roof, which would disrupt the course of events, as breaking the center beam of the woodshed did in Kent, and the agency of users (humans or plants) who might take advantage of the breach to build something new. As Smithson's work seemed to symbolically represent the rift in American culture of the seventies, so *Partially Buried University* could also refer obliquely to the French university strike in the spring of 2009.

I would like the final work to maintain this tension. What do we want to do after all? Plant a garden? Bury a university? And if being "ecologically correct" meant cutting off the branch on which we are seated? Others may argue that the "invasion" of the Centre Saint Charles by "weeds" ("vagabonds" as

Gilles Clément calls them) is the best-case scenario. In ecology, entropy is a measure of biodiversity. By introducing plants "foreign" to the terrace, we could contribute to this diversity.

The project should reveal the dramatic tension between entropy and organization, between the act of an artist "demiurge" and the inhabitants of the Centre who live with the consequences. They may want the artwork to be removed (and the roof rebuilt), but they might also take advantage of its action to create something else. This is not necessarily in the lecture hall, as I suggest in the prototype, but if the roof (or part of the roof) collapses, that's where we fall. The result does not depend entirely on the growth of vegetation, human users could develop improvised architectures, transform the lecture hall into a duplex, add a spiral staircase, a skylight.

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LUDIC LISTENING: SOUND ART IN VIDEO GAME DESIGN

Aaron Oldenburg

This paper will briefly discuss the history of sonic experimentation in digital game design, and describe one of a series of games the author is in the process of creating that directly address ideas in sound art theory. These projects focus on the world of audio with the intention of distancing video games from the rational and concrete. Video games in turn facilitate the exploration of relatively new paths in sound art.

This paper describes several experiments in audio-based game design that attempt to expand the expressive vocabulary of games, briefly discussing the histories and theories of sound art and video game design while outlining their potential to merge. These experiments probe what appears to be under-explored territory in audio games: although music-based play has been popular for some time, dating as far back as Mozart's musical dice game, [3] other forms of sound are relatively under-explored as the basis of game mechanics. This paper assesses the history of audio-based digital games, particularly the genre of music games, examining their limitations while drawing attention to areas of current and future experimentation. The author is in the process of creating a series of short games that explore new forms of audio-based game design, and will discuss one that involves voice-activated visual echolocation in an evasive three-dimensional sonic landscape.

The majority of audio-based digital games are musical and are comprised of the following two major categories: those that build gameplay around pre-existing musical compositions and those that generate dynamic music as a result of player action. In many music video games, the challenge that players face is to hit specific buttons in time with the beat of pre-recorded music. By contrast, the shooting game Rez allows players to compose music indirectly, by playing notes that are generated by the player's firing pattern. [5] Much interactive music software falls outside of games and into the more general category of "toys," as they have no set goals or obstacles. Often the player's only given objective is to compose music through experiment and play. Game or interactive toy-based generative compositions are not without constraints, however, as designers often restrict players to a certain set of notes to prevent them from creating music that is too dissonant and in some cases even alter the player's feedback to fit a pre-conceived rhythm.

Broader definitions of music, such as those proposed by John Cage, have not been widely explored in music-based digital games. Independent and experimental game designers, however, have explored other forms of sound-based game design. Eddo Stern's "Darkgame" installation relies on visual sensory deprivation, focusing in part on the side-effect of heightening other senses such as hearing. In experimental game design competitions, it is a popular challenge to create non-visual gameplay that requires the player to navigate by sound. Although three-dimensional first-person shooters have always relied on audio cues to alert players to the offscreen presence of enemies, the aforementioned games explore new ways to use audio as a way to augment or replace visual navigation.

Sonic art theorist Seth Kim-Cohen argues for a conceptual sound art that is not based on what is heard, "but in the elsewhere/elsewhen engagement with ideas, conventions and preoccupations." [4] Just as

the visual arts have explored the verbal and written communication of ideas over the retinal, he believes that sonic arts can move beyond the sensory. "Hear, Hear," an artwork created by Papermen at Eyebeam, New York, in 2011, is a silent kinetic sculptural representation of the collecting of vibrations by the ear and processing by the brain. It is a silently moving sculpture that nonetheless sparks a cognitive engagement with the processes of hearing. Are there ways that games can represent sound without reproducing it? Games are simulations, or, as Salen & Zimmerman put it, "procedural representations of reality." [6] It is interesting to note that most representations in game worlds, whether they be of death, conflict, conversation, are all simulated, yet sound is almost always reproduced (like visuals). An important area to explore, it would seem, would be simulation of sound through gameplay: having the player perform actions that are representative of the physical and cognitive aspects of hearing, listening and sounding.

What aspects of audio hold potential for game-based simulation? Consider the following descriptions of sounds in the context of actions, environments and visual representations in video games. David Toop compares sound's properties to those of "perfume or smoke," stating that "sound's boundaries lack clarity, spreading in the air as they do or arriving from hidden places." [7] He points out that sound "implies some degree of insubstantiality and uncertainty, some potential for illusion or deception, some ambiguity of absence or presence," and that, "Through sound, the boundaries of the physical world are questioned, even threatened or undone by instability." [7] Sound also has the "ability to stretch across the cut, to meld continuously from one 'object' or entity to another." [2] Sound always arrives at our ears blended, like shadows. [1] Typical games, by contrast, are often about the manipulation of distinct objects with logical boundaries. Games are often, however, about discovering alternate universes, and so contain the potential to allow players to explore worlds with fluid boundaries and objects that blend or arrive with ambiguous origins, like sound.

Optic Echo is a game created for mobile devices with the intention of representing visuals as sound is heard. Walls in the 3D environment are represented not as solid points in space but as particles flying toward the player "from hidden places." Visualization of the player's environment and non-player characters is migratory, ephemeral, like sound. Gameplay references echolocation: the player makes a constant noise (for example, with his or her voice) into the microphone and the game uses the volume of this sound to visually render the walls of the 3D environment, as if the particles were noise echoing off of the walls. The location of solid objects, like the origin of sound, must be inferred from the "optic echo's" movement. The manner in which the visuals were created to resemble sound was inspired by a quote from Frances Dyson in Sounding New Media:

like the fire, sound is always coming into and going out of existence, evading the continuous presence that metaphysics requires; like the fire also, sound is heard and felt simultaneously, dissolving subject and object, interior and exterior. Like the river, sound cannot be called 'the same' since it changes at every point in its movement through a space; yet like 'Soul,' it does not strictly belong to the object. Nor can sound's source and ending be defined. [1]

This was an attempt to mimic audio through another sense, a step toward simulating audio through gameplay.

Humans cognitively approach sound in ways that we do not engage with our other senses. Could it be that in games, navigating a 3D spatial tactile world is not the best way to move? How about forward and backward through the time of a sound? What choices could the player make as they move, what obstacles overcome? Studying audio gives game designers new ways to construct (and deconstruct)

space and action. Conversely, the 3D spatio-centric worlds of video games give artists who work with audio a space where they can explore goal and conflict-based compositional techniques, giving their audiences the potential to engage and procedurally explore the processes of hearing and listening.

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BODIES, INTERACTIVITY AND TECHNICITY IN MEDIA ART

ANDREIA OLIVEIRA

This paper addresses the *degrees of interactivity* produced with and within an artwork. The act of experiencing an artwork shows that any experience is made up of relations of intensity within processes of interactivity between bodies and milieus. These ideas are based on the philosophical writings of Baruch Spinoza, Gilbert Simondon and Gilles Deleuze and are applied to the field of interactive art.

Introduction

This writing is inspired by Spinoza's question—*What can a body do?*—and by his answer—*we never know what a body can do*—until the encounter, and then, what it *can* do depends on the intensity of the encounter and the body's capacity of affecting and being affected. Spinoza's question is the foundation of this paper and it will be concurrently problematized in three different fields of knowledge: Arts, Philosophy, and Psychology. Also, we avoid paradoxical extremes, e.g. natural and artificial, art and life, analog and digital, human and technological, real and virtual, etc which can be reconciled by creating paradigms that propose novel conceptions of what constitutes bodies, environments, artworks and technology.

It begins by asking the question *What can a body do?* and proceeds to ask *How much can a body do?* in the encounter, in our case, with an artwork. In this encounter with the artwork, the relations of affects and affections between the artwork/artist's/spectator's bodies and the milieu happen as an interactive process. Any experience implies interactivity but our interest lies in how this interactivity happens: What are its modes of production? How are bodies themselves affected? What are the nuances of such experience? Thus, our aim is to investigate the ontology of experiencing the artwork, or better yet, in the artwork with its processes of interactivity, herein referred to as *degrees of interactivity.* [1] The artworks as outcomes of a processual and systemic thought which does not dissociate the artwork-human-milieu, and directed to the intensities of the encounter. So, the question *How much can the body do?* in the encounter with the artwork is posed in terms of *degrees of interactivity* between bodies and milieus associated in intensive experience.

The body referred to here includes not only the human but the non-human as well—animal, technological, immaterial—formed by the speed or slowness of matter-taking-form. According to Spinoza, "we have conceived an individual as composed of several individuals of diverse natures, other in respect of motion and rest, speed and slowness". [2] To imagine the body differently we will need to cast off anthropocentric and transcendental positions and consider its spatial extension, potentials, intensities and movement in new ways. The question of the body will be examined from a Spinozist perspective based on the idea of parallelism between body and soul and the concept of the intensive immanent body; from Deleuze and Guatarri we will use the concept of the body without organs; and from Simondon the information body.

The body formed by a technology—thinking, walking, seeing, typing—its nature is essentially artificial. A body is not dualistic as it integrates dichotomies: it is analogue and digital, human and machinic, natural and artificial, perceptive and imperceptive, body and soul, matter and form. It must be stressed that the

body as matter-taking-form only exists in the presence of other bodies and belongs to the associated milieu by which it was created and within which it was created. Artwork, human, animal, machine, landscape, idea-body... bodies of flesh, blood, computer chips, images, sounds, waves, frequencies, affects, signs... bodies not bounded by skin, canvas, walls, or screens... extensive bodies in milieus where they become associated as intensive relations.

Thus, bodies are always in relation with each other, associated to the milieu to which they belong. This paper emerges from concerns and observations about how the artwork is constituted: the artwork belongs to the associated milieu; the artwork is a techno-aesthetic object produced by technology and its entrained technicities; and the artwork can only be understood through the artwork-human-milieu system.

Associeted Milieu

In this sense, we propose a relational perceptual causal chain that underlies a machinic experiential interpretation of the interactive process where viewers become one with the artwork in the experiential milieu that will come to be seen as the exhibition spacetime.[3] We seek to consider the experiential milieu itself as the conditioning environment for the subjective entity that constitutes the event and locate it at the junction of the site of exhibition and the viewer function where the virtual and the actual coincide and become pure experience. In order to do that what we need is not a perceptual causal chain per se but a remapping of the experiential milieu where viewers become one with the artwork-world within which they are enveloped.

The milieu is normally understood as the ensemble of external conditions within which a living being lives and develops or as the assemblage of material objects and physical circumstances which surround and influence an organism. Conceptually, "milieu" can also be seen as an environment in the widest ecological sense of the term, i.e. as the locus of the dynamic interaction of all the factors and mechanisms that participate in the sustenance of an ecosystem.

The concept of the associated milieu, conceived by French philosopher Gilbert Simondon in his book *Du mode d'existence des objets techniques* (1989), is a useful model to analyze the co-arising relationships that take place between an artwork and its conditioning environment. The descriptive term "associated" when applied to describe milieu refers to a specific mapping of an ensemble made up of constitutive elements (which can be sub-ensembles) and conditioning environmental modalities which come together to create a concretized individuation through the ongoing exchanges of energy that take place within that specific milieu. [4]

The milieu allows for a reciprocal relational causality to take place between the elements so that we may conceive of spacetime as the immanent plane from which the subject and object arise. The associated milieu sustains, unites and brings together bodies: it is not a stage upon which a scene unfolds, or a play where only the actors perform, or a canvas upon which the pigments run into each other, or a manuscript where the words follow each other in sequence. The milieu is the setting and environment of concretion, of aggregation, where things condition each other in order to form something which in turn, simultaneously, allows these very same things to take form themselves. In other words, the milieu allows for a non-static, dynamic form as an event of taking-form as experience.

The milieu crosses through bodies, simultaneously existing within the body and outside of it like the air which one breathes, or the water that permeates our body, or the earth that nurtures and nourishes us. To think of the milieu is to think of the production of the body proper, its modes of functioning, and its pre-established connections and relations. In this way, the milieu is active and defines itself as a source of energies, perceptions and actions.

From these preliminary ideas about milieu, it appears that the artwork is produced from the relations between bodies and milieus, mediated by *technologies of creation* and their technicities*, where relations are expressed as variable intensities of interactivity, i.e. as *degrees of interactivity.* These degrees are nuances of the act of experiencing: mixtures, attractions, embodiments and perceptions. Various and concurrent movements, mixing within the milieu, attracting each other, incorporating fragments of bodies, perceiving (themselves) as body and associated milieu as ephemeral landscapes.

Degrees of Interactivity

Mixtures are inevitable; they are voluntary and involuntary affections between bodies and associated milieus; hybrid bodies belonging to the milieu and keen to experience themselves in different ways. To understand the pragmatics of bodies, it is imperative that we understand the immanent relations of bodies. Plato's, Spinoza's, Deleuze's and Simondon's ideas of immanence produce differentiated bodies. In Plato and Aristotle, the transcendent and immanent planes oppose each other, as do body and soul, where the supremacy of the soul prevails. Spinoza brings together transcendence and immanence, as well as body and soul, as parallel relations. The relations between bodies and milieus are immanent and intensive, bodies and souls being relations of speed and slowness. We are equal in terms of attributes, and singular in terms of modes of existence.

Their Ethics are based on what a body is capable of doing, and the positive encounters which potentialize it. In Simondon and Deleuze, bodies and milieus mutually adapt to and create each other in the act of experiencing. Bodies, as relations/gestures of individuation, are no longer subordinate to Aristotelian substance mentioned earlier; being, as the union of the individual and the milieu, is no longer Spinoza's Divine Being; mixtures address the interdependent relations between bodies and milieus. They are mundane signs inhabiting mixtures. These paradoxal mundane signs can lead us to intensive relations with the milieu, exposing bodies to contagion; or they can leave us with empty action-reactions, abandoning the body to suffer the effects without knowing the causes.

Attractions move bodies. Bodies touch each other through the associated milieu where they come together complicitly. Desire expands bodies throughout the milieu, and keeps them connected. We are dealing with an animal art that shows us the potential of the milieu and the affects bodies resulting from the animal behavior of feeling the vibrations of other bodies of through the associated milieu. "All art begins with the animal, for it is the animal, and not machines, minds, or subjects, that carve territories and bodies simultaneously: minds, machines, subjects are themselves the artistic products of this coupling of bodies and milieus". [5] Animals can only catch their prey when part of their body and part of their prey are mixed. When part of the artwork is already part of the spectator's body, we enter the artwork with one body and leave it with another one. Animal-becomings make us discover non-human bodies.

We fall back on affects of relations, where the agent-causes of other bodies on our own are known, where affects are felt as variations of the force of existence of the soul and of the potential of the body

to act. "For, in proportion as the body is capable of being affected in a greater variety of ways, and of affecting external bodies in a great number of ways, so much the more is the mind capable of thinking". [6] In the attractions, it is understood that bodies produce affects—Art being a block of affects and percepts. [7] When attracted, one is captured by the amorous signs that deceive and create fictions, either making us prisoners of the illusions of representation, searching for origins and truths, or releasing us to confabulations, lies and invented realities.

Embodiments are visceral once we give body to that which is lived. Causes are not only known, but also created; propositions, objects, experiences are produced by means of technologies. The act of embodying life is technological, in that what is natural is effected by the artificial. Appropriate technologies are needed to give form, or better yet, for matter-taking-form. Artists use/invent technologies to compose the elements affecting them in order to arrive at the technicities of the artwork.

In this sense, Simondon rescues the relation between man and technics by re-defining human existence in terms of the technical reality that surrounds it. Simondon developed the concept of technicity in terms of open machines and conceived new environments for their unfolding in terms of the associated milieu which allows the inter-dependent co-arising of the technical object, creator and environment into an event.

Through the techno-aesthetic object, art liberates technics and techniques from their technological and cultural contexts in order to surpass their initial function and purpose as well as promote other ways of feeling and thinking. It must be emphasized that this direction consists of a political and ethical position (and not a moral stance) that provides us with the means of thinking our existence in terms of the technical reality that surrounds us.

Technicities belong to bodies; they are the expressive qualities that arise from the composition and organizations of their elements as individual ways of composing: the singing of a bird, the coloration of a plant, the functionality of a machine, the expressiveness of an artwork, the gestures of a dancer… Technicities move within the technical and aesthetic dimensions of techno-aesthetic objects, centering us on that which happens within matter and form. "Matter is thus defined in terms of a *form-taking activity* immanent to the event of taking-form." [8]

Each element draws out implicit forms which are manifested in the techno-aesthetic operations which also determines them. The aim is to understand that which is produced in the experience, in the artwork, artist, spectator, art gallery—with its materials, elements and implicit forms. From sensuous signs, we embody that which tells us about the material qualities and guides us to the immaterial in Art. Signs bring on degrees of interactivity which create information that disrupts the artwork-human-milieu system while internal resonances are produced. Thus, tendencies and attractions become embodiments.

(Im)perceptions are landscapes of creations/actions to be lived. They are actions resulting from embodiments, i.e. they are the effects of mixtures, attractions and embodiments. In order for us to live, we need landscapes to shelter our bodies and souls. Art goes beyond explaining the creation of ephemeral landscapes, it brings us to create unusual landscapes. The singularity of landscapes consists of making visible that which is invisible and allows us to arrive at the imperceptible in perception, the immaterial in the material, the technicities in technologies. It must be stressed that the body perceives before the soul can contemplate; the body perceives not only with the sense organs but also with the affects which inhabit it. Perceptions take place between the perceiver and that which is perceived by means of dynamic forms. "Art brings back out the fact that all form is necessarily *dynamic form*". [9] For this reason, the

artwork can only be understood through the intrinsic and extrinsic dynamics of the meta-stable system of the artwork-human-milieu. This system encompasses an internal resonance herein understood as interactivity. Because the system is meta-stable, it is subject to the problematizing caused by information, which triggers new individuations. [10]

The function of Art is to produce information, to cause alienations so that landscape-simulacra can arise. Landscapes are created through the oscillation between panoramas—prisoners of false impressions and mimetic representations—and simulacra formed in the encounter of dissimilarities in order to produce invented realities: invention is the highest degree of interactivity. Signs in Art give access to the information that produces phase changes in the artwork-human-milieu system: the sign in Art is not the perfection of the sign. It is paradoxal as any other—it closes up when it falls apart in the dissolution of the form, where it can reach the extremes of schizophrenic landscapes; it opens up when absorbing the immaterial dimension of life though the perception in the perception, where landscapes full of different signs are created.

Conclusion

Mixtures in mundane signs, attractions in amorous signs, embodiments in sensuous signs, perceptions in signs in Art: [11] *degrees of interactivity* of an experience. For an experience to be intensive, the sign must remain open to its dynamic and associative processes as it is not a particular sign or element but the associations of signs and elements which move through all *degrees of interactivity*. In this sense, the problem the paper considers is the dynamics of *degrees of interactivity* in the experience of bodies— artwork, artist/spectator, machine, ideas—and their associated milieus, or better, the process of interactivity in art.

We seek to problematize questions of interactivity in order to open pathways to think the techno-aesthetic art object in terms of real interactivity and not simply responsiveness: What constitutes interactivity? What is the role of the spectator/participant? What is the role of technology as the mediating agent? What kind of bodies, milieus, space-times result from the interactive techno-aesthetic object? What are the ontological implications of these techno-aesthetic considerations? How may we think of interactivity in the humanities through art experience?

When researching interactivity in the Arts, it is inevitable not to take the problem to the field of interactive art. Interactive artworks take place and are modified during the artist/spectator/artwork/milieu experience; as they are fundamentally relational, they break down the frame and require participation. Their immaterial potential will be realized in the relational mode in which they operate by acting as a mechanical translator of content and representations, or as a machinic transducer of information. "We understand transduction to be a physical, biological, mental, and social process through which and activity is propagated from individual to individual within a domain." [12] By being an art of action, interactive art can instantly produce action-reactions, or the action can be the effectiveness of the techno-aesthetic operation of the artwork itself as performed by the spectators, in other words, an artwork keeps its operation open in order to allow the spectator to access its implicit forms. Interactive art presents possibilities to explain the processuality of *technologies of creation*.

Technology has its own specific modes of producing bodies which go beyond those which participate in interactive processes. In this sense, when interactivity is produced within techno-aesthetic objects, the compositional relations create novel modes of expression of what a body is and what it can

do. Therefore, the questions become: what is possible (or not) within this construction of bodies and milieus in interactive art? Where is the ethical limit which guides such productions? How much can a body endure within the proposed relations?

This paper comes to the conclusion that *processes of interactivity*, especially in interactive art, address the ethics of the body's potential to act [13] in terms of *how much can a body do*? We seek answers to how an artwork can provoke "joyful" encounters which liberate the potential to act as well as *degrees of interactivity*. The artwork itself does not *per se* exist except as the aesthetic experience with and within the artwork: it exists as an individuation of the artwork-human-milieu system. Simondon's ethics propose processual thought as a constant individuation. His philosophy of technics addresses an ontogeny of human and non-human being (individual and milieu) and is not concerned first-hand with the final configuration of things but with how they become what they are. It is thought that can support interactive art and made to be modified over time as it gathers existential amplitude in its matter-taking-form process.

Promiscuous/ethical bodies are found in the art-life experience; they are promiscuous in the act of mixing amongst themselves, and ethical in their potential to act according to the dynamics of *degrees of interactivity* within each experience.

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NANOVIBRANCY: AN AUDITORY PERFORMANCE OF NANOSCALE RESONANCE

Joel Ong

Nanovibrancy explores nanoscale activity by amplifying the oscilations at the surface of a model tympanic membrane in real time.The project repurposes the AFM by extending its reach into the creation of abstract, subjective and ephermeral sound.It shifts the observation of the miniscule from scientific eye to artistic ear, amplifying the resonance of reality and imagination through a confluence of nano and human scale listening.

Figure 1: Screen shot of Nanovibrancy test run at the John Curtin Gallery, Perth. 2011. Image credit: Joel Ong.

Figure 2: Eardrum Man (2011). What would the eardrum sound like if we were small enough to stand on it? Image Credit: Joel Ong.

Introduction

This paper describes key concepts and processes behind Nanovibrancy, a sound performance installation that utilizes the atomic force microscope (AFM) as a listening device to record and amplify vibrations on the surface of a membrane. It rests the probe in the centre of a silk membrane that functions as a model for tympanic listening. In so doing, the AFM does not deliver a visual representation of the membrane insofar as it is tasked to provide an image of it; but more to determine its process over time and stretch the image into an evolving and ephemeral soundscape.

The project aims to subvert the premise of visual imagery in the current climate of nano-scientific observation through audile, subjective and ephemeral data derived from the AFM scans in real time. It is also site-specific in that it creates an immersive sonic environment fusing the nano-scale resonance of vibratory matter and the human-scale acoustical environment of the gallery space.Nanovibrancy was presented as a durational performance-installation at the John Curtin Gallery in July 2011. (Figure 1)

While the AFM is still an image-creating machine (albeit through complex but arbitrary algorithms), it removes the distance required by the focusing lenses of light-based microscopes and actually contacts the sample's surface as a way to gain atomic resolution. This emphasis on touch as the operant sense for nanoscale perception therefore allows a reordering of the scientific observation strategies commonly associated with microscopy. In addition, it also offers the chance for an artistic, poetic representation of the nanoscale environment. Since the sample's vibrations are highly influenced by environmental factors like ambient noise, air flow, temperature and humidity, this process reflects a vibrancy and agency that is not only centered on the sample, but also in its dynamic position within the environment.

Sidelining Occularity

The invention of the Scanning Probe Microscope (SPM) and its offshoots the Scanning Tunneling Microscope in 1982 and the AFM in 1986 by Gerd Binnig and Heini Rohrer (Binnig and Rohrer, 1986) revealed that to image high-resolution samples at the smallest scale possible, light had become obsolete.

While conventional optical approaches reflected light off the sample through a series of lenses, these devices worked by directly interacting with and touching its surface. The resolution possible was now beyond the effective wavelength of light, inaugurating a range of microscopes that could see into the nanoscale, but ironically were 'blind'.

This invention of the SPM technique signaled a paradigm shift that Peter Galison (2006) refers to as replacing visual ontology with an action or intervention. In so doing, the visual output of the microscope becomes connected to this ability to contact and change, becoming sidelined as a sensory accomplice in the creation and manipulation of nanostructures. Thus the image ceases to be an end in itself - even more than just highly publicized and highly seductive icons of a new science, they implicate the objects they depict as malleable and kinetic.

In Michel Certeau's 'Walking in the City', he describes the vertiginous experience of one observing the street from the top of the World Trade Centre as being created in distance and removal from the "grasp of the city", and later the collective experience at street-level of pedestrians as a "swarming mass (that) is an innumerable collection of singularities" (Certeau, p155). He describes the way in which sight functions as a voyeuristic activity that immobilizes the mass of individuals from a distanced perspective. To

walk the streets of the city therefore warrants an Icarian fall - to place oneself under the threshold of visibility 'down below' and to be immersed as a walker, a Wandersmänner, charting the trajectories of movements as a subjective and durational activity.

Salome Vogelin adds that the 'godlike' view from the tower results in total, objective knowledge whereas the activity of the man on the street is not receptive, but exploratory:

"De Certeau's city on the ground level is created by these blind practitioners, who by association hear rather than see its text, 'make use of space that cannot be seen' and produce with their footsteps the city as a heard phenomenon." (Vogelin 2010, p92; Certeau quoted in Vogelin 2010)

In the same way optical methods of observation and image creation that rely on focal distance are side-lined in favour of the physical exploration of the cantilever on and in the membrane. Nanovibrancy re-lies on this performativity of the membrane as process, replacing the static visual ontology of the sample with an auditory documentation of its material agency. The position of the listener in this case is ex-plored between his/her bodily presence within the soundscape and the perspectival distance arising from the representation and mediation of nanoscale audition.

Leaning on the surface of a Membrane

Nanovibrancy is as much a performance as it is a passive observation. Any sound that is heard relies on the inherent agency of the membrane, rather than on a form of composed or pre-determined activity. This inclination to inflict and impose oneself on the activity of the membrane is both an artistic and scientific tension.   Since nanotechnology offer the capabilities to manipulate atomic particles, the impe-tus to 'do' something rather than just passively observe matches the expectations of sub-molecular re-arrangements, attaching and removing individual atoms, or even leaving marks on the surface as experi-mentally useful procedures.

The sounding of a membrane that 'amplifies' rather than 'affects' it emphasizes the sounds that are al-ready present in it. Jane Bennett refers to the "capacity of things . . . not only to impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendancies of their own" (Bennett 2010, viii), echoing Bruno Latour's definition of the "actant" which is a source of action which has an individual efficacy and the ability to modify another entity.   The mem-brane is seen, and heard, as an actant, with its own agency and efficacy.

But as a membrane - a flap of freely suspended 'skin'; it is implicated as an active listener of its environ-ment, extending the repository of internal sound to include its acoustic environment. Scanning the membrane reveals its internal structural mechanisms and the inter-atomic foces at its surface; it also reveals its exteriority within the medium of air and the vibrations it experiences as a result of gaseous atomic activity. The membrane thus becomes a dynamic actant whose agency is reflected in a state of becoming within its external acoustic milieu. Gaston Bachelard argues:

In its energetic folding the atom is becoming as much as it is being, motion as much as it is object (Bachelard quoted in Andrews 1992)

Similarly, the membrane as dynamic process literally and metaphorically usurps a visualist definition of the 'object' - it does not offer a static depiction of the sample. Instead, it stretches the effective image

into the observation of a process – of the object as a vibrant participant within its environment occupying a transitory middle ground "between potential and actual" (Andrews 1992).

In Nanovibrancy, the listener is brought into the space of the nano-cosm through a sharing of the acoustic environment of the membrane. Listening to the membrane thus creates a dynamic continuum that connects the listener and the object in an ensuing relationship within these energetic oscillations. The perception of sound is determined by the physicality of all the components that conduct it. Therefore, the physiological hearing activity, its model through the silk membrane and AFM assembly in Nanovibrancyexplore their "energetic unfolding" within the acoustic environment, becoming indicative of the continuum of vibrations through the membrane, air and listening bodies. As Salome Vogelin describes:

Listening produces me as a dynamic subjectivity intertwined with the dynamic things that are thinging the life-world rather than in relation to a substantial and permanent vis-à-vis of a transcendental world. Any connection of myself to another thing or subject ensues in this dynamic. (Vogelin, p 94)

By extrapolation, everything present is a dynamic actant involved in the sensitivity of the membrane. This presents an interesting contrast between the reductionist ontology of the 'atom' and the expansion of an ecology of materials into the macro-environment where it is defined not by itself, but in its enfolding external relationships. Georges Canguilhem's defines the milieu as "an array of decentred and mutually influential relations between an organism and its surrounding environment" (Canguilhem, quoted in Roosth 2009). By extension, the acoustic milieu therefore can be said to be made up of mutually influential assemblages of organisms and their environments within a landscape of vibratory oscillations.

The assemblage in Nanovibrancy is made up of connected things extending the vibratory continuum upward and outward into anything and everything in the environment but extends even further through the air in the room into the listening bodies.

The model of tympanic listening through a membrane implicates the physiological hearing pathway as a series of connected, conductive mechanisms all grouped in an assemblage that effects the eventual signal that is perceived, even as it is an indication of an inter-subjective phenomenon.

From the listening body, the room as the metaphor of a resonating chamber implicates its structural components as material participants rather than passive observers of the performance. Sound accentuates the physical construct of an architectural space because at certain "resonant frequencies", the walls of a room will begin to ring, presenting every constructed space as a palpable entity with its own sonorous potential.

In Nanovibrancy the perpetuating feedback loop between the listening membrane and the gallery space becomes an aggregating mass of auditory feedback. These frequencies that arise through this process do so at the natural resonant frequencies of the architecture. Albeit, the architecture is a dynamic entity in itself, responding to change in variables like human movement, air flow, thermal flux etc.

Imaginative Listening

Sounding the membrane does not only reveal the material assemblages that bridge the listener and the object through conductive resonance; but through the cognitive activity of listening, it furnishes an imaginative proximity to the source.

Sound draws together the sounding object and the listening body in a relationship fortified by the acoustic connection of the two. Where Nanovibrancy aims to bridge the distance of scale, this is not an acoustic one but more an imaginative one. By amplifying the membrane, it presents the illusion that transplants one, blind, onto the surface of the membrane – What would the eardrum sound like if we were small enough to stand near it? (Figure 2)

In the metaphor of the nano-scopic microphone, the stimulation of "magnified" listening also presents a duality of cognitive spaces. In the first instance, the recording of nanoscale vibrations situates the context of listening within a visual causation of atoms vibrating i.e. my mind sees images of the atom in motion, the atom in the assemblage and so on because I know that this is the supposed result of the experimental setup. But in alluding to a post-perspectival space away from the inclination towards visuality, perceiving the space of the nano-cosm becomes a fundamental activity in reduced listening. It becomes an imaginative, mythological realm where the image is abstracted into its visceral, somatic and immersive soundings. In this position, I do not know, and I do not have to know what exactly constitutes these vibrations, I hear, feel and am immersed in it as a tangible, vibrant and energetic gestalt.

Nanovibrancy thrives on the imaginative experience of sound, one that emerges from sensory extension of our ears into the nanoscale. In the actual performance, the sounds that were present in the gallery space were not stylized representations of nano-activity; instead I sought to present the sounds as they were. As a result, there were often patches of silence, or low-level static sweeps that were not the most interesting sounds possible. This artistic tension in allowing the sounds to be themselves became a defining character of the performance and the developments leading up to it.

Conclusion and Further Thoughts

Nanovibrancy thus presents a site-specific installation performance that subverts the optical expectations of an objective science. Through its amplification of the minute vibrations on the membrane's surface, it unfolds the nanoscale interactions of molecular bombardment and thermal interference as an evolving soundscape over time. This enhances the emerging rhetoric of nanoscience as being invested in the materiality of atoms and molecules and their interactions with each other, and within the broader molecular environment. With the proliferation of haptic feedback devices that provide users with more tactile control over their samples, the visual output would then become connected to this ability to contact and change, becoming more of a sensory accomplice in the creation and manipulation of nanostructures.

In its ability to reach into the nanoscale, nanoscience becomes a milestone in the creation of scientific knowledge. This potential to now see, touch and hear at such a small, yet physically grounded scale goes beyond the social constructions of art and science. And in the work of Nanovibrancy, it reveals a deeper essence that is found within the vibratory continuum existing at the nanoscale. The words 'minute', 'miniscule' and 'infinitesimal' that litter the discourses of nanoscience become more than imaginative sources but palpable entities; the connections we forge across scales of perspective are now

founded within the common ground of vibrant matter. Our listening ear is to be reinvigorated by knowing its place in the atomic assemblage, and our imaginative minds brought to new spaces of creative exploration through the immersion of sonic potential.

Gaston Bachelard reveals in the Poetics of Space that such imagination of the miniscule cannot be founded upon the logic of human-scale perception, but instead need to be subtended down the rabbit hole of abstraction and absurdity. And as Nanovibrancy locates itself between the spaces of material resonance and mythological imagination; the milieus of fact and fiction, the fertile grounds of imagination and reality now collide and reside in close proximity with each other.

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TOUCH INTERFACES – BETWEEN HYPERREALISM AND INVISIBILITY

DAVID OSWALD

In this paper current trends in mainstream multitouch interface design are analysed. Based on a critical review of Apple's iOS Human Interface Guidelines and on experience from teaching several multitouch design seminars, recommendations for design practice and some forward-looking statements concerning hyperrealistic interface metaphors will be derived.
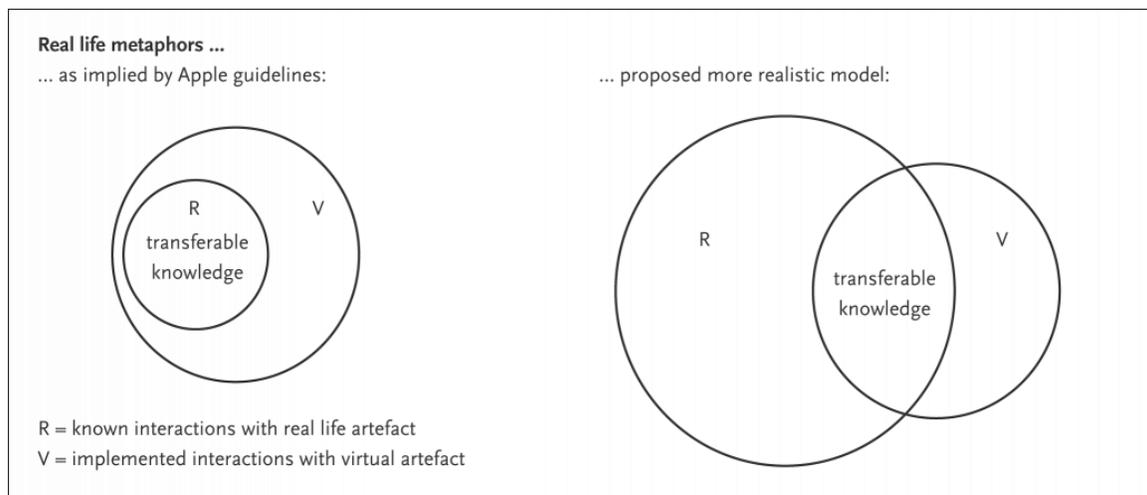
Figure 1: Knowledge that can be transfered from interaction with real life objects to interaction with metaphoric interfaces. Copyright by the author.

Figure 2: App prototypes from digital media seminars employing real life metaphors (left and middle) and standard software elements (right), 2010. Copyright by A. Berg, M. Bode, J. Heins (left), W. Holle, M. Oliveira, H. Richert (middle), D. Storm (right).

Introduction

Multitouch technology has existed for several years today. [1] While big multitouch tables have mostly been found in public places like exhibitions, small screen devices like multitouch smartphones have become an everyday phenomenon. In both cases the context of use has been different from the use of a desktop computer. Multitouch table systems often are designed for specific content, an individual location and fixed context of use. In contrast, smartphone applications are to be used in any context – due to mobility. With the emergence of medium sized multitouch devices like the iPad, more and more digital products, which are known from a work-related desktop context, are being redesigned for multitouch use. But just like the invention of the computer mouse was a prerequisite and an activator for the invention of graphical user interfaces and new software genres, [2] multitouch interaction is a prerequisite and activator for novel interfaces and the emergence of media formats and applications which are specific and typical for medium-sized multitouch devices.

Today two trends in multitouch interface design are already apparent: Photorealistic real live metaphors like wooden bookshelves on one hand and direct, touch-based interaction without any visible buttons or handles with content like maps on the other hand, or even sensor based interaction.

Realism and Learnability

The real-world metaphor approach has already a tradition in human-computer-interaction. The very first graphical user interfaces of the late 1970s where based on a visible real world metaphor. But due to technical limitations the visual style and the iconography of the desktop interface was quite abstract – black and white pixels only in low resolution. This relatively high level of abstraction helped to forget about the original meaning of these metaphors once the user's learning phase was left behind and the meaning of interface elements had been internalised. When seeing "menus" in a software application today, no one thinks of a restaurant's list of dishes. The idea of a restaurant menu was helpful in the early years of GUI, but today's computer users would be rather distracted or even confused by a photorealistic imitation of a restaurant menu card with "cut", "copy" and "paste" listed on it.

A second wave of more realistic real world metaphors hit the interface design discipline in the early 1990s when "interactive multimedia" became popular. Abstract and text-based interface elements like menus, buttons and drop-down-lists were replaced by the display of everyday objects in everyday environments. These were again real live metaphors – now with a higher level of detail, showing greater similarity between the real world objects and the visual representation. In spite of significant usability problems the naive realism of these interfaces was a success in so called "edutainment CD-ROM" applications. Attempts to transfer this approach to standard software (like Microsoft BOB) at this time failed completely. [3]

HYPERREALISM IN MULTITOUCH INTERFACES

Today applications on an Apple iPad again look like real objects. E-books look like real books, software calendar apps mimic paper sheets, leather covers and even chrome-plated spiral binding. Compared to 1990s multimedia the level of photorealism and the aesthetic quality are obviously superior, but the concept is the very same. And also the theory behind real-world metaphors is still the same: They should help the user understand and learn how to use virtual artefacts by transferring knowledge from real

world interaction to the computer world. In their Human Interface Guidelines for iPhone and iPad, Apple therefore recommend the use of real world metaphors as standard practice: "When virtual objects and actions in an application are metaphors for objects and actions in the real world, users quickly grasp how to use the app." [4] Addressing possible limitations of such an approach, Apple are worried only about possible shortcomings of the real-world antetype's functionality: "The most appropriate metaphors suggest a usage or experience without enforcing the limitations of the real-world object or action on which they're based. For example, people can fill software folders with much more content than would fit in a physical folder." [4] This is a quite one-sided view – only focussing on limitations of the real-world object and disregarding the limitations of the virtual object. When we see a book in the real world we exactly know what we can do with it, how we handle and navigate it and we also know what we are not able to do with it. With a photorealistic representation of a book on a screen this is different. Of course the resemblance to a book gives the user some clues how to possibly interact with the interface, but it is quite clear that the user can only interact in ways that are anticipated and implemented by the creator of the software. Probably it is possible to "flip pages". But there are several ways how to flip real books' pages – where do you have to touch the page, what kind of movement is expected? Is it possible for users to write annotations? How? Does it allow to mark pages with dog-ears – and why not? Is it possible to rip out pages?

Based on everyday experience we know how we can interact with our environment and what we can do with the objects surrounding us. Due to this everyday experience we are even able to anticipate possible uses and interactions with artefacts we have never seen or touched before, just by looking at them. [5] We immediately know how our body relates to the objects, for instance if we can sit on it or where we can put our fingers in. And we successfully anticipate possible handling and mechanical constraints of objects. Well designed artefacts stimulate these expectations by indices – visual cues communicating their handling – and by that make a product self-explanatory and easy to use. "Which parts move, which are fixed? Where should the object be grasped, what part is to be manipulated? [...] What kind of movement is possible: pushing, pulling, turning, rotating, touching, stroking?" [6] Needless to say that the induced expectations should be met at the end. Elements that look moveable should be moveable in the expected way.

CAN INTERFACES BE NATURAL?

Most of this kind of everyday knowledge today is not "natural" but deeply rooted in technology driven culture. Interaction with light switches, bicycles or books may feel natural for us, but it is artificial. In any case there is not too much difference in figuring out how we can climb a tree (natural), or how we can use a knive (artificial). Both is based on experience, which implies that it has to be learned in the first place no matter if natural or artificial.

The same is true for virtual interfaces. We make asumptions about how they can be operated and controlled based on experience. This experience today primarily is experience with other virtual interfaces and only in the second place it is based on knowledge aquired while interacting with physical everyday objects. When test users of a gestural interface where asked what kind of gesture they would expect for accessing a selected item, the majority proposed pointing at it twice – a double tap in the air. [7] This is clearly not a natural gesture, but it has been internalised in years of performing double clicks in standard desktop interfaces. With more and more people growing up with digital media, the discrimination be-

tween knowledge from the analogue world and knowledge from the digital domain seems to be anti-quated and obsolete. For so called "digital natives" a double click is more familiar and feels more natural than cracking a nut or peeling an orange.

When everyday objects are used as interface metaphors some interaction techniques will be anticipated and expected, but the intersecting set of possible interactions shared by real and virtual artefacts is actually rather small and is determined entirely by the software design. So there is are two gulfs to bridge in order to use such an interface effectively. One is the difference between what the real objects allows or affords to do and what the virtual one does not. The second gulf is the difference between what the virtual interface allows or affords and what the real thing does not (see figure 1).

Invisibility and Intuition

Actually the problem is not the difference between the two sets of interaction possibilities but the lack of knowledge about it. In interfaces with a hyperrealistic reproduction of everyday objects this lack of knowledge is mainly caused by a lack of visibility. The interface lacks visual cues of what is operable and what is not.

Despite this conflict between real life metaphors and visibility, Apple also recommend to pay attention to readily identifiable interactive elements: "Controls should look tappable. iOS controls, such as buttons, pickers, and sliders, have contours and gradients that invite touches." [4] Already a superficial analyses of iOs applications shows that this works fine in abstract interfaces where clickable elements are clearly discernable – by visibility and by convention. But real live metaphors often lead to inconsistencies. Shape and materiality of virtual objects "invite touches" where touching has no effect. Then again clickable and movable objects are not identifiable by the eye: paper pages do not look scrollable, telephone numbers do not look clickable.

For decades mobile device interaction lagged behind desktop software, mainly due to hardware limitations. Since the introduction of the iPhone in 2007 it has been the other way round: interaction techniques of mobile devices drive innovation in standard desktop interaction. Apple continue to implement multitouch gestures, which were developped for mobile touchscreens, to classic input devices like the trackpad and the "Magic Mouse" a mouse with a multitouch area on its upper surface. In the tradition of the "direct manipulation" interaction paradigm, this is said to make interaction more intuitive: "New Multi-Touch gestures [...] let you interact directly with content on the screen for a more intuitive way to use your Mac." [8] Several different definitions of intuition exist in philosophy and psychology. It is probably easier to agree on what intuition is not: It is not a discoursive or conscious process of reasoning. It rather is a way of judging and decision making without analytical reflection, mainly based on tacit knowledge. Tacit knowledge is indeed unconscious. But it is also, like knowledge in general, based on experience – that means it has to be learned. For instance there is no "natural" way of interaction with a map, because using maps is already a cultural technique. Once we learned how to work with real maps this knowledge can be helpful to work with digital maps as well. Touching and moving maps around works intuitively indeed, but Apple offers more: "New gestures include momentum scrolling, tapping or pinching your fingers to zoom in on a web page or image, and swiping left or right to turn a page or switch between full screen apps." [8]

The popular two fingers "pinch" gesture to zoom maps, images and websites is not intuitive at all: Neither the interface shows any sign that would indicate "pinchability", nor does the idea of a real map or photograph suggest "zoomability". Again the problem is that the virtual artefact does not actively communicate what kind of interactions are possible in addition to our tacit knowledge from the real world. The pinch gesture is successfull, not because it is so intuitive – it simply isn't. It is merely easy to learn

and easy to remember. Actually it is not based on a real life metaphor – in the physical world it is hard to find any example where objects can be scaled by simply moving two fingers. But still it is learned and remembered easily due to the simple analogy it is based on: A change in distance of the two fingertips is proportional to the change of the size of the touched object. Accompanied by direct visual feedback the logic of this interaction method is understood immediately.

But without knowing that one can "pinch" a map or a photograph hardly anyone one would try. This simple fact does not attract too much attention because seeing the gesture just once in one of Apple's TV commercials for the iPhone or the iPad will suffice to understand and remember. This leads to the conclusion that interaction does not need to be intuitive, but has to be learnable.

Conclusion

Merely copying reality does not necessarily lead to understandable interfaces. When using real life metaphors, designers have to be very conscious about interaction disparities between real and virtual objects.
Much more important than intuition is a good balance of learnability and effectiveness. What a good balance is of course depends strongly on the type of user and the context. Especially in professional software intuitive use and learnability do not have to be top priority. In the long run rather ease of use and effectiveness are crucial. For a software that is used on a daily basis and for years some learning effort for the sake of effectiveness will be worthwhile.

The terms "simple", "easy" and "intuitive" seem to work perfectly as marketing phrases. As general and universal goals in interaction design they should be refused. Often easy to use artefacts do not have too much potential and power. Just take a violin and a triangle (the percussion instrument) and consider their learnability and their potential – probably not everything in life should be about ease.

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THE LIGHT AT THE END OF THE TUNNEL: AN INTERACTIVE INSTALLATION IN PUBLIC SPACE

Selin Ozcelik

While the interactive media become ubiquitous in public space, how it communicates with its site stays as a question. In this paper, an alternative answer is offered by analysing a multimedia installation focusing on how the social components are triggered by digital interaction. Consequently, the importance of social integration and social-site-specifity become apparent as additional components in the design of interactions in public space.

no caption

"*Like all social practice, spatial practice is lived directly before it is conceptualised...*" [1] (Lefebvre 1991)

It was a rainy day in April 2010 in Frankfurt. As one of the most central junctions of the city, Willy Brandt square was crammed with many people who were hastening to their goals. People who were hurrying up to the main station, waiting for their trams at the tram station, waiting in a line in front of the theatre, walking through the opera building at the bank square. Business women, business men, students, employees, unemployed, visitors and habitants of Frankfurt, old people, young people, children...The passers-by of this junction were streaming to the underground metro station as the rain flows to the underground.

A man's shouting was heard at the metro station 'I am Paul Auster! It is not my real name!'. People could not realise what was happening down there. 'You are the baleful one, that maculates the country', the other one answered accusingly. Then a scared young woman stated 'I think... you never had loved'. Then another woman was proud of herself stating that she had a mission there. Surely, people could not understand what was happening at their usual metro station on that day overhearing the loud yells of all these people. After a few steps a light theatre welcomed them at the top of the escalators with the voices of Quinn of Paul Auster, Terasias of Sophokles, Lulu of Wedekind, and Motte of Stockmann under the stage lights.*

'The Light at the End of the Tunnel' is an interactive sound and light installation, produced by Atelier Markgraph GmbH in collaboration with city theatre Schauspiel Frankfurt, Martin Lighting Professionals and the station managers VGF, for the fifth Light Culture Festival, Luminale 2010 in Frankfurt . The Light Culture Biennale, Luminale, is held parallel to the Light + Building trade fair every two years in the city. [2] It is a creative platform which make the light professionals and lighting artists, designers, urban planners and architects meet, and gives them an opportunity to illuminate all over the Rhein-Main region collaboratively and innovatively. During the festival, the city becomes an open space to create site specific illuminances. Around 150.000 visitors of the festival witness a colourful ambience around the sky scrapers, on the historical museum buildings, at the public squares and through the boulevards of the city. That is to say, during the Luminale the light becomes a medium to transform the city into an art space creating new visual experiences through it.

Hosting also the city theatre, Schauspiel Frankfurt, the underground station at Willy Brandt square is a meeting point of thousands of people during the Luminale. With four entrances and three floors, it is an intersection of six underground metro lines. Within a human traffic, the passers-by's experience of 'the Light at the End of the Tunnel' starts at the entrance of the station with the voices of the actors from the original theatre plays, and with the guidance of floor markings. After walking through these, at the B-level of the station, people encounter a bright, colourful theatre scene with moving stage lights and an eight-meter-long LED panel. It is a set for passengers and passers-by whose audience are the people driving the escalator. As they move on the stage, they can activate quotes taken from current plays at Schauspiel Frankfurt. By stepping on one of the role markings, a passer-by can trigger the stage lights which spot him, the LED panel which lights the quote of corresponding character of the role marking, and the sound which is vocalized by the theatre player. In this means, a multimedia performance takes place interactively. A quote from a classical play and another one from a contemporary play were embodied by the participants like a conversation. Similar to the stage at 'Théâtre de l'espace'**, 'spectators experienced the scenes juxtaposed with one another, whether in a planned confluence or a chance intersection of sights, sounds, and narrative.' [3] With this interactive setting, a passer-by creates his/her own theatrical narrative by experimenting different roles of this interactive play. Additionally, s/he can be a part of a common performance where the other fellows act on the stage. In both cases, purposely or unknowingly, people, who only pass by, become the actors or the audiences of a theatre play which narrates 'the moment' in this specific public space.

That is to say, it can be claimed that 'The Light at the End of The Tunnel' is nourished with its potentials in enhancing these moments and in triggering social interaction among people. Besides that, it also sustains the social interaction supporting the social function of its public space as a component of digital interaction. It uses light, sound, graphic not only as architectural components but it congregates them via interaction and supports the public content of its site. Beside the regular function of this public space, it provides people an opportunity to involve in creating another social layer in this public space. A metro station, as a place where people only go by, is transformed into a public space where an additional social communication level achieved via multimedia. They pause, they share moments and create their own narratives with fellows or with strangers using interaction. They try to catch the stage light on themselves, jumping on to a classical role from a contemporary one to create an absurd dialog or moving continuously to change the light ambience of the whole room. With the presence of such an interactive installation at a metro station, people become aware of the 'publicness' of this public space that they have already become a part of, and start to construct a new kind of social relation with people around them. It is definitely a physical intervention to their usual, mundane, every day space which creates awareness via attention, participation, collaboration and performance taking place in this public space.

Thus, 'the Light at the End of the Tunnel'*** becomes also a catalyst to arouse social interaction there. In this sense, this place gains a public layer beside its functionality where people share an experience. In that means, if McLuhan's approach of 'the light as medium itself' is considered, it can be claimed that, 'the Light at the End of the Tunnel' transcends being a 'light bulb' [5] with the communicative exchange with its public. Within a context of a light festival, it intervenes the public space creating a dynamism in social interaction. This is because it is not only site specific in terms of architecture but also site-specific for its social context. With this social-site-specifity, the installation as an 'intervention' in the public space becomes an 'integration' into the public space by stimulating and supporting its publicness.

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In this project, ten roles and around fifty quotes from the plays in the April 2010 programm of Schauspiel Frankfurt were selected for the interactive setting. These plays were 'Antigone' of Sophokles, ' Oidipus of Sophokles ', 'Das blaue blaue Meer' of Nis-Momme Stockmann, 'Lulu' of Frank Wedekind, 'Stadt aus Glas' of Paul Auster, ' Phaedra' of Jean Racine and 'Geschichten aus dem Wiener Wald' (Anonymous).

*** Théâtre de l'espace is an experimental space performance by Architect Edouard Autant and actress Louise Lara. In Gray Read's words this experiment 'used theatre to investigate architecture as an art of situation, of placing people in meaningful spatial relationships with one another. Autant designed the Théâtre de l'espace to model the experience of an urban plaza with multiple, simultaneous scenes that both surrounded and were surrounded by the audience. Performances juxtaposed fictional narratives, improvisation, and real situations to propose a paradigm for public space in a modern, collective society. Through theatre, Autant and Lara investigated architecture not as form but as action, a practice particularly relevant to design in cities.'*

****The Light at the End of the Tunnel won the prizes iF Communication Design Award 2011 (Gold-Interactive Installations), German Designers Club Award (Silver-Environmental Design/Architecture), Art Directors Club Germany 2011 (Bronze-Events).*

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THE RHETORIC OF THE JPEG

DANIEL PALMER

As a method of compression for digital photography associated with the World Wide Web, the JPEG is today the default mode by which we experience on-screen images. Curiously taken for granted in discussions around digital photography, this paper asks what is at stake in the development and implementation of this standard, and proposes that the JPEG is a social and ideological phenomenon.

JPEG compression artifacts (saved at low quality) Image credit: Daniel Palmer.

Fifty years ago, Roland Barthes famously called the photographic image "a message without a code". [1] Barthes was concerned with its illusionary transparency or 'photographic paradox', the double structure of what he called 'denoted' and 'connoted' meanings operable in the reading of any photograph. Three years later in his essay "The Rhetoric of the Image" (1964) – hinting at the medium's indexical nature that later preoccupied him in *Camera Lucida* – Barthes tells us that the relationship of signifieds to signifiers is not one of 'transformation' but of 'recording'. As such, he argued that *reading* a photograph involved relating it to a rhetoric – all the social codes within which signs make sense to readers (including the function of postures, expressions and gestures; associations evoked by depicted objects and sequences; and accompanying text). Yet the image itself, Barthes argued, is "a message without a code", since being "captured mechanically" it does not involve "rule governed transformation."

Charge-coupled devices (CCD) were already under development when Barthes published those essays. By 1969 CCD sensors could convert photos to electrons, collecting light and converting it to a voltage charge and a numerical code. And by the mid-1970s, computer programmers set to work on developing

compression techniques that would eventually lead to standards such as JPEG and TIFF. Digital photography is encoded all the way through, in elaborate algorithms built of zeros and ones, yet this code remains as invisible as the social codes that govern the reading of images. Under normal circumstances, when we see a digital image on-screen, or printed on paper, its numerical basis is repressed. The makeup of the image only becomes visible when the algorithms are pushed, typically in the form of cosmetic disturbances such as jagged edges. Usually undesired, compression artifacts – and other blocky raster effects – are like the accident in Paul Virilio's economy of speed, unforeseeable but substantive. Compression artifacts have themselves become the basis for creative exploration, most famously in Thomas Ruff's *jpeg* series, which ironically demand to be seen in the flesh, rather than on-screen.

What is a JPEG? The Evolution of a File Format

As a method of compression for digital photography closely associated with the World Wide Web, the JPEG is today the default mode by which we experience on-screen images from computer monitors to mobile devices. According to a 2011 press release from the official site of the Joint Photographic Experts Group that gave their name to the format, over a trillion JPEG images have been created (see www.JPEG.org). The same press release states that the format has "contributed to the progress of e-commerce, where digital images offer new opportunities in the form of products and services" and that "the existence of standard image coding formats" has been an "enabler" of our "digital imaging ecosystem". Facebook and Flickr are celebrated as part of that ecosystem, while the growth of the online pornography industry is unsurprisingly neglected (Thomas Ruff once again draws our attention back to this them in his *Nudes* series).

Most photographers and media theorists – surely everyone reading this – know that the JPEG is a technical standard that specifies how continuous-tone image data is compressed into a stream of bytes and decompressed back into an image. Beyond that, the JPEG is strangely unknown, almost completely neglected in the critical literature around digital photography. On the one hand this is unsurprising; after all, most photographers barely understood the history of Kodak, Agfa or Fuji film stock either. It was just a neutral substance, and the choice to use one or the other was based as much on habit as aesthetic preference. As for the (art) history of photography, where the final image is privileged, discussion of the technical means of its production is considered vulgar (even as this is a regular topic of conversation among photographers themselves). But the JPEG is different from film, since it is not something we choose to use, being built into cameras and the default file-sharing format. Undoubtedly its history – buried in reports and technical releases – is obscured because it appears so 'natural', and so concurrent, to the digital era. And indeed, its history is unremarkable. Following early research in the 1970s around the 'discrete cosine transform', international standards bodies began the push for an image compression standard in 1982. The resulted in the formation of the Joint Photographic Experts Group in 1986 – as a joint committee between the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU). The official standard dates to 1992 in Geneva.

As part of that "general interface between systems of equations and sensory perception" – as Friedrich Kittler describes computing – the JPEG format was designed to exploits the human eye's differing sensitivity to chrominance and luminance, to discard information that the eye cannot easily see. [2] Essentially this means the so-called 'redundant data' of subtle color distinctions and high frequency brightness variations. However, since the quality of the image declines as this data is removed, JPEG compression is considered 'lossy'. The original format offers only 8 bits of data per color, providing a relatively coarse

256 levels between complete darkness and complete brightness. Images containing large areas of a single color, such as blue skies, are therefore particularly prone to compression artifacts. Nevertheless, a 20:1 compression ratio can be achieved without noticeable loss of quality. If rhetoric is classically defined as "the art of adapting discourse, in harmony with its subject and occasion, to the requirements of a reader or hearer", the rhetoric of the JPEG involves reducing an image's file size to the minimum without drawing attention that loss.

Smaller file sizes are useful for two obvious reasons: to save memory or disk space, and for faster transmission across networks. Since JPEG compression was developed at a time when memory was expensive, camera makers welcomed more images fitting on a memory card. Moreover, the release of the JPEG format coincided with the first popular graphical web browser, NCSA Mosaic, in 1993, quickly followed by Netscape, Interent Explorer and the popular explosion of the Web in the mid-1990s. In those early years, so-called 'progressive JPEGs' divided image files into a series of scans for progressive rendering as they loaded over slow dial-up modem connections. Each scan gradually improved the quality, with the image slowly loses its blurriness and becoming clearer. But even this did not stop me from choosing the option of 'turning off images' in the browser preferences – an option still available on many web browsers.

As Lev Manovich suggested in 1995, rather than "an aberration, a flaw in the otherwise pure and perfect world of the digital", "lossy compression is increasingly becoming the very foundation of digital visual culture." [3] Indeed, amateur photographers have proved unexpectedly content to accept a lower quality image for the convenience of digital speed. Kodak, in particular, eventually admitted their early miscalculations on this front. As the bulk of their profits had come from manufacturing film, Kodak came belatedly to promoting digital cameras for obvious reasons – and not least as they mistakenly believed that film sales would continue to flourish simply because celluloid produced a superior image. Kodak, perhaps more than any other company, should have realised that economics and efficiency always win out over image quality.

Image quality remains the primary discourse in which JPEGs are understood by the photographic community. A typical online photo-lab will offer advice regarding the level of JPEG compression that "will not lead to visible loss in quality or detail." More dramatically, a best-selling guide to Photoshop proposes that: "shooting in JPEG mode is like taking your film to a high street photo lab, throwing away the negatives and then making scans from the prints." [4] The argument here – spurred on by the rise of so-called RAW and DNG (digital negative) files – is that JPEGs are degraded, even inauthentic, copies. It echoes a common misconception about JPEG images that they degrade each and every time they are opened. For serious amateurs and professionals, RAW and DNG files are akin to 'digital originals'. Even more than compression is at stake: JPEGs are associated with 'destructive editing' and tied to 'in-camera' processing of qualities like colour balance and sharpness, as opposed to the ability to post-process such settings in software like Photoshop, Lightroom or Aperture. In many respects the RAW vs JPEG debate thus updates the craft versus automation tension that Julian Stallabrass discusses in his 1996 essay "Sixty Billion Sunsets". [5] On one hand, the drive behind JPEG-producing point-and-shoot camera design is to automate what used to be called 'previsualisation' –most recently including smile-activated shutters and 'face recognition' that prioritise the focus and exposure when a familiar face appears in the frame. Stallabrass' argument – that relieving the camera user of manual control has the paradoxical effect of *mystifying* the camera's processes – still holds. Indeed, iPhone apps even play with the automated 'developing' of JPEGs in nostalgic ways (leading to recent minor controversy when photojournalist Damon Winter won an award for using the Hipstamatic app in Iraq). On the other hand, the economics of film-less photography also encourages photographers to 'over-sample' the subject, and defer their

imaginative conception of the image to its post-processing. The increasingly widespread awareness that to post-process JPEGs is to risk an avalanche of artifacts has at least focused attention, among serious amateurs, to file formats, including the issue of the proprietary nature of RAW files and format obsolescence.

More importantly than image quality, the JPEG format is part of the new computational logic of photography. Crucially, all digital cameras also save JPEG files with EXIF data – an acronym for Exchangeable Image File. The term exchange is key here. The camera model and settings such as shutter and ISO speed, aperture, capture date and time, focal length, metering and flash mode, and geolocation are all stored as metadata – helping to enable images to be catalogued, searched, shared and used. Likewise, descriptive tags – increasingly semi-automated via software may also be built into the JPEG image via EXIF data. This metadata is fundamental to the workings of photo-sharing and social networking sites, and is part of the way the JPEG protocol enables *interoperability*. [6]

The Ideology of the JPEG?

The underlying question in this paper is: in what sense is the JPEG file format significant to or even determining of photographic cultures? That is, what are the unexpected consequences of a file format that has become the universal standard? My approach borrows from the emerging field of study known as 'software studies'. Lev Manovich, pioneering the field, has argued that there is no such thing as digital media in general, no "properties of a medium", only operations and affordances defined by software. [7] More recently Manovich has argued that software studies aims "to investigate both the role of software in forming contemporary culture, and cultural, social, and economic forces that are shaping development of software itself". [8]

Jonathan Sterne's work on the mp3 as an historical, cultural and political phenomenon is instructive here, enabling us to think about the JPEG as a format whose ubiquity across devices facilitates particular photographic practices. As Sterne notes, the mp3 is a form designed for massive exchange, casual listening and massive accumulation. As he argues: "The possibility for quick and easy transfers, anonymous relations between provider and receiver, cross-platform compatibility, stockpiling and easy storage and access" were all "built into the [file] form itself." [9] Precisely the same can be said of JPEG. Adrian Mackenzie, in an article on 'codecs' in Matthew Fuller's book *Software Studies: A Lexicon*, has shown the complexity of examining the MPEG format, arguing that its performative calibration, within precise "psycho-perceptual parameters", "refers implicitly to a great number of material entities ranging from screen dimensions through network and transmission infrastructures." [10] All of which is also true of JPEG.

Paul Caplan has recently argued that "protocols such as JPEG and XML 'determine' a new scopic regime characterised by network relations which is built around a discourse of 'the archive' and an ideology of visual democracy." [11] Caplan describes the JPEG as a protocol object, so familiar that it has "become transparent and taken for granted." [12] In this sense JPEG extends the discourse and sales pitch of photography, which has always been one of ease of use, accessibility and openness – that it is, "a nominally democratic medium". But as Caplan also observes, "this discourse of participation is clearly ideological when these imaging practices are located within the complex relations of ownership, control and power". [13] The new scopic regime is articulated around networks that are closed, proprietary, its "image spaces, existing as part of new media giants' such as Yahoo and Google's portfolios of dataspaces primed for mining and advertising, are actually private commodity spaces". [14] Borrowing,

among others, from Bruno Latour's 'actor-network theory' and Graham Harman's 'object-oriented philosophy', Caplan treats "the jpeg compression protocol as an 'actant' doing things in the world: making images findable and viewable in browsers; making them small enough to be distributed and exchanged in mobile spaces; playing a part in Facebook's face recognition business plans and Apple's App store domination." [15] The JPEG is thus 'enfolded' in imaging practices and industries, not to mention the economic-political relations of Web 2.0.

In the popular imagination, the JPEG stands for the democratisation of image making and the global distribution of the image. Take the rise of the amateur in news reporting. Iran was labelled 'The JPEG Revolution' on the front page of the *International Herald Tribune* newspaper in 2009. Indeed, we can be grateful that the JPEG is a royalty-free, open-source codec established by a non-profit UN-style organisation. Yet the primary motivation of the JPEG committee is to accelerate the adoption of new imaging products and services by the market. Today, as Caplan notes, images must become JPEGs, either captured or converted as such, if they are to find a place within social media. [16] By making the JPEG standard freely available, software publishers and hardware manufacturers can integrate support for the new file format into their products. Furthermore, the openness of the format is far from guaranteed. For instance, the JPEG committee recently formally adopted JPEG XR – extended range – as part of the continual evolution of the format. Although what was eventually ratified is an open format, Microsoft had hoped to retain some proprietary control when it submitted its 'HD Photo' format to the international standards organization in 2007 with greater dynamic range, a wider range of colors, and more efficient compression.

In 2010, Google – as part of its "make the Web faster" effort – announced a new WebP graphics format (pronounced 'weppy') with claims that its use could cut image file sizes by 40 percent. In a move that once again demonstrates the socio-technical basis of digital aesthetics, WebP has a tendency to blur images rather than create a JPEG like blocking – and is therefore better for facial skin tones in particular. Earlier this year, Google quietly slipped this potential 'JPEG killer' into Gmail, Picasa and its Chrome browser. If used, these Google interfaces automatically and invisibly convert JPEG images to WebP. Google's move is directly related to its effort to push their new web video format, WebM. In any event, faster file transfers and lower network burden are obviously attractive for Google, who point out that images make up 65% of the typical data of a web page. But there are penalties: encoding and decoding WebP images takes significantly more distributed computing power. And while both WebP and WebM are open formats, we should never forget that all the data around online images gets mined to become part of valuable algorithms to be patented and used to direct the unpaid labour of online attention through which audiences provide the basis for the advertising economy.

After twenty years, the JPEG is a powerful incumbent – built into every camera, Web browser, image-editing program, pharmacy photo-printing kiosk, and mainstream operating system in existence. These material environments illustrate the complex forces and relationships within which practices of digital photography operate, and invite us to move away from perspectives that seek the essential characteristics of the technology. By virtue of its ubiquity and association with the Internet, the JPEG is rhetorically tied to the idea of democracy in an age of distributed imaging, in which the image has been spatialised in global databases. More broadly, the very manner in which computer software in general separates the (image) interface from algorithm "makes it a powerful metaphor for everything invisible that generates visible effects, from genetics to the 'invisible hand' of the market", as Wendy Chun has recently argued. [17] The rhetoric of the JPEG, its persuasive power, lies in this same invisibility. As with the very idea of 'analogue photography', perhaps only once it is outmoded will the JPEG move into the critical light.

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EXAMINING ISSUES OF BODY IMAGE AND COMPLEX REGIONAL PAIN SYNDROME WITHIN THE DIGITAL

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Drawing upon the creation of a digital tool to replace self portrait sketches in the diagnosis of Complex Regional Pain Syndrome we will examine the body's depiction in the digital, drawing upon patient interviews to explore how the digital can help us understand our body image. In so doing it will challenge phenomenological accounts of the body and seek critique the structures that often assert the digital as an incorporeal space.

Introduction

Body image can be altered by pain, 'peripheral 'injuries such as amputations, or insults to the central nervous system. These conditions have also formed the basis of Merleau-Ponty's philosophical enquiry into how we might understand embodiment. Within clinical practice attempts are made to 'repair' patients' body image through rehabilitative techniques however the means of assessing these changes has been that of self-portrait sketches.

The use of self portraits has been problematic in that it has often been limited by the abilities of the patient and, not without irony, the additional limitations that the condition itself can place upon them. Alexa Wright's work on the Sci-Art funded *After Image* project (1997) investigated the phenomena of phantom limbs however the techniques involved in creating these images were not ones that could be easily utilised by patients within a clinical setting. As a result of this research was instigated that examined the possibilities of the manipulation of an avatar for suffers from Complex Regional Pain Syndrome (CRPS) within the Digital to communicate their experience of their body image. This was instigated by allowing patients to remove, scale, displace and render the body in a variety a ways.

This paper will examine issues concerning the perception and depiction of the body within the digital. It will draw upon research interviews with users of the system to explore how the digital, rather than promoting notions of 'virtual' self can help us understand our experiences of the physical. In so doing it will draw upon a phenomenological understanding of embodiment and seek to critique the structures that often assert the digital as an incorporeal space.

Complex Regional Pain Syndrome (CRPS) was first identified during the American civil war when it was named *Causalgia* derived from the Greek words for pain and heat which are symptoms typical of the syndrome. CRPS is associated with the body's extremities and can affect whole limbs. It is defined by two forms, Type 1 (CRPS1) and Type 2 (CRPS2), but the nature of the pain of this is common to both forms. In CRPS 2 the pain can (albeit disproportionately) be associated with identifiable nerve lesions or tissue damage however in CRPS1 there is no identifiable injury that can be associated with the pain that is suffered.

Our understanding of CRPS is still in development and there are still different sets of criteria for its diagnosis; a situation most likely exacerbated by the fact that many of its symptoms are not identifiable through the use of objective tests. As we have noted a common factor is chronic pain associated with heat; this is accompanied by extreme sensitivity and painful reactions to everyday sensations such as the touch of clothing. Along with this there are a range of other symptoms that may be experienced that can include the perceived (and sometimes actual) swelling of limbs and the sense that the affected region does not belong to the patient; in some cases this can lead to a desire to have the limb amputated. Perhaps one of the most perplexing aspects of these symptoms for patients and clinicians is that they can vary greatly through the course of a day.

As a result of these factors there has been a tendency to believe that there is a psychological basis to CRPS. However a systematic review[1] of research concerning this relationship has suggested that there was 'no relationships between psychological factors and CRPS1'. In fact the frustration of trying to understand and convey these symptoms can be more of an issue, in fact one patient involved with our study noted that 'I really thought I was losing it.'

 If the range of experiences described are not the result of the patient's psychological makeup how might we begin to understand these symptoms?

Body Image

Although body image is susceptible to distortion through psychological factors (as seen in conditions such as anorexia nervosa) neurological studies have shown that other factors play into its creation.

Work by Ehrsson, Holmes and Passingham's has sort to investigate this through an investigation of the "rubber-hand illusion". The illusion concerns the perception that a rubber hand was a part of a subject's body; this was generated by providing sight of a rubber hand being brushed whilst simultaneously brushing the subject's hidden hand. Ehrsson et al sought to establish whether the illusion was more than simply a result of the visual representation of the hand being brushed. This was tested by blindfolding their participants and moving the subjects hand to touch the rubber hand whilst simultaneously touching the participants hand in the 'same' place.

The results demonstrated that the illusion could be generated though synchronous touching without the need for a visual representation. Further tests also asked subjects to locate the index finger on the hand subject to the illusion. This revealed an error in locating the finger that appeared to be dependent upon the veracity of the illusion. Given this it appears that the illusion's power was such that it remapped the perception of where the participant's hand was in space.

The Role of the Somatosensory System

The Somatosensory system incorporates the receptors and processing that provide our sense of touch, temperature, body position (proprioception) and pain (nociception). McCabe, Cohen, Hall, Lewis, Rodham and Harris have proposed that disruptions within the somatosensory system can begin to account for the symptoms described within CRPS[2]. They note how our body image is formed through the

...integration and processing of multimodal sensory percepts that involve the peripheral nervous system and central nervous system (CNS).... This is not a unidirectional system, whereby the CNS simply responds to a peripheral stimulation, but is a bidirectional process in which CNS activity may induce consequences.

This has some reaching consequences for our understanding of what we might understand body image to be. We often assume that our bodies are a given around which our perceptions are formed. The phenomenologist Edmund Husserl notes that

The Body is in the first place the medium of all perception...the zero point of orientation... each thing that appears has eo ipso and orientating relation to the body. (Edmund Husserl, *Ideas II* trans. Rojcewicz & Schuwer, Kluwer, 1989 p 61)

This is perhaps most clearly expressed in the phenomenology of Maurice Merleau-Ponty.

If my arm is resting on the table I should never think of saying that it is beside the ash-tray in the way the ash-tray is beside the telephone. The outline of my body is a frontier across which ordinary spatial relations do not cross. This is because its parts are interrelated in a peculiar way: they are not spread out side by side, but envelope each other. (Maurice Merleau-Ponty, *The Phenomenology of Perception,* trans. Colin Smith *,* Routledge, 1962 p98)

Phenomenology quite literally places the body centre stage and one might even claim that Merleau-Ponty's philosophy is based around an a-priori status for the body. In contrast to Merleau-Ponty's assertion, within CRPS we discover patients who can experience a limb to be foreign to their body and who possess 'a poor awareness of its location in space'.

 In fact when asked to move an affected limb suffers of CRPS often do not move the limb itself but move from the unaffected part of their body as if the limb were an *object*within their peripersonal space (and therefore affectively 'besides') their body. In this regard we discover circumstances within which ordinary spatial relationships *have* entered the body.

Rather than possessing the body as a 'given' to which sensation 'adheres' it appears that body image emerges from the relationship between sensation and the CNS. Given this the 'enveloping' to which Merleau-Ponty refers effectively occurs prior to the body image. If sensation is not something appended to the body 'External' sensation and proprioceptive perception by necessity will envelope each other as they are processed by the CNS generating our body image and sense of space.

Changes in Body Image

Our somatosensory system is known to be involved in more than just the perception of what we might consider to be our own sensations. When viewing the experience of others and imagining activities of various sorts the somatosensory and premotor cortices becomes active. Antonio Damasio describes the empathetic sensation of pain that we can experience as the "as-if-body-loop" mechanism.

It involves an internal brain simulation that consists of a rapid modification of ongoing body maps. (Antonio Damascio, *Looking for Spinoza,*Heinemann p 115)

However the notion of a body map is in itself problematic as Damascio points out

The result of the direct simulation of body states in body-sensing regions is no different from that of filtering of signals hailing from the body.... What one feels then is based on "false" construction, not on the "real" body state. (Ibid)

Damascio's use of scare quotes is appropriate because the sensation is real, what differs is that in that empathising with somebody who has grazed their knees although we've physically not gone through that event we experience it in another way. Similarly the experience of CRPS patients is real even though they apparently possess a 'normal' limb.

A condition that has similarities with CRPS is Fibromyalgia (FMS). The symptoms of FMS include widespread pain, hypersensitivity to sensory stimuli, phantom swelling of limbs and reduced sensitivity to the position of limbs and motor abnormalities such as tremors or slowness in movement.

In order to examine whether a dysfunction in the interaction between motor and sensory systems might be involved in symptoms experienced in FMS McCabe et al conducted a series of tests using a mirror/whiteboard that created varying degrees of sensory conflict during congruent/incongruent limb movements. The results of this were that 89.7% (26 out of 29) of patients with FMS involved in the tests reported changes in perception compared with 48% of a healthy control group. The sensations experienced included...

...disorientation, pain, perceived changes in temperature, limb weight or body image. Subjects described how these symptoms were similar to those they experienced in a "flare" of their FMS. This led us to conclude that some sensory disturbances in FMS may be perpetuated by a mismatch between motor output and sensory feedback.

Whilst it appears that this mismatch plays a role within FMS it was also the case that the healthy participants also reported (albeit at a lower incidence) changes in perception. Rather than being a phenomena exclusively linked to the pathology of FMS the results of these tests point towards what appears to be the emergent nature of body image as an a priori condition of perception. The anomalies that appear to exist within FMS therefore appear to make those who suffer from the condition all the more vulnerable to new anomalies. Given this it would appear that within CRPS such disturbances are exacerbated.

Given the close integration between (the enveloping) of body image and spatial perception it appears that conflicting sensation, proprioception and visual perception or faulty sensory integration might explain the experience of CRPS patients who have difficulty in locating their limbs or who feel that they are not a part of their body.

Communicating Painful Contradictions

The right side of my whole body actually feels quite normal, there no problem with that I don't have any difference in perception to what I see with that...

Because of the fact that CRPS is not well known diagnosis can often take some time. As was noted by one patient in our study

The thing I found difficult was getting this far, my GP knew nothing, so the diagnosis took forever...

During this period patients suffering from CRPS often doubt themselves because of the contradictory nature of their experiences.

A method currently used in assessing CRPS is the use of self portrait sketches or drawings made by clinicians; these have a number of limitations such as the ability of patients or staff to render these sensations. These are often revealing for those suffering from CRPS because it can often be the case that patients have not fully considered the nature of their sensation. It appears that they have often been trying to deal with the contradictions rather than 'inhabit' the sensations resulting from CRPS. One patient noted that

...its quite new to me because I hadn't really thought about this until I came in here.

This could be due to the nature of the sensations encountered...

I know there are fingers there and I even move them, I can't see fingers when I try closing my eyes to see it, I don't see anything, I just see a big blob

Inspiration for the development of a tool that would assist patients in communicating their symptoms came from Alexa Wright's *After Image* project which dealt with the experience of amputees and phantom limbs. Whilst Wright's work used Photoshop to manipulate photographic images of amputees this wasn't appropriate for the creation of a tool that could be easily used within a clinical setting. The spatial anomalies experienced CRPS patients also suggested that the development of a 3D tool would be more appropriate.

As a result of this a prototype tool was created that allowed the positioning, scaling and colouring of body parts to see whether this would aid patients in their description of their experiences. This was tested with patients suffering from CRPS who attending the Royal National Hospital for Rheumatic Diseases (RNHRD) in Bath.

Ethical clearance for the tests was of course required. One of our concerns was that in discussing their condition the level of pain experienced by patients often increases, as a result there were concerns that

use of the tool might negatively affect patients and so measures were put into place so that this could be addressed if it were to occur.

The tool was well received and considered to be a valuable improvement over established methods. What was interesting was that within the interviews that we conducted patients were asked if the experience of the tool was distressing for them in any way. In a number of instances increased pain was experienced but other benefits were expressed.

No, I don't think I've got a bad feeling from doing this, it's not a bad feeling it's just to me looking at that .... puts it into perspective what I've got its just I don't know how to explain it, it looks in human form exactly how I feel and I've never had that...

It was also the case that appeared that even if it hurt the process might have helped reconcile some of the contradictory sensations experienced by patients.

Patient: Seeing something and knowing that it's *your hand* is errm how can I put that into words, its erm, I don't know it I suppose accepting now that it's there, it's happened, I've got it..

Interviewer: Does this help you accept it?

Patient: *Yeah*, because you can see it...

Although the it was not something we sought to address through the use of the tool it is interesting to note that it may have benefits in the acceptance of the condition.

It wasn't that I disliked using it, it's just... for me as I say to visualise that how I feel I felt a bit emotional, but the more I'm looking at it, it's only because I'm sitting here thinking that is exactly how in my mind's eye what I look like so it was a bit of a shock I suppose.

The Nature of Pain

You can't see pain

By its very nature the tool tended to focus upon the perception of the scale, position and possession of limbs. However the depiction of the quality of pain and the degree of contradiction often experienced within that pain was something that required further development.

My hand feels as if it's absolutely on fire and then if somebody touches it, it feels cold, and this pins and needles and I don't know how to represent that...

In fact these contradictions appear to be central to the nature of the pain experienced by many with CRPS.

These fingers here are numb, I suppose in a way they should be transparent really shouldn't they... 'cause these three fingers here are numb, I feel I could just stab them, but it's still got that hypersensitivity in it.

As a result of this we have now embarked upon the development of techniques that allow patients to approach a visual description of these sensations. However the sensation of 'pins and needles' described by one patient was, to varying degrees also reported by others.

Ok so the skin surface doesn't feel any different here, but when I've got my eyes closed it's very, it almost feels as if it's... if I say it's not there you know when you've sat on your foot and its gone to sleep, its that sort of feeling so you sort of know its there but if somebody said where is it its quite difficult to say it's just there...

In itself this provokes interesting questions concerning the issue of ownership of affected body parts... what if the pain is associated with a lack of sensation?

This opens up upon one of the therapies being used to minimise the pain suffered by those with CRPS. One of the emergent techniques used in treating CRPS concerns the sensory mapping of the affected region. It has been found that sensory retraining of the limb can reverse cortical changes and reduce pain.[3][4] Staff involved with the development of the Body Image tool are involved with the development of an Electrical Sensory Discrimination Therapy device (ESDT) that can improve sensory discrimination in the limb of healthy subjects and those with CRPS (funded by the NIHR[5]).

Conclusion

What does all of this mean for the electronic arts? For many years there has been a tendency to view the data of electronic systems as being akin to the idealism of Plato. The evidence of neuroplasticity and devices developed by scientists such as Bach-y-Rita has been used to support such claims. However as we have seen vision also plays a part in the somatosensory system; it may be the case that devices such as the BrainPort naturally play into this.

However as we have seen through our discussion of CRPS perception appears to be far more complex than a simple case of sensory input and neurological output. What we need to do is to begin to develop an understanding of the ways in which the somatosensory system works and the ways in which it participates in the generation of our body image. If we were to buy into the rhetoric of a digital realm of the ideal, any attempt to achieve the production of a body image in any other world seems fraught with potential problems. However it also the case that the digital can be used to realise images that reflect the realities of that system for those who suffer from conditions such as CRPS.

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ON BREATHING AND GEOGRAPHY – SONIFYING THE SEVERN AS SHARED GENERATIVE ART PRACTICE

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Using the example of a sonification prototype that explores the Severn estuary rhythms, this paper discusses possible frameworks for larger, multi-dimensional sonifications. It explores the necessary compromises between quantifying and qualifying data and argues that skillful use of sound compositional techniques, data mapping and participatory practices can deepen and intensify listeners' experiences.

Severn Bridge, 2010, Owain Jones, photographic media, Copyright Owain Jones.

The Severn Estuary in Southwest England (fig. 1) deserves great attention: with an enormous tidal range and three million people living around its shores, it is a unique site of interlinked and clashing rhythms. Moreover, the passage over or under the estuary, industry and tourism affects a much wider, and not necessarily local, population group. This is the target audience for Sonic Severn, [1] a small but growing online collection of soundscapes, sonifications and compositions about the Severn Estuary, curated by Tidal Severn.

Using the example of a more recent data-driven sonification prototype that explores the Severn estuary rhythms, this paper discusses possible frameworks for larger, multi-dimensional sonifications. It explores the necessary compromises between quantifying and qualifying data that can influence listeners' interpretation of sounds, and discusses different kinds of 'accuracies' that may be applied in the creation of sonic representations. These accuracies are often connected with listeners' perceptions of how they are connected with this landscape. It is argued that skillful use of sound compositional techniques, data mapping and participatory practices can deepen and intensify listeners' experiences of generative processes.

The sea's ebbs and flows, storms, swirls and stagnant waters have inspired many well-known compositions, such as Vivaldi's La Tempesta di Mare, Debussy's La Mer, or Vaughan Williams' Sea Symphony. Some of the rhythms of the sea can be especially well grasped in tidal landscapes such as the Severn estuary. But in addition to rhythmic changes, more intrinsic links between tidal landscapes and sound practices can be made. For example, plots of tidal ranges and plots generated by sound oscillators both exhibit typical sine wave structures. Coastal gauges calculate the tide height by mathematically eliminating wave heights, while in sound synthesis gauges limit the frequency range of signals. Tidal patterns are predicted via Fourier analysis – a method that examines fundamentals and their harmonics – while in sound practices Fourier analysis can be used for the generation of overtone-rich notes. Thus many of the methods used for the analysis of tidal processes are also applied in sound synthesis.

For a tidal sonification, exploring these commonalities may seem like a useful starting point, and yet such an approach overlooks the role of human experience. A landscape like the Severn estuary is not only read logically. Once immersed in it, sensations force themselves upon us: its unforgiving wind blasts the skin and makes the eyes water, its rain sticks sand grains to the skin; we smell and taste it. Before we know it, these sensations are shaped by our internal blueprints – memories, habits, cultural norms – and so we might start to think that the wind intentionally plays with our bodies, or that the estuary teases us with mudflats and quicksand pools. Interpreting what is around us is such a strong mechanism. It informs our habitual thinking patterns and shapes our expectations. When it fails, we tend to feel let down by the situation we encounter and less so by our expectations of it. Heading for a day out at the Severn beach for instance, we might be disappointed with the vacant scrubland we find but still not question what we hoped to see.

Indeed, habitual thinking patterns are hard to break. They can easily undermine the process of sound mapping itself. If we were to map the Severn estuary sediment for example, we would encounter the following problem: although the Severn estuary has one of the best-researched sedimentary regimes in the world, it is still difficult to pinpoint the sediment location. This is because the 30 million tons of fine silt that are suspended in the estuary's waters during a typical spring tide, are not equally distributed. There are areas of denser and less dense suspension, and some areas remain stationary (pools) while others move with the tides (slugs). [2] Moreover, the amount of moved material depends on the severity of each tide, which in turn influences the re-distribution of the landmass (erosion and deposition). Thus research – as well as first-hand observation – tells us that in this intertidal environment, a simple distinction between water and land is quite misplaced: land and water here permeate each other in very unpredictable ways. And yet, when thinking about the estuary, how easy it is to picture a map in our minds where a simple coastline separates land from water.

To arrive at a new mapping strategy for the estuary, one might therefore consider an artefact that literally redraws itself with each tide. Since the coastal shape would no longer be recognizable, the artefact could orientate its users via site-specific sound beacons instead, for example the sounds of the seagull colonies on Flatholm island. Beacons like this contain information not only about the physicality and materiality of a location, but also on the condition of the sounding objects embedded in them. Thus the use of real-time sound beacons can help to experience a landscape afresh. [3]

To move listeners between locations, this artefact would have an interactive interface. Listeners would only hear sounds within a certain range of their position, like one does on sound recording trips. This can encourage discovery via comparative listening, for example the discovery of different wave sounds caused by different bathometries: at Clevedon seafront for example one might hear small waves rushing

onto a pebble-covered bay, while at Burnham-on-Sea the wide-open sandy flats only produce occasional water ripples.

To further an understanding of the interdependence of the environmental processes in the estuary, this artefact also needs to become scalable. 'Zooming out' would enable synthetic listening (listening to the estuary as a whole), which in turn allows to make new connections between different sound events, for instance between the sonified lunar zenith and its following high tide, or between wind conditions and tide height.

While this new mapping strategy provides an outline for a developmental direction, Tidal Severn's current sonification prototype is still at a much earlier stage. At the moment it taps into three kinds of data: the level of tide over the mean sea level, weather data (wind speed, direction, atmospheric pressure) which influences the tide, and the solar-lunar constellation which also affects the tide. Since tidal data is multi-dimensional and human memory limited – our short-term memory can only hold about seven items of information at the same time [4] – data interpretation becomes increasingly difficult the more data streams are used; hence the limitation of the number of data streams.

These data streams were then mapped to groups of sounds. The key technique used hereby was parameter mapping, [5] which means that changes in numeric data values affect the attributes of sounds (such as onset, frequency, duration or amplitude). In parameter mapping, the relationship between sound and data can established as directly proportional (rising water level = rising pitch), scaled (rising water level = logarithmic rise of pitch) or otherwise mathematically defined. Thresholds, where the data indicates significant changes, can be acoustically marked, for example as flood warning sounds.

A known disadvantage of parameter mapping is that listeners need to understand the mapping strategy before they can understand the meaning of the changes in the sounds. [6] However, it was found that listeners needed less training if sound timbres were selected perceptually and applied consistently. Thus in the sonification prototype, sound metaphors (swelling and ebbing of sounds = swelling and ebbing of a water body) and self-labelling sounds (wind-like sounds = wind data) were used to allow for an intuitive attribution of sound to source. Moreover, the three sounds were acoustically grouped, each having distinct timbres (sound colours). The attributes of each group (pitch, duration etc) remained data-driven, but their timbres constant. This strategy seemed to aid comparative listening, as listeners noticed site-specific characteristics in the data more easily than when different mapping strategies were used.

Another finding was the influence of time compression on listeners' perception of the sounds. It is said we are more likely to pay attention to short sound events with a distinct change in dynamics (waves crashing into a seawall) but to ignore long drawn-out processes that show little change in rhythm or dynamics (a receding tide revealing mud flats). To explore this notion, the sonification prototype was tested with a number of time compression ratios. The data would no longer be sonified in real-time, but instead one tidal cycle's worth of data compressed into minutes. For many listeners the interrelations between the three sounds became more apparent when the data was scaled in such a way. Then listeners also seemed to become more sensitive to structured motion (rhythm) and were able to distinguish regular from unusual patterns more easily.

Indeed, if the Severn estuary rhythms were to be described by time classifications in music, the tide would fall into a 'macro timescale' of musical architecture or form, which according to Roads is measured in minutes, hours or days. [7] The tide in the estuary is duo-diurnal, which means that only after 12 hours or so it reaches the end of one basic unit of time (or beat). The relative positions of earth,

moon and sun on the other hand only repeat themselves every 19 years or so. This kind of rhythm corresponds to the 'supra timescale,' covering months, years, decades and centuries. [7] Since neither timescale connects to an everyday experience of duration, only an experienced observer would notice an unusual change, for instance in the monthly spring-neap cycle or the annual tidal cycle.

Weather patterns, on the other hand, fall within our everyday experience of duration, but since these are characterized by arrhythmic repetition – strong gusts of wind, or rainy days with sunny intervals are quite common in the estuary – it is not always obvious how the seemingly chaotic weather patterns relate to the seemingly regular tidal patterns. Thus a problem that affects real-time tidal sonifications is that since they do not coincide with habitual notions of duration, the cyclical nature of their rhythms may remain elusive to many listeners. On a deeper level, this leads to the question as to when artefacts that translate data into sound can actually be said to be successful.

To answer this, it is useful to turn to earlier days of sonification practice, when sonifications were defined as "the transformation of data relations into perceived relations in an acoustic signal for the purposes of facilitating communication or interpretation." [8] According to this, the aim of communication or interpretation should guide the sound mapping process. This has not lost any of is its validity, however, more recently it has been demanded that, at least within a scientific context, sonifications must also reflect objective relations in the input data, use systematic means to translate the data into sound, and should be set up in such a way that they are repeatable and reproducible. [9] What is often criticized nowadays about art-related sonification artefacts like the Severn prototype is that their algorithms are not made transparent, and so it remains unclear as to whether the sonification was carried out objectively and systematically.

In principle, this is a valid concern, yet the kind of objectivity called for is often hard to ascertain with the kind and quality of field data available. The Severn estuary is itself a part of a larger ecosystem, and so it is hard to define the boundaries of any of its data streams; for example the local weather conditions measured in the region are often the results of larger changes somewhere else in the system. It is important to understand this global link, but without limiting the data in some ways, characteristic local weather patterns may not be observable at all. A further complication is that most publically available scientific data is not updated in real-time. Tidal data for instance relies on – not completely accurate – predictions; and a weather station in Alveston that updates itself every 2.5 seconds is the nearest real-time data source in the area. Most other available data is time-delayed and/or somewhat coarse, only exposing its characteristic patterns with a degree of inaccuracy.

Objectivity is also hard to ascertain when the act of sonifying data already involves perception; at first in form of the researcher who maps data to sound, and then in form of listeners who re-interpret what they hear. Moreover, many data sources from the estuary represent vast numbers of very small elements. As humans we do not have an intuitive grasp of very large or very small numbers, and so it remains a challenge to successfully sonify, for example, 30 million tons of silt suspended in water. Since a directly proportional mapping of data to sound might not be adequate here, a more interpretative mapping strategy might be applied to aid communication. However, this already influences listeners' perception in a particular way.

But since the role of perception is so hard to exclude, it might be useful to integrate it more explicitly into the methodology. To this end, Lefebvre's Rhythmanalysis [10] provides a useful frame of reference, as it intrinsically connects the researcher's thoughts and experiences with the geographical location where the rhythmanalysis takes place. With references to musical rhythms as well as tidal rhythms,

Lefebvre's framework appears as particularly suitable for a sonification of the Severn estuary, yet its adoption is not entirely straightforward. For example, when Lefebvre introduces the notion of "lunar towns of the oceans," and "solar towns of the Mediterranean," [11] this may seem appropriate on some level; tidal rhythms are still engrained into the architecture of lunar cities and present in form of estuary-related professions. However, on another level, one might wonder about individual inhabitants' perceptions of the interplay of diurnal and lunar rhythms. Thus to allow for greater self-representation of those researched, a more participatory version of rhythmanalysis is required, one that can map the polyrhythmic exchanges that actually take place between estuary inhabitants and the landscape.

To this end, researchers like Biggs have pursued a deep mapping of a small number of estuary locations. [12] Deep mapping focuses on qualitative data, which is obtained through a collaborative process involving inhabitants and concerned parties. Although "in performance and archaeological circles in the UK, deep mapping refers primarily to site-based performances by Mike Pearson, Michael Shanks, Clifford McLucas, and the radical Welsh performance group *Brith Gof*," [13] deep mapping has been used much more widely. It can reveal radical perspectives, particularly when it abandons the traditional researcher-led perspective for collaborative methods and processes. A deep mapping that involves estuary residents would be able to map thoughts and issues in their complexity and, according to Biggs, challenge "distinctions between academic and artistic outcomes, between healing fictions and scholarly critique, between amateurs and professionals." [13]

For an artefact that successfully sonifies Severn estuary rhythms, it seems, participatory practices like deep mapping need to be used alongside established data communication methods. In this way, intuitive connections between observed tidal phenomena and their experience can more easily be made. Moreover, creating the possibility of moving between measuring and sensing, between different time and map scales involves listeners cognitively as well as emotionally. As Lefebvre remarked, this can open the door to new insights:

Our scale determines our location, our place in the space-time of the universe: what we perceive of it and what serves as a point of departure for practice, as for theoretical knowledge. [...] Another scale would determine another world. The same? Without doubt, but differently grasped. [14]

And since, according to Lefebvre, it should be possible to connect with complex natural phenomena more deeply when we can relate them to our own bodily rhythms, the following may serve as a concluding thought experiment: It takes the duration of about 12000 human in and outbreaths for the Severn estuary to complete one tidal cycle. Counting thousands of breaths in order to grasp the nature of the tide is however simply unbearable, as the difference between the two durational scales is too great. But when we mentally switch scales, an intuitive connection can quickly be made: by observing how, like the tide, each breath unfolds slightly differently each time; how it naturally accelerates, decelerates, pauses and turns direction.

Dr Michaela Palmer and Dr Owain Jones are Tidal Severn, an interdisciplinary research team that provides information, teaching materials and presentations in order to raise public awareness about the Severn Estuary, a large and important intertidal landscape in Southwest England.

Sonic Severn is open to composers, sound designers and sound artists who wish to work with some of the phenomena of the Severn Estuary, in order to share what is in living memory and to open listeners' minds to the fragile relationships between human experience and local landscape.

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WAKEFUL SOFTWARE AND WAKEFUL MUSICAL INSTRUMENTS: A THEORETICAL APPROACH TO THE IMPLEMENTATION

Fabio Paolizzo

A new category of content-related software is here proposed. 'Wakeful' software is one that senses and responds to an environment with which it may consistently interact meaningfully. The term 'wakeful' is here meant as 'sign-bearing,' in relation to the potential of computers and human beings to interact in terms of sign exchange.

The present proposal is based on concepts that interest any human-computer interaction that involves the generation or manipulation of content of any type. Specifically, the study was carried out in relation to music and computer-based interactive musical systems. Accordingly, the research offers definitions of both 'wakeful software' and of 'wakeful musical instruments,' which are particular types of computer programs and of interactive musical systems. In interactive music, the reasons why users and audiences can only occasionally interpret the sonic constructs as music, which an interactive system generates, are often obscure. The present study is part of a larger project that aims at defining a protocol for living being-machine interaction, in order to guarantee consistency of communication between these types of agents. Currently, the solution to such crucial problems as the above is being urgently sought in diverse fields of study, from computer science to philosophy of mind. Wakeful software is one, which respects such a protocol.

First of all, we shall give a definition of an 'interactive music system'. Robert Rowe described such systems as "those whose behaviour changes in response to musical input." (Rowe, 2001) On the other hand, a definition of 'wakefulness' implies a comprehension of what consciousness is; an umbrella term that has many different meanings and about whose fundamental characteristics there is no consensus. According to the Stanford Encyclopedia of Philosophy, while it is possible to understand consciousness as a mental state, an animal, person or other cognitive system may be conscious in the sense that they constitute forms of consciousness; they are conscious cognitive systems. In this specific regard, consciousness may be firstly identified as sentience or wakefulness. While sentience is the capability of any organism to sense and respond to its world (i.e. any living being), an organism is wakeful only when actually using such a capacity (i.e. a comatose living being might not be 'wakeful'). In both forms, the concept of 'response,' recalled by the definition, implicitly points at an act of communication, which may eventually or actually take place, between the cognitive system and the environment. The English term communication derives from Latin verb 'communicare' (to share). As pointed out by Dan J. Rothwell, a necessary condition, for a communication to be established, is that the communicating parties share a common environment of communication; they need to be capable of a similar interpretation of the messages being exchanged.

In relation to the focus of the study, the first question arises: do computers and human beings share such a communicative commonality? The present research will show that although they do not, specific techniques can be adopted for machines to simulate logics of communication, which are proper to living

beings. Such techniques may allow any human agent to consider the responses of content-related software, as either an act of real communication or a convincing simulation, to which attribute meaning. While sentience and wakefulness constitute relatively simple forms of consciousness, human beings and possibly other cognitive systems are more sophisticated; they are forms of self-consciousness. Creatures or cognitive systems, to be considered as such, need to be more than sentient and wakeful; according to the Stanford Encyclopedia of Philosophy, they are those which "are not only aware, but also aware that they are aware." A question, which has been formulated already many times, arises here again: can a computer be conscious?

In interactive software of any kind, the concept of agency is central. A peculiar relation exists between agency and consciousness. What is the nature of this relation and how is it possible to mean consciousness in relation to agency? Is any agent conscious? Interaction between human agent and machine occurs within what is called a multimodal ambient, where agents interact with each other by different modes (i.e. as in the planet Earth). In very general terms, agency can be defined as the capacity of an agent to act in a world. However, agency differs for intelligent and non-intelligent agents. For instance, there is general agreement that human beings are intelligent agents, who are able to make choices and to enact those choices on the world. Instead, natural forces are considered to be causes that involve only unthinking deterministic processes. In this simpler form of natural phenomena, agency seems to imply only the capacity to act in an environment. However, even excluding the Gaia theory, agency often exceeds the mere capacity of action; it implies a relationship which is connoted by a decisional nature that may help to clarify the distinction between intelligent and non-intelligent agents. The English word agency derives from the Latin 'agere' (to do): an agreement to act on one's behalf. Such 'action on behalf of' implies the authority to decide which action is appropriate. According to the Encyclopædia Britannica, "in computer science, an agent is a computer program that performs various actions continuously and autonomously on behalf of an individual or an organization." The authority of taking appropriate decisions is a capacity that cannot be simply described as deterministic, and leads us to discuss the subject of how human beings come to make decisions.

According to Thomas Nagel, a being is conscious just if there is a subjective way, a mode of consciousness that constitutes the creature's mental or experiential point of view. For Nagel, bats are conscious because there is 'something that it is like' for a bat to experience its world through its echo-locator senses. While a software agent is not a living creature, indeed certain software agents may be actually capable of sensing and responding to the environment. In which case, it makes sense to pose the question: 'what is it like to be a software agent?' May such agents be considered as conscious? Taking into account the above mentioned diverse forms of consciousness, software agents should be considered as capable both of sentience and wakefulness. However, can they be considered as forms of self-consciousness? Can they be aware of being aware? In order to progress toward the formulation of an answer to such a question, we will introduce few concepts from biosemiotics.

The Oxford Dictionary of Biochemistry and Molecular Biology defines biosemiotics as "the study of signs, of communication, and of information in living organisms." This term derives from the Greek 'bios' (life) and 'semeion' (sign). In biosemiotics, "signification (and sign) is understood in a very general sense, that is, not simply the transfer of information from one place to another, but the generation of the very content and meaning of that information in human as well as non-human sign producers and sign receivers." (Emmeche and Kull, 2011) This principle was described in different terms by the Nobel prizes Ernst Mayr and Manfred Eigen as the peculiarity of living forms and possibly, of man-made computers. However, computers are designed by humans to achieve specific goals; their teleology is derived. Instead, the informational characteristics of organisms evolved through adaptation and the same living

forms are the result of an evolution. While software agent can adapt to the world that they sense, as living beings do, for a computer such a process operates within a scenario that is to some extent predetermined by its designer. Nevertheless, two further observations can be made: in humans, the informational processes resulting from adaptation and self-adaptation are similar to each other; the informational processes by which humans and computers interact and adapt to the environment denote similar traits.

The necessary condition for self-adaptation to occur is that the mind – or whatever entity or organ may constitute the 'mind,' as we are considering the eventuality of self-conscious cognitive systems that do not have 'minds,' – needs to be attributing meanings to the perceived signs; a process of interpretation may have to take place. Interpretation is the process of attribution of meaning by which signs take shape in the mind. Any interpretation is always a bi-directional and recursive loop, since whereas the mind assigns a meaning to the sign, the sign itself is connoting the mind. This process, fundamental to forms of self-consciousness, is virtually open-ended, being the result of a recursive process of interpretation. Finally, we can now refine our question: are computers capable of interpretation?

Lending to the present investigation a few of the conceptual fundaments of biosemiotics, it is possible to describe interactions in a multimodal ambient as recursive sign exchanges occurring between agents, whereas such an ambient includes agents capable of interpretation. We shall clarify such a statement. There is a strict relation between an interaction and an interpretation process, interpretation being a form of mental interaction between thoughts and information retrieved from the external phenomenological reality. Therefore, interpretation maintains an interesting relation to the concept of agency. While internally representing reality, the mind does not operate 'on behalf' of reality; signs cannot be considered as agents, as they do not intentionally act, but instead are being acted on by the mind. Still, the character of intentionality, denoting the interpreting mind, is not only recursively self-fuelled but self-aimed. Hans-George Gadamer rethought "the traditional concept of hermeneutics as necessarily involving, not merely explication, but also application. In this respect, all interpretation, even of the past, is necessarily 'prejudgmental' in the sense that it is always oriented to present concerns and interests." (Malpas, 2009) We previously defined computers as inscribed within a derived teleology. Having now highlighted self-aimed intentionality as the peculiarity of interpretation, we have evidence that computers are not capable of interpretation. However, it still makes sense to further investigate the analogies between human and machine cognition, as they appear to root into a similar dynamic of interaction.

In biosemiotics terms, "a sign is not the same thing as a piece of information. It is related to information but only becomes 'information' through an act of interpretation." (Hoffmeyer, 2008) In the mind, each of the perceived signs evokes an entire net of concepts. When trying to explain and apply present concerns and interests to current experience, all the concepts thus educed interact. Not only do the concepts recalled by a certain sign interact with concepts afferent to a different one, but signs and concepts actually affect each other, and as concepts change, so do the related signs. Forms of self-consciousness operate an open-ended process of redefining both themselves and their world of signs; their interaction is populated by signs that affect concepts, which in turn affect other signs and concepts. Finally, we can state that interpretation exceeds the self-contained teleology of what computers are today, as from their 'what it is like' perspectives signs do not exist, only information about their own current state does it. Unsurprisingly, current computers are not forms of self-consciousness. Nevertheless, these implications will help us in defining what both wakeful software and wakeful musical instruments are.

In Rowe's definition of an interactive musical system, the term 'musical' exceeds the mere sonic phenomenon, as music is the result of an interpretation. In such a system, the presence of an interpreting

agent is implicit. For convenience, we shall use the following definition: 'an interactive musical system is one whose behaviour changes in response to inputs, which at least one interpreting agent recognizes as musical.' Will such an agent also consistently consider the system responses as being musical? Within art projects, in the present research, both users and audiences experiencing interactive music were frequently unable to interpret the sonic constructs, generated by such a system, as music. While computers treat the received stimuli as information, biological agents interpret such information as a network of signs. Such a discrepancy actually constitutes a structural obstruction, for living beings, in attributing meaning to actions or constructs that are generated by computers.

A step forward in finding a solution to this problem can be taken by considering biocommunication theory, which frames the interactions between subjects of the same species or between subjects of different species in terms of sign-exchanges occurring within a shared communicative commonality. "Intersubjective interactions are characterised by reciprocal validity claims. To speak, make propositions and understand utterances does not function through private encoding process and subsequently a private decoding process, but a shared rule-governed sign-mediated reciprocal interaction. The shared competence of semiotic rules and the socialised linguistic competence to build correct sentences enable the interaction partners to understand identical meaning of utterances." (Witzany, 2010) In order to circumvent the gap that we described above, the present study identifies specific structures of interrelation for living biological organism-machine interaction. These structures are defined as 'bio-logics'; logics that mimic the informational mechanisms of living beings. These bio-logics are implemented as computer algorithms to improve such interactions. Without being recalled in such a way, these structures were nevertheless frequently adopted in computer science. Similarly, interactive software often incorporated these types of algorithms. The present research recognizes that such structures and instruments belong to the categories that we are here defining. However, their cataloguing exceeds our scope, which is instead to highlight the consistent significance of such theories and to offer classification of their nature, as a protocol for designing such interactivity; a set of procedures to be followed in designing living being-machine interaction.

Among the bio-logics, the present paper proposes salience to enable human beings to consistently attribute meaning to actions operated by a computer or to constructs that it generates, which they might not otherwise consider to be coherent signs within the context. Usage and improvement of salience-based mechanisms has recently been the focus of consistent research (i.e. as in the EPSRC project, aka Salience project), which offered the chance to successfully adopt such techniques for better modelling of cognition in computing. The Oxford English Dictionary defines the adjective 'salient' as 'most noticeable or important' and similarly, the psychologist William Crano identified salience, as a factor that informs the awareness of the perceiving subject about the effects of an attitude upon himself/herself. An interpreting agent selects salient information, in virtue of the self-aimed, explanatory and applicative character of interpretation itself and attributes a meaning to such information, identifying it as a sign. In the constructs or actions produced by computer programs, whereas the morphologies reflect salience, interpreting agents may notice such a salience and therefore, recognize the information as a sign.

Therefore, software can be descried as wakeful, when sensing and responding in its multimodal ambient by defining salient morphologies to which living beings can attribute meaning, within the specific context. Such an attribution of meaning is actually consistent and not only occasional, as a communicative commonality is granted to these computers and living beings by the implementation of bio-logics. In such a framework, bio-logical algorithms format the information, as signs recognizable by living beings. Obviously, such a translation is only a simulation of an authentic process of interpretation. Still, regardless of whether the interpreting agents consider the machine to be a form of sentience, wakefulness,

self-consciousness, or just a convincing simulation, an act of communication can be actually established to a certain extent.

In communication, the resemblance of authenticity may be a valid surrogate for the real thing, as sets the necessary conditions for an eventual communication to actually occur; living beings recognize in salient interactions a logic that is proper to any life form. Alongside the approach offered by biocommunication theory, it is similarly possible to recall and extend Nagel's perspective in a direction offered by simulation theory, by which "human competence in predicting and explaining behaviour depends chiefly on a capacity for mental simulation." (Gordon, 1992) This theory deeply roots into the human capacity for empathy between subjects and "involves the imaginative method of projecting first personal experience, to achieve imaginative acquaintance with what it's like for the other." (Holton & Langton, 1998) In one of its latest formulations, simulation theory necessarily involves introspection, following the generation of a mental upshot for "detecting or determining the nature or character of that upshot." (Goldman, 2011) In humans, both a default tendency to empathy and a state of self-awareness are usually present. From one hand, an empathic feeling such as identification and eventually, even compassion, may arise after having recognized, in the interacting party, a characteristic that could denote life to a lower or higher degree: from unpredictability to reactivity, vulnerability, intentionality, or eventually, even humour. From the other hand, human beings may expose such characteristics when they do not imply intentionality, because of their sophisticated capacity of interpreting. Nevertheless, for humans, and possibly to a similar extent, for other living beings capable of self-consciousness, a simulation of intentionality may be more convincing, when it allows those to identify the trace of a sign within it. Forms of self-consciousness share an understanding of their world based on their subjective, experiential and only way to comprehend, and being aware of such an act. In direct proportion to the communicative commonality that they are sharing, these sophisticated living beings can consistently 'biocommunicate' its interpretation to each other, distinguishing between intentionality and a deterministic process. Sign exchanges constitute their mode of interacting (and communicating) within the multimodal ambient that they live in. Nevertheless, identifying within the responses of a computer a certain degree of intentionality, for however simulated and predetermined that can be, still may engage the interpreting agents into a convincing conversation with such a computer.

Any wakeful software is more than interactive, as it is more than sentient. It does not only have the capacity to eventually sense and respond; it can actually apply such a capacity in the mode in which the interpreting agents, populating its environment, interact. Such an instrument is wakeful, in the sense that those agents may repeatedly recognize its responses, as such. As content-related interactions involve the interpreting agents to interact in terms of sign exchange, wakeful software interacts with such an environment, in such terms. It is 'one that senses and responds to an environment with which it consistently interacts meaningfully.' Specifically for music, in play with a wakeful musical instrument, both user and audience may identify the generated sonic responses as salient information, which they may therefore interpret as a musical signs; for them, the interaction of the system is consistently musically meaningful. A wakeful musical instrument may be similarly defined as 'one that senses and responds to a musical environment with which it consistently interacts in a musical meaningful manner.'

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MOBILITY INTO IMMOBILITY: DESIGNING NETWORKS

Luisa Paraguai

The text is concerned with the networks and flows of information and bodies, discussing other perceptions and movements to perform our everyday life and to comprehend the world. At the end, INmobility, an artwork in progress, is presented and concerns with the mobile technologies as other possibilities of people being temporarily "on the move", questioning physical and temporal domains to propose narratives.

Fig 1. Visual narrative 1, 2011, Luisa Paraguai, photographic media.

Fig 2. Visual narrative 2, 2011, Luisa Paraguai, photographic media.

Fig 3. Visual narrative 3, 2011, Luisa Paraguai, photographic media.

The text is concerned with networks and flows of information and bodies, discussing other perceptions and configurations of movements to perform our everyday life, and so, to perceive and comprehend the world. "Movements often involves an embodied experience of the material and social modes of dwelling-in-motion," [1] and we have sewing those organizations and systems upon physical and informational – data networks. Then, the reality can be understood as a negotiation process among different actual events, according to distinct protocols of communication and networks; it means the reality is understood as a dynamic process of flows.

Firstly, the people, technologies and space relationships are explored as possibilities of connections among different networks – as movements in physical spaces and/or as communication processes in digital and radio protocols. At the end, the project INmobility presented is concerned with the idea of technology as an agent to evoke other narrative dimensions to deal with the space and time, revealing different perspectives of reading and understanding the world.

Networks: Topologies Defined by Connections

Mobile communication, evoking characteristic ubiquity and accessibility, has permeated all domains of our everyday life. People have moved around actualizing different networks, physical locations and data nodes configuring a complex structure, programmed and self-configurable at the same time. "The diffusion of Internet, wireless communication, digital media and a variety of tools of social software has prompted the development of horizontal networks of interactive communication that connect local and global in chosen time." [2] People have faced different patterns of arrangements, juxtaposed and superposed, trying to transcend the dominant logic of each network and to establish common and collaborative procedures. "Flows are streams of information between nodes, circulating through the channels of connection between nodes." [3]

The mediated communication devices have configured a hybrid mode of existence, juxtaposing digital and physical domains simultaneously. That concept of hybrid space as a formal structure of those interconnections – visible configuration, has been considered quite important to apprehend the symbolic

and aesthetic perspectives of the reality. "The expression of social relationships, ultimately power rela-tionships, that underlie the evolution of the multimodal communication system." [4] The cultural dimen-sion of that process, as a multilayered transformation of communication, can be defined by synchronic connections among several networks, with different protocols of communication; it means we have ex-perienced the tension between the parallel development of a global culture and multiple local identities. We have to renegotiate space-time organizations as models of circulating in the world; it means we have to deal with different protocols of communication simultaneously as 'to be on the move' – to oper-ate and produce within in-between spaces and times.

"Territorial behavior is a self–other boundary regulation mechanism that involves personalization of or marking of a place or object and communication that it is 'owned' by a person or a group." [5] Nowa-days, we have related to different forms of information systems – radio channels, mobile calls, GPS info, emails, text messages, skype sessions, facebook posts, twitter comments – tracing and tracking objects, locations and people. A specific perceptive and cognitive condition has addressed bodies-with-environ-ments – physical and digital, to a specific set of performances. It means others within that system have known each person or object. Such systems, named as "flow architectures" [6] and "network society," [7] have distributed economies, peoples, objects and activities, across the world. Their social structure is made up of networks that are powered by microelectronics-based information and communication technologies, improving on the characteristics of flexibility, scalability and portability. The apparently different domains of work, family, and social life becoming more networked, more similar to each other and more interdependent.

What is specific to our world is the extension and augmentation of the body and mind of human sub-jects in networks of interactions powered by micro-electronics-based, software-operated, communica-tion technologies. These technologies are increasingly diffused throughout the entire realm of human activity by growing miniaturization and we may add portability. [8]

Technological and social organizational convergence has taken place between physical and technological systems and gradually has formed a new ambient, in which the ability to connect from wireless devices has become the predominant form of communication. The project INmobility is concerned with the meaning of materiality and those artefacts through the roles they play in different territorial networks. "In a world of networks, the ability to exercise control over others depends on two basic mechanisms: the ability to constitute networks, and to program/reprogram the networks in terms of the goals as-signed to the networks; and the ability to connect and ensure the cooperation of different networks by sharing common goals and combining resources, while fending off competition from other networks by setting up strategic cooperation." [9]

The main characteristic of wireless communication is not physical mobility but constant access and com-munication; it takes place because of the Internet potential structure of operation: a distributed net-work that has the possibility of combining distinct horizontal structures. Then, the mobile interfaces have connected those communication systems, not related and based on the Internet network protocol. It is a multimodal, "[...] also self-generated in content, self-directed in emission, and self-selected in re-ception by many who communicate with many" – "a mass self-communication." [10]

We can stand a spatial structure that dynamically adapts to the communicational demands and necessi-ties from own nodes; it means, for each new connection the network topology can be modified based on the existence of their nodes/users' mobile phone and their abilities for communication. The attempt to comprehend and incorporate that operational network structure is to formalize a social shared space

as zones of fluxes, and not determined spaces of information distribution. Nowadays, it is necessary to comprehend mobility as the ability to move between different networks – physical and digital communication systems – that have as many dimensions as interconnections.

Automobility and Time-Space Relationships

The first attempt to reorganize public and social, spaces and accesses was made by the cars, extending where people could go to and hence what they are literally able to do. They set others flexible social patterns of commuting, family life, community, leisure, and the pleasures of movements and so on. "Machine space, or territory devoted primarily to the use of machines, shall be so designated when machines have priority over people in the use of territory. Automobile territory in modern American cities exemplifies the concept of machine space." [11]

The car has reorganized in complex and heterogeneous ways the mobilities and socialities across significant distances and moments; it has created spatially stretched and time-compressed modes of people's moving and being encapsulated in a personal, cocooned, moving capsule – a bubble. "I suggest that there have been four characteristics modes of dwelling with regard to the car, what I term 'inhabiting-unmade-roads', 'inhabiting-the-paved-road', 'inhabiting-the-car', and 'inhabiting-the-intelligent-car'." [12] At first, the cars were open, not separated from the around sights, smells, and sounds – presented as the regular basis of commuting or even social life; in the second stage, the important was the tour than the destination – the performance of motor touring, the machine; in the third stage, the driver became a passive observer of the world, passing through the window – a refuge, a mobile privatization, in which the driver's body became fragmented and disciplined to the machine. The car can be thought as an extension of the senses so that the driver can feel its very contours, shape and relationship to that beyond its metallic skin. It is an everyday object and becomes a place to behave in a particular way in which, nowadays, people can organize a series of multiple activities, connecting to distant others through internet, mobile phone or radio.

"The car becomes a symbiotic extension of the driver own embodiedness." [13] Automobility cannot divide spaces clearly – as work and home, leisure and work; it has produced lengthy commutes into and across the city. Then, cars have become a contemporaneous device, organizing possible complex models of social and cultural organizational structures to approach the urban landscape. Import us, the current instantaneous time involving the resynchronizations of the existent time-space paths. A shift to an individualistic timetabling of many moments or fragments of time – a personal clock-time upon the public timetable every time we drive. People have tried to sustain "coherent biographical narratives in the context of multiple choices filtered through abstract systems," [14] and the project INmobility is an attempt to register those images and sounds.

The flexibility of movements is modeled by the temporal instance, producing multiple activities, spatially desynchronized from each other but integrated. It means, the traffic is a repetitive order of things independent of drivers whose actions compose it. People try to structure complex, fragile and contingent patterns of social life – self-created narratives – juggling fragments of time and activities. A network of individuals is connected through similarity of actions and intentions, and totally dependent on a social order.

"The difficulty we have in defining all associations in terms of networks is due to the prevalence of geography. It seems obvious that we can oppose proximity and connections. However, geographical proximity is the result of a science, geography, of a profession, geographers, of a practice, mapping system, measuring, triangulating. … All definitions in terms of surface and territories come from our reading of maps drawn and filled in by geographers. Out of geographers and geography, 'in between' there own networks, there is no such a thing as proximity or a distance, which would not be defined by connectibility. The geographical notion is simply another connection to a grid defining a metrics and a scale. The notion of network helps us to lift the tyranny of geographers in defining space and offers us a notion which is neither social nor 'real' space, but simply associations." [15]

INmobility: Texts and Textures of Everyday Life

People have performed their everyday life in metropolitan areas while organize constant attempts of virtualising the space-time relationship. In that text, we have brought the terms networks, cars and communication systems together to configure visual experience maps of moving as a collaborative and multitasking platform. The space and time relationships have been discussed articulating different protocols of communication and modes of distribution not coordinated. The INmobility project is concerned with the visibility of those temporary social networks, physical and digital, juxtaposed by synchronous live messages; the proposal of the narratives produced is to visualize our daily actions as dynamic collaborative networks.

Motion and emotion – the car was taken as a place to exercise the subjectivity, a private bubble in which experiences are released in unacceptable forms and gestures; it is understood as an enclosed space of control, inhabited in different ways and able to evoke new behaviors and gestures. Those body movements are understood as a polysemic representation affecting ways of sociability, formal and informal attitudes. Central to dwelling the car is the soundscape – different technologies can create sound spaces that are occupied by voices, music, sounds, and dialogues. Nowadays, the mobile technologies have proposed to the users other connections not proximal – from the intimate condition of driving to a participative way, to create their everyday routes.

Mobile technologies have set other possibilities of people being temporarily 'on the move', creating gaps and holes, other dimensions and domains. The ability of using those devices has demanded from users to comprehend and accommodate technologies on time and space. The 'nine to five' culture, in big cities as São Paulo, using mobile and GPS devices, can engender interspaces and reorganize physical arrangements, intertwining different space and time models. Audio and images narratives (figure 1, figure 2, figure 3) have been experimented, trying to track distinct networks and to map distinct social activities. The window and mirror images are explored as modes of recognition and presentation to others. Other perspectives and angles evoke a "fluid choreography," [16] but still suggest an effective private space. From those visual narratives we can exercise parallel dimensions and to question the feeling of belonging to those urban spaces.

Fig. 1. Visual narrative 1, 2011, Luisa Paraguai, photographic media. (Used with permission.)

Fig. 2. Visual narrative 2, 2011, Luisa Paraguai, photographic media. (Used with permission.)

Fig. 3. Visual narrative 3, 2011, Luisa Paraguai, photographic media. (Used with permission.)

From the project we want to comprehend the tension between distinct materialities of the space and time relationship simultaneously operated by people through mobile devices. The intrinsic operational mode of the networks that conforms some informational patterns – computational and bodily, electromagnetic and spatial, has dislocated the usual understanding of shapes and spaces to propose other articulations. The blurred limits and the possibility of compounding physical spaces and informational contexts have evoked other dimensions for people's interaction; the audiovisual narratives proposed have pointed out the mediated practices to create particular perspectives of those specific spaces. The perception and action relationship has presented itself as a phenomenological experience in which the individual, car and the ambient are included by media.

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DIRECT TO VIDEO: STEPHEN BECK'S CAMERALESS TELEVISION

KRIS PAULSEN

This paper examines Stephen Beck's cameraless video synthesizers of the 1970s. Rather than using video as a camera-based mimetic medium, Beck directly manipulated the basic component of video – the electron. Video Synthesizers, I argue, propose an alternative understanding of video and its essential qualities. Synthetic video grounds itself in the materiality of the screen rather than the transparency of the image.

Fig 1. Stephen Beck at the Beck Direct Video Synthesizer, 1971, Stephen Beck, Digital image scan from original monochrome photograph, Copyright Stephen Beck.

Fig 2. Photograph of Two Video Weavings Still Frames, 1973, Stephen Beck, Video stills, Copyright Stephen Beck.

A live video camera pointed at its own monitor creates a vertiginous hall of mirrors in its feedback loop. The distance between the lens and the screen is simultaneously flattened and extended toward an ever-receding and ever-repeating horizon. The apparently automatic, realist codes of the video camera turn suddenly surreal by exploiting an inherent effect of the live medium. If one then tilts the camera, this loosened hold on representation slips completely away into dazzling abstraction. The monitor displays a dutched image of itself, but this image still contains in its echo the previous one – that of the upright monitor – and a temporal record of the movement. The image of a monitor turned perpendicularly in its own frame will swirl under the pulsating pressure of feedback. By slightly tampering with the aperture of the camera, the contrast, brightness, or focal distance one can completely divorce the image from any sign of reality. It pulls from the corners of the screen, and reconfigures into a tumbling pinwheel that grows more and more complex over time, creating morphing "mandalas" of electrons on the surface of the screen. These shapes, though free from the compulsive representation of the camera, are the "archetypical" [1] images of the video medium.

This live feed "mandala" effect is a simple means of divorcing the video camera and screen from the iconic and representational codes that usually govern it. Nam June Paik and Shua Abe exploited this and other effects to create their first video synthesizer at WGBH-Boston in 1969. Like Paik's earliest television works, the Paik-Abe Synthesizer worked upon other images rather than literally synthesizing its own. For his first solo exhibition, 1963's *Exposition of Music and Electronic Television* in Wuppertal, Germany, Paik altered the circuits in thirteen television sets, thereby determining the conditions under which the broadcast image could appear: images were reduced to thin lines, warbling waves, trembling circles, blurred tonal fields, and single points of pulsating light. Paik and Abe's synthesizer similarly modified the video signal, but did so without altering the circuits of the television sets; their device manipulated the image in the studio then sent it out over the air. For the duration of the broadcast, the individual home receivers appeared to have been subject to a similar manhandling as Paik's first sets. In 1970, hundreds of TVs in the Boston area appeared to be "broken" – or at least deranged – during Paik's four-hour broadcast of *Video Commune: Beatles from Beginning to End*, the first on-air demonstration of the Paik-Abe Synthesizer. The Paik-Abe Synthesizer subjected live and recorded video images to a set of distorting processes that turned the visible world psychedelic and strange. Despite this abstract effect, the video image was still closely tied to the camera and its mimetic properties; the synthesizer needed the camera's images to "seed" its manipulations and distortions.

Stephen Beck, like Paik, moved away from the representational effects of the video camera toward the abstract possibilities of a purely electronic medium. He, too, created his first synthesizer in the late 1960s, and later worked at a PBS research lab. Beck's synthesizers, however, did away with the camera completely. They were, in his own words, "constructivist in nature, not distortionist." Beck's synthesizers were free from the camera's mimetic representations.

Beck's experimentation with electrical images began long before he had access to television set or a broadcast signal. While still an undergraduate at the University of Illinois at Champaign-Urbana, Beck invented a device he called "The Phosphotron." It consisted of 10 pairs of goggles wired in parallel to a single oscillator. Beck would connect a group of his friends to the device for a "video séance," during which the machine directed weak electrical current into the super-cutaneous surface around the eyes, causing a wild display of phosphenes to appear before the participants. They saw undulating colors, bright flashes of light, and floating shapes. The images hovered in space, but were not grounded in it. When Beck turned the machine up to about 20 hertz, the flows of light "broke into micro-textures very reminiscent of geometric, quasi-crystal patterns found in Islamic, Byzantine, and Ottoman art." [2] The

device brought to collective vision a set of non-objective, archetypical images using neither camera nor screen.

The young artist and engineer's desire to capture and communicate the fleeting, intangible, immaterial shapes of phosphenes and hypnagogic imagery led him develop a series of direct, that is, cameraless, video synthesizers in the late 1960s and early 1970s. The National Center for Experiments in Television (NCET) invited Beck to California to become a resident artist in their studio after hearing about his first analog synthesizer, the Video Synthesis Instrument Number Zero (VSI#0) (1969). The center was an experimental video division of KQED public television in San Francisco that specifically encouraged the production and broadcast of non-traditional forms of television. There he created two other synthesizers, The Beck Direct Video Synthesizer (1970-1971) and his first digital synthesizer, the Video Weaver (1973).

At 7:30 pm on 19 May 1972, Stephen Beck performed the Beck Direct Video Synthesizer live on KQED-San Francisco. According to Beck, it was the first – and perhaps only – live broadcast from a direct video synthesizer. [3] Beck's historical performance took place as part of KQED's news program, *SCAN*. Reporter Joe Russin interviewed Beck at the controls to give the viewers some context for what would follow. The young, longhaired artist explained, roughly, how the synthesizer worked while Russin, chin in hand, pondered Beck's curious answers. The synthesizer, Beck explained, "generates electronic signals which excite the television set to create light to happen where I want it to." Video, he provocatively offered, does not need to be "pictures of things." While the two men talked, Beck manipulated the synthesizer's controls, producing a rapid series of random patterns, graphic figures, and iconic images. The machine was a beast: color monitors and hulking switchboards stitched together with bright loops of yellow cable. [Fig. 1] The physical complexity of the synthesizer, with its exposed wiring and tangled connections, stood in sharp contrast with Beck's easy, graceful manipulation of the image. Despite Russin's contextual framing of the synthesizer, KQED's viewers frantically called into the station during the performance to accuse and compliment the broadcasters for "breaking" their televisions. [4] Yusef Lateef's music accompanied Beck's fluid, undulating color forms. The music was significant: not only did it link Beck's visual compositions with the improvisational form of jazz, the synchronization of visual and musical elements indicated, beyond a doubt, that the television wasn't "broken;" it was merely behaving in a way that seemed incompatible with its typical behavior and the conventional forms of broadcast television.

NCET went to great lengths to publicize and popularize their prodigy's invention and the growing field of synthesized video. Brice Howard, the Center's director, produced a series of "Electronic Notebooks," aimed at both distributing work by the Center's artists, and educating the general public about how to actually see the television rather than imagine that they were seeing through it. The series featured Beck on its inaugural episode. "Electronic Notebook No. 1: Video Synthesis" (1973) paired Beck on the Beck Direct Video Synthesizer with musician Warner Jepson playing the Buchla Audio Synthesizer. The episode opens on the two artists, side by side, at their synthesizers as a narrator compares the more familiar audio synthesizer to the processes of Beck's machine: both machines conjure "forms, textures, and colors" from electronic signals. The description links synesthesia to synthesis, as do the titles of the pieces that followed: *Illuminated Music 2* and *Illuminated Music 3*.

Illuminated Music 2 begins with a cut from footage of the artists to a blank, black screen. Two bright rectangular dots appear in the center, along the CRT's horizontal axis. The two quickly split into four; each dot and its double slide vertically away from each other and then loop into the center of the screen, and then disappear. They glide across the surface of the television, tracing a clear path without ever forming a proper image or shape. The pattern repeats twice over, and then quickly grows more complex: rather

than disappearing into the screen's central fold, the dots double and circle each other in a juggling pattern. The left side mirrors the right, only slightly out of sync. The slowly dancing points of light then quickly replicate themselves, extending in long chains to the center point of the screen. For a moment, the discrete dots take the form of an octopus, each long leg moving in a manner that is, at once, both natural and magical. The component parts of each undulating tentacle become independent fill the screen with a kinetic yet orderly field of static. The buzzing dots then melt into smooth airbrushed forms. By beginning with discrete dots - units of light - Beck slowly reveals the screen as, simply, a set of potential coordinates in space and time. What one sees is not an object or a representation or an image, per se, but the excited, ever changing surface of the screen; this is video freed from the camera.

From single points of light, the Beck Direct Video Synthesizer made the television screen and its basic operations visible and intelligible. One can no longer look "through" it as if it were a window to the moving image on the other side. One sees the screen for what it is: a flat field of points, a surface. In *Illuminated Music 2* the most basic unit of the electronic image pulsed and morphed into a dazzling and eccentric series of "archetypical" images – mandalas, geometric tessellations, phosphene flares, and hovering afterimages.

Beck's next synthesizer, the Video Weaver, brought into view another formal property of the video image, the horizontal and vertical scroll of the monitor's electron gun. Again moving away from the camera and the representational forms that it produces, Beck shifted the viewer's attention to the movements that make up the video image, rather than its component parts. Through Beck's new machine, screen's horizontal and vertical lines become the warp and the weft of a weaver's loom. The graphic patterns are in constant motion as they scroll across the screen. In *Video Weavings* (1973) [Fig. 2], Beck cycles through a series of traditional textile patterns: diamonds, chevrons, and argyles slide seamlessly into complex Hopi, Navajo, and Shaker designs. Beck's digital synthesizer analogizes the ancient technology to the new one: each creates an image built of lines read one by one. The weaver's thread becomes Beck's electron beam. Through the metaphor of weaving, Beck further extends video's point-by-point, line-by-line electronic logic to that of the computer: the Video Weaver is the descendent of Jacquard's loom. Joseph Marie Jacquard's 1801 invention, with its punch cards and prefigured sequences, anticipated the development of computer hardware and programming. Beck's weaver picks up this historical thread, and connects early video to generative and computational art. [5]

The non-representational, computational character of synthesizer video sits in an uneasy relationship to the history of video art. In the mid 1970s, video was just beginning to be theorized and historicized. In 1976 Rosalind Krauss famously condemned video art as narcissistic and unconcerned with the formal, "reflexive" investigations of serious artists and critics. Video, rather, is "reflective," that is, it acts as a mirror transmitting live, representational images, usually of the artist or viewer. According to Krauss, the self-obsession evident in early video art, however, is indicative to the medium and narcissistic video artists accidentally model the formal structure of video by obsessively using the device to record and respond to their own images. If video is a "medium," Krauss ventures, it is in the psychological rather than formal sense of the word – "telepathy, extra-sensory perception, and communication with an afterlife." [6]

Krauss's critique of early video does not take up the non-objective, non-mirroring work by Paik, Beck, and the other synthesizer artists. Instead it centers on a set of artists who had come to video after making their names in other media. The history of video art has largely followed Krauss's lead and bracketed synthesized video (with the exception of Paik's work) as a footnote to the larger history of artists' video, [7] despite its important role in the development of the genre and its enormous impact on future of the

media and technology. As early as 1974, Artforum editor, Robert Pincus-Witten cast them out of the discussion of video art precisely for being formalists and for being unconcerned with the representational image. At the Museum of Modern Art's conference on the state of video art, "Open Circuits: An International Conference on the Future of Television" (1974), an early academic assessment of video art, Pincus-Witten argued that the work of synthesizer artists "was deficient precisely because it was linked to and perpetuated the outmoded clichés of Modernist Pictorialism." Video, for the critic, was an inherently "reproductive recording medium" that "must always engage narrative content." The only achievement of the synthesizer artists, he claims, was the invention of the various devices. [8]

Non-representational, ephemeral, often unrecorded and cameraless, synthetic video found itself in a difficult position in relationship to criticism in the 1970s. In Krauss's and Pincus-Witten's accounts, video is a camera-driven, "reproductive" medium. Synthesizer video, then, simultaneously exposed a nature that seemed too inherently close to the waning principles of modernism, and in its experimental agenda it exposed most of what appeared to be the essential trappings of video – the camera, representation, tape – as not necessarily or inherently part of the medium. In doing so, synthesizer video surprisingly brings together the reflective and reflexive poles of Krauss's argument. Feedback, according to Beck, is "the imagery that results from the television set in a self-meditative state. Input is focused on output, its eye focuses on its vision, and in this meditative state it creates a specific graphic imagery." [9] When the camera looks at itself, it doesn't see as Krauss's "narcissistic" video artists do. What it sees is an ever-changing series of non-reflective images, variations on its own essential forms. In video, mandalas – those images that aim for unity and completeness through meditation – expose the screen as complete within itself. Beck's work extends this path of essential yet non-representational video forms to the screen without aid of the camera. Here, in the realm of pure video, Beck separates the image from the screen, just as phosphenes are visions separate from the eye. The video medium is at once, formal and reflexive, and at the same time "extra-sensory" and "psychological."

Clearly, Beck's synthesizer works call attention to the reflexive qualities of the video screen. The formalism that Pincus-Witten condemns seemed to destabilize the what appeared to be the very nature of television and video and in doing so, severed it from a clear lineage with representational media and mass media, such as photography and film – and even conventional TV – and established a new trajectory that linked it more closely to computer graphics and to future forms, such as video games and generative arts. Beginning with the feedback mandala, artists like Beck discovered how the camera's ability to transmit live, indexical, images could be used to free it and video screen to make imagery that was, at once, both abstract and deeply familiar. When divorced from its compulsion to mirror and capture the physical, visible world, video laid bare a parallel world of archetypical, geometric, non-objective images. Mimesis was just one function of video, not its essential, medium-specific quality. Rather than looking at the kinds of images a camera could capture, they sought out those that the screen seemed specifically able to produce. This meant seeing past the narcissistic seductions of the representational image, and looking at the device for what it was at base – a single electronic dot skating across the rasterized surface of a magnetic screen.

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4. Ibid. According to Beck, the station received more than 100 calls. The callers that charged the station with "breaking" their televisions were largely positive about the effect.
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TRANSCENDING INTO THE VIRTUAL: PRESENCE PROGNOSTICATIONS AND THE RE-CALIBRATION OF TELEMATIC ART

ELLEN PEARLMAN

Telematic Art is artistic collaboration over robust 1gigabyte fiber optic research networks. This paper explores recent experiments in telematics with 3D Virtual worlds, improvised performance, motion capture suits, spoken word, video art, live and pre-recorded dance, VDMX VJ effects, MAX/MSP/Jitter and various music and sound programs with live audiences and on-line performances.

Fig 1. The dancer's outline of herself in the "Nuclear Sweet" video, produced when her motion became sound and the sound became dark pixels of herself mixed into the video sent through a network connection.

Fig 2. Text poem in white, four video clips projected on boxes, Actor reading on Skype, motion capture studio with dancer on grid from Hong Kong for Syneme Summer I.

Fig 3. Pixellation, chroma and drawing (blue lines) manipulated by finger bending in "Here and There".

The Wonder of the Ancestral – In a Post Modern Kind of Way

Telematic Art originated from developments in computer art, hardware and networking technologies based on algorithmic and mathematical art. This has enabled new forms of representation and interactivity in group authored artworks over networks. For the most part sound, or sonic arts has formed the basis of development for many experiments at Syneme Labs based in Calgary, Canada. New media with each new iteration tends to develop and embellish the framework of older mediums it references as a kind of augmented proxy. In that sense what Syneme has done resembles the early experiments with the telephone when Alexander Graham Bell uttered his famous sobriquet, "Watson, can you hear me?" Initial connectivity for Syneme focused on uncompressed audio over high speed fiber optic research networks, especially but not limited to IpV6. [1]

The first piece of computer-based art appeared in 1951 when John Whitney used left over bits from defunct analogue computational devices. Most technology now in vogue, including "3D goggles, network art, computer-generated choreography, bio-computer interfaces, expert systems, robot art, ... were already common currency in the 1960s and 1970s." [2] Roy Ascott in his essay "Is There Love In The Telematic Embrace" [3] clearly understood the implications of of the confluence of "video, sound synthesis, (and) remote-sensing. He defined telematics as "Computer-mediated communications networking involving telephone, cable, and satellite links between geographically dispersed individuals and institutions that are interfaced to data-processing systems, remote sensing devices, and capacious data storage banks." The observer/participant and the system they are working within are in a constant state of change and even instability because the content is electronic and digital until it reassembles itself as one of a number of different art forms. The art object changes into a "cultural communication system." Telematic communication "extends the gaze, transcends the body, (and) amplifies the mind into unpredictable configurations of thought and creativity." [4]

There were few instances of these developments; Kit Galloway and Sherrie Rabinowitz's ground breaking 1977 *Satellite Art Projects,* Roy Ascott's clever 1980 *Terminal Art*, and at ISEA'94 in Helsinki, Paul Sermon's *Telematic Vision.* It showed a video camera recording events on two separate couches. A person sat on a couch in each location. On a monitor that mixed the images both individuals could see themselves in virtual space sitting together, and could interact and respond to one another. Since this paper is not on the history of digital or telematic art, these examples are just a tiny slice of the work that has preceded these investigations. Not all Syneme performances and concerts in the past two years are mentioned, just those that this author participated in.

In The Beginning Was Sound: A Sense Of Urgency – Making the Connection

2009 - OCTOBER

On October 27, 2009 I sat in the auditorium at the China Electronic Music Center (CEMC) at China's Central Conservatory of Music in Beijing. This was the first time that the Central Conservatory of Music used its new high speed fibre optic connection to initiate a telematic concert with Canada. Bruce Gremo's played *Calgary Interventions* on his Cilia flute controller using MaxMSP. For improvisation he took a soprano saxophone signal from Jeremy Brown in Calgary and let three continuous streams from that data control his output. I watched Bruce on stage, and saw Jeremy projected on a screen overhead. An image

of a whirling graphic appeared on another projection screen. This was the first telematic concert I had seen and I secretly hoped someone would jump out of the screens and do something on the stage. [5]

The technical obstacles to this concert, which included other musical compositions between China and Canada, were formidable. Before any of it could occur, a fiber optic line had to be taken from a Beijing research university and physically cabled over to the music conservatory. The Jack OS software that enabled the connectivity needed to be implemented, tested and stabilized. Wang Ke (Haku) a Beijing music student and programmer modified the original Jacktrip program to make it compatible with Ipv6.

2010 - JANUARY

In January, 2010 I began my studies in telematic art at the University of Calgary with the Canada Research Chair in Telemedia Arts, Ken Fields. Ken had laid down the fiber optic line in Beijing and set up that first concert. By the end of January I was working with other students on the NetTets 2010 Happening Festival facilitating a concert between the Central Conservatory of Music, China, Tavel Arts Technology Research Center, Indiana University Purdue and the Yong Siew Toh Conservatory of Music and the Arts and Creativity Lab, Interactive and Digital Media Institute of the National University of Singapore. A percussionist played live time at the Rosza Theater at the University of Calgary watching musicians on a projection screen in Singapore, Beijing and Indiana. Everyone could see one another and play together. The average latency of sound between node points was about 300 milliseconds. This setup had been accomplished using JackTrip audio software and a Lifesize video conferencing system that compressed the video signal.

It was thrilling we made the connections work between four timezones and everyone played together in front of a live audience. [6] This proved that four countries could play a concert together live time, and was an important next step for our research.

You Can See Me - Now What?

2010 APRIL

On April 24th Syneme Labs presented a 15 minute performance at the Indiana Intermedia Festival,aproduction of the Donald Tavel Arts Technology Research Center, Indiana University Purdue University Indianapolis. This performance consisted of Syneme Labs, musicians at the Tavel Arts Center and a group of 3D artist at the HR School of Fine Arts in Bloomington. [7] The artists 3D world made in 3Dvia Player was sent to Syneme Labs from Indiana utilizing the LifeSize and Tandnburg systems, and projected onto our right most wall. At various times Syneme had its own 3D world created in Maya3D projected onto the left wall. A dancer moved back and forth between the two worlds, and a third image on right projected what our studio camera was recording. This image was sent to Indiana for projection on stage at their Tavel Arts Center. At different times pre-recorded effects from VDMX, a VJ software were projected onto the dancer. Pre-recorded music in the Syneme lab also played in the background. All of this was sent back over the network to Indiana where three sets of live images were projected while musicians on stage improvised and played their own scores.

During the concert Syneme could not see the live stage in Indiana, though Indiana could see whatever images Syneme chose to send throgh its live camera feed. We were able to shift back and forth between

the 3D virtual worlds and the VDMX projected worlds by using the LIfesize conferencing system software. By introducing a robust visual intervace and a life dancer interactivity and presence factors were greatly enhanced.

JULY 2010

The First Annual Syneme Summer Institute in Telematic Art was launched with participants from Calgary Canada, Beijing China, Bournemouth United Kingdom, Waikato New Zealand and Indiana Purdue, USA,i using a variety of technologies and means to project video, poetics, motion and sound into the studio. One person read over Skype excerpts from the Bible and Chairman Mao's Book of Quotations. These excerpts were translated into 85 English letters aligned equidistantly without spaces between words or punctuation, as they would be in classical Chinese and ancient Hebrew. The visual texts were displayed and read by viewers. The text was projected onto a horizontal square. Underneath the text, projected onto white vertical boxes were videos that had been FTP'ed from Hong Kong and projected through a MAX/MSP VPT (Video Projection Tool) patch. On the right was a live animation of a dancer in a motion capture suit performing on a green grid. Our aim was to have the motion of the dancer control simple parameters in the video such as on/off or brightness, or saturation. Music originated from New Zealand and Calgary. [8]

There was a time lag between the movements of the dancer in Hong Kong and the movements of the dancer appearing on the grid screen in Calgary, but it did not affect the performance.

There were many technical issues to resolve. Since the Summer Institute lasted only three weeks, the deployment of Hong Kong PolyU's staff including the HARNET, the Hong Kong fibre optic backbone required constant debugging. A programmer in Beijing opened up the SDK of the motion capture system to change its parameters. The frame rate of motion capture had to be reset to work at the unusual rate of 60 frames per second so the x, y, z coordinates of the animated motion capture software could be streamed to Calgary.

DECEMBER 2010

In December Syneme facilitated ResoNations, Arts for Peace of the UN-NGO WAFUNI. Renowned musicians from New York, Beijing and China participated. Not all partners were on IpV6, some were on IpV4, so Syneme acted as the switching station in routing network information between these countries. [9] This concert resembled the January 2010 NetTets concert because it connected three disparate locations together for a music performance

JANUARY 2011

On January 29th, 2011 at the NetTets2011 Festival I premiered "Nuclear Sweet" [10] a telematic performance based on formerly classified videos of nuclear explosions from the 1940's-60's that were filmed and narrated by a cadre of Hollywood elite sworn to decades of secrecy. This distributed performance event worked with a live dancer who, through movement was able to generate and manipulate sound in real-time with the interplay of imagery. The dancer's movements were captured in the camera and processed with a motion capture function in Isadora Software. The velocity of her movement was then sent over the network to a MAX/MSP granulator patch. At various times in the performance the sound

or pitch from the granulator patch was routed over the network back into the videos playing behind her, disrupting the pixellation with a ghost-like image of her form appearing in the video. Simultaneously music was sent over the network live time from Indiana U.S., by a musician who was watching the performance via a live video feed. His audio connection was over JackTrip.

APRIL 2011

On April 21, I worked on the visual component of "Here and There," [11] a musical piece for ham radio written by Stuart Saunder Smith 30 years ago. For this piece I made a flex sensor glove that was onnected to an Arduino board and worked with effects in MAX/MSP/Jitter. These effects consisted of changing the pixellation and brightness, contrast and saturation of an image by moving my fingers. I could also blend muliple images and awkwardly draw a crooked line across the screen, then erase the line with a flick of one finger. These images were sent over the network using Skype and projected on a screen in front of a live audience. They were manipulated in response to the live time music in Indiana. These crude effects proved live time manipulation of a broadcast image could be sent over the network in response to music and other stimuli.

SYNEME SUMMER INSTITUTE II

Returning to Hong Kong for Syneme Summer II, I created "I Move In Decades," a telematic performance about the tenth year anniversary of the attack on the World Trade Towers. Using the talents of professional dancers, musicians and video artists, it built on the research done in Syneme Summer I of converting motion capture data to OSC. For this iteration dancers were rigorously mapped with their x, y, z coordinates using specific trigger points on the wrist, elbow and ankle. A clear range of motion was codified. The data was successfully converted to OSC. However, the MAX/MSP patch was not ready to be used in time for the performance, so the live time OSC data was stored. An asynchronous use of it will be used with a MAX/MSP patch. [12]

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BODYCAD: CREATIVE ARCHITECTURAL DESIGN THROUGH DIGITAL RE-EMBODIMENT

BANU PEKOL

Combining architectural theories with insight from courses/workshops taught to architects on embodied design, this paper deals with the question of how the use of digital media in architectural design can propose creative conditions for movement and how movement creates similar openings for architecture. It demonstrates the need for the creation of an informed architecture inviting movement through relational architectural interventions.

Architecture incorporates the possibility of action, which is naturally tied to a bodily reaction. Any structure that aims to be evocative should go beyond the merely visual. Unsurprisingly, the same can be said about choreography. This paper aims to demonstrate how architectural education can be enriched through digital spatial analysis tools which stem from the need for an enhanced bodily awareness for architects. The projects which this paper refers to are all concerned with deconstructing space such that it is experienced differently: through the use of the graphic programming environment Isadora, the structure provides a reassessment of itself. Methodologies for assessing the impact of movement on the perception and cognition of architecture have yet to be developed fully. The experience of space is closely tied to what it means to be a subject and with the constructions of subjectivity. This paper argues that both architecture and dance are about experiencing and visualizing space, which furthermore shapes the creativity as well of subjectivity of architects (or even, dancers).

Architecture is a dependent discipline. Yet also, architecture, as a profession and practice, does everything to resist that very dependency. This means that architecture is influenced by external forces from the design stage to the construction and even occupation stage. Thus, even if the architect has internal processes of her own, it is the external forces that shape the architecture itself. From this dichotomy arises a gap, which this paper engages with by incorporating the body and movement into architectural creation. Beginning as a consequence of the Beaux–Arts system, architecture has retreated into an exclusive and self–referential world. Today, even if the architectural outcomes in schools look radically different, the processes and methods used to achieve these outcomes are analogous. In some schools, conventional software is put aside for new algorithms generated by the students, which actually all follow a similar value system. [1] Progress seems to be represented by technology combined with aesthetics, using the newest technologies, forms and surfaces available. This is mainly due to scrupulous attention being paid to winning the client or audience, using various visual ploys and tactics. Also, the inevitable use of photographs in publications shifts our attention from architecture as a spatial whole, to the representation of it. Further, as curriculum requirements become standardized, more technical and even administrative skills being expected from an architecture graduate.

Architectural Theory and Embodiment

Kant defines space as an "a priori representation which underlies all our outer intuitions." [2] The space he explains is mostly derived from inside the subject, rather than external factors. This is a notion which implies that space is created from within the individual, a theory has been proven scientifically through

evidence that a certain area within the human parahippocampal cortex is more active in response to lay-out of space, as compared to using only objects as a reference point. [3]

As the German philosopher Johannes Volkelt argued in the late 1870's, the composition of a particular space can only be explained through movement and we must participate in this *emotion of movement* in order to understand it aesthetically. Such participation will provide the viewer with a more holistic experience of the building. Even though the importance of space is acknowledged in architectural historical literature (always within the limits of a privileged historiography), this is not extended to movement through space, and how the body responds to space.

In the second half of the 20th century, J. J. Gibson challenged the concept of visual perception and demonstrated that it is part of a perceptual system which actively involves locomotor movement. J.J. Gibson's reversal of sensory apparatus with types of environmental information the body deals with can similarly be adapted to this case. The function of architecture as stable and inert, and the body as a walking organism can be applied in such a way that architecture is regarded as the information that one can interact with, and accordingly the body will be forced to acknowledge the space created by the architecture: a new language, or inventory for movement will be created.

Heidegger's concept of *ent–fernung* –where one distances herself not according to physical distances but to what is important to her– is also useful to elaborate what is aimed at in this project. [4] In this way, physical priorities are played down and factors such as the perceptual and social can be engaged with much more efficiently. Space becomes a vessel for possibilities (social, cultural, perceptual), merging the body phenomenal and body politic.

Lefebvre, in *The Production of Space*, argues that space is produced by multiple social forces which he categorizes into the perceived, conceived and lived. This argument is useful to show that architectural design is one aspect of spatial production, and that the other agencies are as valid, if not more, than architecture. [5]

A work of architecture, even if its outer walls remain put, has within it spaces that can change or move. The "mobility of building and within building is one possible idea of Deleuzian thought that might be of tremendous value in architecture." [6] Building is generally understood as the movement of materials for the final stabilization of a structure. Yet the activity of building should also be seen as a method of creating, opening and unfolding spaces. This means that a building can allow new methods of mobility, movement and change.

Why should a building built by humans who inhabit their physical bodies not be influenced in a more informed way by these bodies? The corporeal presence of a building is thus both an apodictic part of design, and also an element of architecture that is not as removed from the architect as, for example, the infrastructure. Architects should feel free to seek ideological inspiration beyond their field of discourse. Such inspiration and expressive potential can then be used not only for conceptual propositions, but also physical applications. In turn, this will bring closer the architect and architecture, the designer and the design.

Movement and Architecture

Defining architecture through a field not normally and necessarily perceived to be related to it allows us to engage in a dialogue with architecture which would otherwise have not been possible. Architecture and movement can be studied together, but for what use? The means of architecture are basically set forth by our capabilities to make and sense physical distinctions in space. Movement/dance is not a part of architectural education, or vice versa. Yet both disciplines can borrow from each other in their process of creation. For example, both dance and architecture organize space. However, therein lies a nuance: dance de–stabilizes the space for the in stasis spectator, while architecture reinforces the space with factors such as gravity and functional necessities. Architecture can be considered as the main, dominant discourse for structuring space, and dance can be considered the main discourse for 'feeling around' space. A dancer can articulate space in a way much different than an architect. If architecture is a "set of practices, techniques and skills" then dance can provide a further set of skills or techniques to it.

Our bodies as psycho–sensorial systems are capable of picking up and sending haptic signals and responses. Architecture is capable of creating a bodily response and participation; however few buildings succeed in doing so. Since all buildings are created with the human mind, it is first and foremost the mind that should work with the body to become aware that architecture –which embodies the possibility bodily interaction–, will enrich the human experience. The interaction may not be tactile; it can be imagined as well, by envisioning flying over and under buttresses, gliding along curved walls or soaring upward through stairwells. An initial disorientation is necessary to then become aware of the spatial relationship of our potential movements with the architecture itself.

As Le Corbusier says, architects live in the extraordinary world of the acrobat. [7] Dance and architecture both frame, articulate, structure, give significance, relate, separate and unify, facilitate and prohibit. Mostly, they do this through logic of visualization stemming from notions of perspective, and thus viewing the world in a Cartesian way. If we consider the logic of visualization, we understand that seeing things from such a particular perspective or viewpoint locates the viewer and affects their sense of subjectivity. But dance and architecture also can disrupt this logic by lessening the distinction between buildings and space, inside and outside. Distinctions between warm and cold, still or windy air, scents and sounds, the feel of various surfaces are all components of architectural experience that can only be enhanced through being exposed to and creating such sensational experiments.

The Graham technique in modern dance uses exercises based on the haptic experience of space. The expression of 'feeling the space' is almost literal, as dancers who practice this technique pull and push the space around them to give meaning to their movements. Rudolf Laban's dance notation is another attempt to define space through the movements of the body using geometric planes.

Digital Tools and Architectural Embodiment

Choreographers have been working with digital platforms since the 1990's in order to pass on their choreographic theories and practices to their future company members, or interested dance–enthusiasts. The most well known is William Forsythe, who has worked with researchers and artists from varied fields for his award–winning online dance notation 'Synchronous Objects, for One Flat Thing Reproduced'. His works are interesting because they are able to convey his choreographic logic not only to dancers, but also non–arts specialists such as cognitive scientists.

Such open–ended digital educational tools are becoming ever more popular. Architectural education has been using digital platforms mainly for translating the sketched image into perfectly calibrated drawings, and easily manipulating it once on screen. Even with 3D renders of architecture, the fact that the viewer's body is motionless while looking at a flat screen remains unchanged.

The gap between the internal processes of the architect and the external forces that shape the architecture can be studied through digital technologies. Architecture is taken here in the context not only of the built environment but in the multiple groundings and environments for movement. Architecture does not necessarily mean the practice of building; the intelligence from architectural education can be applied in various ways. This conclusion that models used in design science are metaphors which convey their meaning by way of a hermeneutical understanding has been exemplified in multiple studies. [8]

"Aesthetic and cultural practices are peculiarly susceptible to the changing experience of space and time precisely because they entail the construction of spatial representations and artefacts out of the flow of human experience." [9] The outcomes of working with architecture and dance not only benefit the digital representation of space and architecture; they redefine a movement vocabulary. When walking on the ground, one notices a small inclination, or any irregularity. The muscles and balance, adapting to the surface, automatically compensate this. When using a virtual model, such automatic reflexes do not exist at first; they must all be learned and experimented with, to find the ideal response. The walls, although virtual, represent obstacles, and since the voyage is undertaken not just by walking on the floor, the ceiling, walls, windows, doors and columns all have as much importance as the floor. Architectural elements gain a new meaning, and features such as arches which used to be structural and decorative, now interact with the inhabitant.

The idea that aesthetic perception of architecture should be enriched with the inclusion and application of full spatial comprehension forms the basis of this paper. Since Kurt Gödel, it has been confirmed that no system of logic can contain its own explanations: a given system is always built upon axioms which are subject to further analysis. The form of one system becomes the content of the next higher system, and so on. So, the form of the building is the content of our interaction with it. You cannot interact with a façade. The project similarly is a work on oneself, on one's own interpretation on how one sees things etc.

The following examples aim to illustrate how such participation can be developed, and how the body can be used interactively with the space/architecture around the architect in training so that architecture becomes an expression of life, rather than an evasion of it.

ARCHITECTURAL BODIES

In the workshop titled *Architectural Bodies: Experiments on Gestures*, conducted by the author in Summer 2011, participants were led through a series of intellectual, cognitive, and physical exercises that seek to question the relationship between gestures and architectural spaces. Both the technical as well as the creative processes underlying this workshop allowed the participants to experiment with their own perception of 'natural gestures' as well as creation of 'spatial gestures'. For the workshop, using the graphic programming environment Isadora, a computer programme that analyzes real–time gestures and their interaction with various architectural settings was prepared. Each participant formed her own "spatial gesture" by choosing a particular pre–recorded space and through the computer program output constructed a physical response to the space with her own body.

This workshop aimed to demonstrate how spaces condition particular gestures, and how gestures are inherent even in activities where only one person is involved. The translation of gestures into architectural images provide an exciting yet challenging insight into how dominant jests can be re–evaluated within the context of space–creation. Architecture students, who are used to working with AutoCAD, Rhino and other computerized architectural programs, when faced with their body in space, acknowledged that their bodies in space have no relation to the straight lines or geometric shapes which they are accustomed to working with. In the workshop, the real and the virtual imply each other continuously. Through the experiences gained from virtual interactivity, the sequence in which the content is structured will not –as is customary– stay linearly organized, accessed and unchanged.

The workshop allowed the participants to acknowledge that gestures can not only be understood as re–presenting body–images, as the movements of the participants were driven by proprioception rather than architectural design principles taught in their classes. This fact is reminiscent of Agamben's argument that "If dance is a gesture, it is so, rather, because it is nothing more than the endurance and the exhibition of the media character of corporal movements. The gesture is the exhibition of mediality: it is the process of making a means visible as such". [10]

One other program prepared for the workshop connects the limbs of the participant to a 3D CAD mode, using sensors. The spatial limits of the building make the voyager move in a certain way, completing the interactive cycle. The space suggests a particular way of movement to the voyager and with this suggestion it will reveal that which it is harmonious with, and anything that prevents it will seem out of place. This can then be linked to the design problematics in architecture, pre–construction analysis, or to different analyses of theories of architectural analysis. The user of the program must always try to think of and use 'form' in its full spatial completeness. In order to do this, she stops prioritizing the façade. This is akin to when in dance, the dancers are constantly reminded to feel their centre and move through the manipulation of the centre. Such a centre of intention can be formed in architectural movement research. Thus, through our interaction with the work and our decisions to move in a particular way throughout this interaction, we meet ourselves in the work.

The workshop also draws from Paul Schilder's concept of "body image/body phantom" which is a neuropsychological mapping of the body which refers to the inner image of one's outer, physical appearance. The graphics, formed by the workshop participant's bodies on the architectural videos provided an alternative body image. By internalizing the external to the body (the architecture, in this case) into her corporeal activities, the participant began to adapt her body to the context.

BODY AND SPACE IN ARCHITECTURE

An undergraduate course titled *Body and Space in Architecture* created and taught at the Mimar Sinan Fine Arts University's Faculty of Architecture by the author, focused architecture undergraduate students on architecture and embodied design. The majority of students had difficulty tearing themselves away from the obsession with producing visually impressive work. Once they got the hang of the subject, they began seeing the body in every aspect of architecture. After completing their end–of–year project, the students came back with results that they confessed they had not expected, with comments such as realising that functions were not the same as desires in architecture. This implies that their education which included courses on ergonomics was in need of a supplementary module which demonstrated the versatility of the body in architecture.

Conclusion

The theoretical background along with the examples from educational practice complete circle back to William Forsythe, whose understanding of space is "an inclusive concept that even integrates the interior of the bodies, breath, and most essentially proprioception; all of these factors become interfaces for artistic response and creation." [11] Forsythe's CD–Rom 'Improvisation Technologies' applied geometries of objects in the space around the dancer onto the dancer's body. The digital practices where body becomes space itself can be applied to architecture students who will then stop relying on their auto–pilot (or rather, auto–architect), and engage in a more intimate and visceral manner with their design concepts. Heidegger's suggestion that we live in the space opened up and revealed by technology rings true once more, in this context. [12]

Architecture is generally experienced by dwelling in it. August Schmarsow 's term *Raumgefühl* (sense of space), rather than *Formgefühl* (loosely translated as sense of form) is what should guide the design approach. The architectural experience of a space should be extended from only accepting it as a dwelling to a more aggressive, seeking approach to architectural forms with the use of new psychophysical coordinates. Architectural design can become a process of interpretation, rather than focusing on presentation and representation. This re–shaping of space–creation through digital tools should be presented as an educational model based on the creation of an informed architecture that invites ways of moving through not just bodily gestures of the humans themselves but relational architectural interventions.

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SUBTLE PRESENCE: DESIGN AND IMPLEMENTATION OF USER CENTRIC CONTENT DELIVERY USING BIOMETRIC DATA CAPTURE AND INTELLIGENT ANALYSIS

WILLIAM PENSYL

Explores the user centric delivery Media content, using biometric data capture, intelligent analysis of facial data, age, gender and other forms of data that can be directly captured in a non-invasive manner. The system has an inherent intelligence that is ambient, and ubiquitous – allowing for interpretation of a wide variety of stimuli and that can be easily collected.
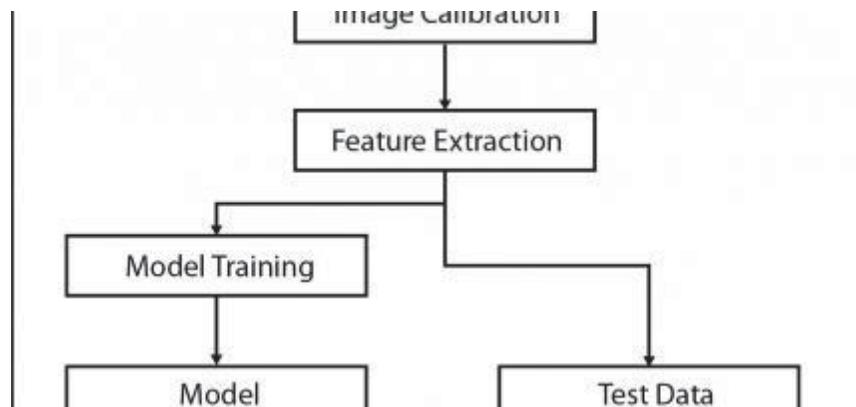
Figure 1. Processing Flow Diagram of HiPOP System
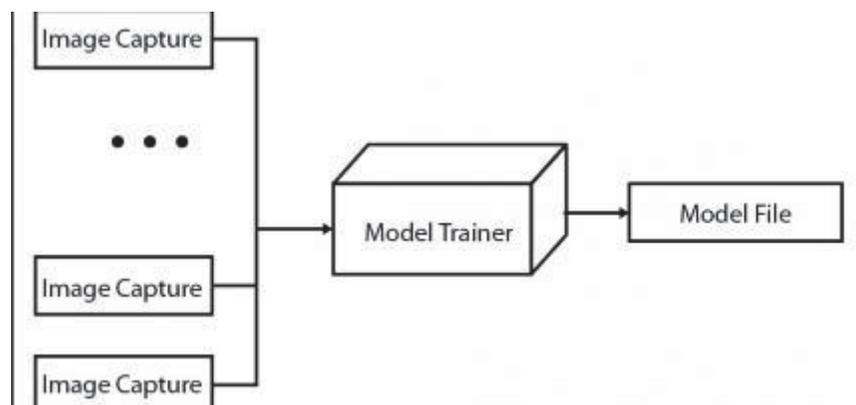
Figure 2. Data Training from Datasets

Figure 3. Subtle Presence, presented in the 2011 Sarajevo International Winter Festival.

This paper presents design and implementation of user centric content delivery using biometric data capture and intelligent analysis. We describe feasibility and successful implementation of responsive information delivery tools prefiguring facial and biometric data to cue advertising, social communication or culturally relevant user experiences. Initially designed for marketing content in public spaces, the content delivery can vary depending location and population demographics. Various forms of data, captured in a non-invasive manner, including facial images, height, body type, age, gender and aspects of mood can be used determine appropriate media delivered based on these personal attributes. To alter the type of media content presented in advertising, in retail environments, exhibition installations or public spaces, it may prove useful for media designers or systems designers to be able to assess certain personal attributes of the viewer in the space. We refer to this system as HiPOP – A High Impact Point of Purchase content delivery system.

The system uses ambient and ubiquitous intelligence to detect a face, calibrate the image and extract features to classify and determine personal attributes. After testing for gender and age group, media content is presented based on these attributes. Such a system must have an inherent intelligence and modest decision making ability that is ambient and ubiquitous – allowing for interpretation of a variety

of stimuli. The intelligence must allow meaningful responses to visual and sensor cues. There are many possible applications for the implementation this system, including, information delivery for targeted advertising, social communication in public environments. It also can be used to create socially engaging integrated media artworks within architectural and exhibition spaces. This allows viewers to engage in aesthetic experiences that are subtly responsive to their personal physical attributes and moods.

Project overview

There are a number of developments that are required for this type of information delivery. These build upon previously published biometric data capture techniques. The significance of the work lies in the development of an autonomous, intelligent system that can deliver user specific information based on the collected data of a viewer's gender, height, weight and other cues that allow for a definition of a user profile. One critical aspect to such a system is an ambient and non-invasive data capture with a naturalistic, subtle response to the user.

There has been much research on capturing user biometric information, gaze detection, posture, and these have been used to create interactive systems that allow for more natural interactions in games, interactive and environments. However, no application has been developed for point of purchase environments. In this project, we want to focus on getting useful information delivered for viewers in this specific application. Furthermore, we utilize hardware/sensor and vision systems to increase the range and accuracy of information delivery, providing better solutions for advertising, customer support, and open these platforms for the creation of interactive artistic installations.

System overview

The system processes the images captured through three modules: a "Detection Model," a "Data Training Model," and a "Demo Showing Model." The Detection Model algorithm detects a face, calibrates the image and extracts features using OpenCV, Haar-like application and LibSVM to classify and determine gender. [11], [8] An AdaBoost learning algorithm boosts classification performance. [6], [7] [8] The Data Training Model uses a cascading classification method and a LibSVM to train analysis of data and generate a final data model file. [8] The Demo Showing Model manages windows for the system and audience delivery content. The detection result is shown in face detection window and scene view window. The content images or steaming video is shown in a second display monitor.

The Detection model uses sensing and vision technology that captures a video stream, an algorithm that analyzes and identifies if a face is present, then compares the detected face to a library of defined face images organized by gender and age. This allows for the determination of characteristics including gender and age within a set of age groups. The method of detection and classification uses OpenCV Haar-like Features to find a face rectangular within the space where video camera is pointed. [1] A LibSVM is used to classify and determine the final result in gender and age bands. The results of the content delivery selected are targeted to groups that are more easily defined. [8] Gender is easier to detect than age. The fine distinction between age within the small child group, or with the adult groups is more difficult to accurately determine.

The HiPOP System is detailed in the processing flow diagram in Figure 1. The image is captured by any consumer grade webcam and passed to the face detection and image calibration module. The features are extracted via a very fast feature evaluation using Haar-like functions and AdaBoost [5] to increase to focus in a small set of critical features.

The Data Training Model is necessary to ensure the software algorithms can compare the data set of images with the library and the images captured can be calibrated to increase accuracy in the final result.

Using the LibSVM data file the system is trained to analyze the data, to classify the faces according to a set of grouped ages and genders, and to generate a final data model file. Different data models can be created using different data sets. The Demo Showing Model shows the data detection results and sends the data to playback system, either a QuickTime or Windows Media Player.

This implementation relies on published work on Haar-like Features [10]. Haar-like features are digital image features used in object recognition. They owe their name to their similarity to Haar wavelets. Viola and Jones implemented very high frame rate object detection with only the information in a single grey scale image, using rectangular Haar-like features. A simple rectangular Haar-like feature can be defined as the difference of the sum of pixels of areas inside the rectangle, which can be at any position and scale within the original image. This modified feature set is called two-rectangle feature. Viola and Jones [1] also defined three-rectangle features and four-rectangle features in the object detection framework. The values indicate certain characteristics of a particular area of the image. Each feature type can indicate the existence (or absence) of certain characteristics in the image, such as edges or changes in texture. For example, a two-rectangle feature can indicate where the border lies between a dark region and a light region.

The Viola-Jones object detection framework has three steps to extract features and classification. Rectangular Features are enclosed within a detection rectangle. The area rectangle is divided horizontally and vertically. The value of the divided rectangles is determined and the differences in features are found. Viola and Jones refer to the method employed as the "Integral Image." This first step is used to determine the rectangular features in an intermediate representation. The Integral image allows the number of iterations in processing the image to be limited, thus increasing the speed of the feature extraction. The second step uses a variant of the AdaBoost [5] to select a small set of features and train the classifier. First, collect a group of pictures, some with human faces and some without. For each image, give the image a weight (1/m [human face], 1/l [non-human face]). And then extract "T" features from a lot of images. The processes for extraction, repeated T times are: first, standardize the weight, the sum is 1; second, pick up the feature that has smallest error; third, record the parameter where the error is smallest; and finally, refresh the image weights. After the above processes, we can decide if this image contains a face. The third step uses a set of Cascade Classifier Functions to compare iteratively against at library of images that are previously classified as faces, and within a gender or age group. Through testing and comparison of the captured face, the result is determined, within a margin of error. A larger library for comparison increases the accuracy of the result. There is a trade off in the speed of processing due the comparison of larger ldatasets. For purposes of this implementation, the determination needs to be very fast. To maintain a fast response, we work with a limited set of images in the library. The first step determines the results in male or female gender. Following, the face images are classified via the cascade classifier function to determine age grouping. In our implementation, the age groups are limited to child, teen, young adult, adult and seniors. The system implementation also includes the detection of a smile, adding the potential for determination of a certain amount of mood within the face of the individual viewed.

To increase the accuracy of the result, determining the age and gender, the data training models Support Vector Machines (SVMs) supervise the learning methods used for classification and regression. SVMs are classifiers the extract the results belonging to one of two categories. The SVM training algorithm builds a model that predicts whether a new example will fall in to one or the other category. The use of the SVM increases the accuracy of the resulting detection.

Implementation

The HiPOP system was designed for environments where narrow cast media is delivered in an environment; such as a retail outlet point of purchase display is maintained. Other locations where a system such as this can be employed are in any location where marketing or advertising content is presented in a public space to one person or to small groups of people. It is common that we see narrow cast information displays in point of purchase locations, elevators, entry foyers, and even in mass transit trains and subway cars. For such content delivery to have a maximum impact the content can be targeted to the person that is looking at the monitor. In these circumstances, the system can play content that is of interest to the person there. This targeting of content may increase apprehension and response by the viewer. In most cases of content delivery in these types of displays, the content is simply streamed without consideration for who may be viewing it. The content may be completely off target. For example, in a point of purchase display, the customer could be an older female. Yet the content of the media may for a product that is commonly used only by young males. Extreme examples of this kind of disconnect occurs when the product marketed is related to a life style or behavior that may be considered inappropriate by the viewer. This could lead to a negative experience, and decreasing participation by the consumer. If the content can be targeted to the individual, then interest and participation can be maximized.

One unique feature of the HiPOP system is that the viewer is never aware that the media content is focused to them. The system simply displays the content in a seamless manner, without any indication that a detection of personal attributes is made. The system uses a web cam mounted near a display screen. The camera captures the faces in the space and detects personal attributes. Using the techniques described above, the system determines and classifies the person and then displays the targeted content. There is a limit to the accuracy of the detection. In ideal circumstances, gender detection is 80 to 85% accurate. However, since the system is designed to display the results without the knowledge of the viewer, the viewer does not experience any negative responses. They are unaware that the content displayed is the result of an inaccurate detection of personal attributes.

Another use of the system is in subtle, conceptual and artistic interactive media installations in public spaces. This is useful for interactive or streaming media content in exhibition to be displayed and altered based on the viewer's personal attributes. In Figure 3, the installation depicted alters a still life painting and changes it over time. The result of face detection alters the image according to the viewer age and gender.

In upcoming installations, importance is placed on the detection of mood. As the system software can easily detect facial expressions, the altering the content to match the mood of the viewer can easily be attempted. Current work explores how images can be shifted due to the mood displayed in the viewer in exhibition spaces. Detecting reaction to content and altering the content stream in ways that increase satisfaction is possible. Alternatively, we will explore how mood of the viewer may be affected by the images. There may be ways that various images types can be used to evoke mood shifts within the viewer. In the current installation we are detecting the smile in the viewer's faces. We can track the length of time the viewer is smiling, or other limited facial expressions. The longer one smiles, or alters their body posture; the vibrancy and saturation levels of an image can be adjusted. Other type of images can be streamed based on the visual cues collected. This new work requires "training" of the model to classify the images detected according to the set of groups defined. The library of images is stored in a database with key identifiers associated with mood: smiling, eyebrow position, eye wideness, body poster, and slope of shoulders, head tilt, or other detectable and identifiable cues.

Conclusion

Such systems can provide valuable mechanisms for delivery of media content in public places. One goal in advertising and marketing is increasing interest and engagement of the viewer. By targeting the content more closely to the person based on their own specific attributes, engagement in the content can be maximized. For artistic or conceptual installations, specific goals can be achieved through interaction that is responsive, yet unobtrusive. In the system we have implemented, there is no data or personal information is actually stored by the system. The system simply detects a face or personal cues and defines a classification of the person based on age and gender, and plays a piece of media content. This system creates a subtle responsive interaction that is unobtrusive, yet provides valuable media content that has the potential to increase viewer's engagement in meaning ways.

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ART ↔ SCIENCE RELATIONALITIES

Olivier Perriquet & Bill Seaman

As science moves away from single disciplines into research that combines multiple scientific fields, we seek to discuss the possibilities of a multi-perspective approach reminiscent of Stenger's *ecology of practices* where science and the arts provide differing perspectives that can be brought into dynamic relationality.

Research and practice that explore relationships between art and science have been around for a very long time. As a subgenre of the artworld, these works and related questions are currently showing a renewal of interest. Are we simply experiencing a transient period when the frontiers between disciplines become more porous and allow for a better mutual comprehension or are we experiencing a real game-changing scenario similar to one of these paradigm shifts described by the epistemologist Thomas Kuhn?

Although initially suggesting the presentation of a taxonomy of the different relations between the Art(s) and Science(s), we have realized in our discussions that such an undertaking would call for a vast study, much broader than what we can actually address here. Nevertheless we will try to articulate a series of operative relations and explore their qualities— this is what we have termed *relationalities*. We have immediately found that each of us represent a quite different understanding of these relationalities and works of art that arise as examples of this juncture. Thus this paper will be an embodiment and synthesis of a dynamic dialogical process, sometimes synthesizing and sometimes pointing to difference. In general both of us see a difference between the practice of Science and Art. If we here adopt a position that does not take for granted that art and science are simply *two different names for the same practice, approach or activity*as sometimes claimed by the proponents of Art-Science bridging, we also believe that these domains of inquiry, seen quite separately by default, can sometimes be brought together when a conviction is established that the disparate pieces can be merged in the service of a new practice.

There has been a certain dose of play in our approach. We both believe this component is common to both art and science. Aspects of creativity are also central to both but are manifested in very different ways in general as part of their practices e.g. in science creativity might become manifest in how one approaches or frames a research problem. This work should be considered a stepping stone toward a more systematic undertaking. We have ended-up here with an initial collection of relationalities between Art and Science that one might call variations on a theme. We seek to let these entries talk and negotiate between each other, exemplifying a dialog between shots from different angles or perspectives. Drawing on Stengers' *ecology of practices,* [1] one might see here an ecology of co-existing relationalities. We typographically coined Art ↔ Science to encompass a wide range of possible relations.

Art (=⊇∩≠≤≅) Science?

Having in mind a target rubric Art ↔ Science, we posit a series of overarching concerns explored under this label. A seminal book outlying one period of works is the late Stephen Wilson's Information Arts and

related website. [2] Here Wilson provides a unique set of categories that comfortably intersect with ours below:

- the development of new forms of artificial intelligence and computational practices;
- the exploration of robotics;
- the creation of intelligent environments;
- the exploration of consciousness studies;
- the study of science as it relates to understandings of the body;
- the development of new forms of interface and sensing modalities;
- the creation of new experience focusing on phenomenology, interactivity and intra-activity;
- the exploration of new materials born of scientific inquiry;
- the abstraction of particular material practices in the service of art and architectural production — e.g. biological processes, physics, and nanotechnological processes;
- the exploration of new technologies for artistic purposes — e.g. locative media, virtual reality, augmented reality, etc.;
- the use of game strategies;
- language games / mathematical games and instantiations of knowledge/concepts through play;
- the employment of media archeology / variantology and its relations as art content;
- the mining of the history and philosophy of science as subject matter;
- the exploration of databases and/or data mining;
- the employment of visualization strategies and/or the abstractions thereof;
- the use of telematic and locative potentials;
- the interest in emergence, generative strategies and dynamic/non-fixed works of art;
- works of social and cultural critical reflection focusing on scientific issues;
- political reflection critiquing scientific research;
- creativity and innovation arising out of scientific inquiry.

Each of these categories can easily be populated with a group of examples. A question that naturally emerges is whether we encompass more or less any form of Art in general, in terms of Art ↔ Science practice or not. Our short answer is no: when art is informed by science by using its materials, technologies and paradigms it expands the possibilities of creation (e.g. using new materials created by physicists or scientific concepts) and simultaneously becomes tinged with what we might call a scientific *color*.

Our question actually bifurcates: (1) can a given work be of art and of science at the same time - Seaman believes yes, where Perriquet is much more circumspect; (2) can 'any' work be described as an Art ↔ Science work - we would both say no. The physicist and philosopher Lévy-Leblond raised an interesting negative voice and argued in a recent essay [3] that the artistic approach and the scientific approach are different in nature and do not consist of a single genre, that this separation is constitutive of each field and condition of its reception. This has also been a debate between us. While Roger Malina, one of the most outspoken contemporary proponents of Art ↔ Science bridgings, published a recent rebuttal to Lévy-Leblond's text, [4] Jacques Mandelbrojt, co-editor of the Leonardo Journal, also remarked that it offers *"a point of view different from that which usually prevails in Leonardo, and it can make [the readers] find their own path by comparing those two points of view."* [5]

We agree with the idea that neither art is a part of science in general, nor science a subset of art, nor science and art are two names for the same activity. But we adopt a softer position, considering that some works may be of art and science at the same time. Seaman defends the idea that, properly contextualized, *"science = proto-conceptual art"* while Perriquet would perceive a mix of genres only in specific

works (but appreciates the hidden and subtle recursivity of Seaman's artistic equation). Seaman's collaborative book with the scientist Otto Rössler, Neosentience | The Benevolence Engine, [6] exemplifies this equation. Seaman calls this approach Recombinant Informatics, exploring a multi-perspective approach to knowledge production. A methodology to investigate the meanings of a mixed-genre work, can be taken up by observing it through artistic glasses as well as through scientific lens (additionally works can also be addressed from other disciplines e.g. the humanities). Wearing these alternating lens provides differing perspectives, resulting in different discourses on the same object or experience.

Works of art-science collaboration may end up in differing output arenas, where the scientist might publish about what they take away from an art-science collaboration in a journal or book chapter, the artist may manifest the result in an exhibition, installation or other form. Concretely, daily scientific productions are mainly publications, addressed to colleagues, and subject to peer-review, whereas artworks are intended for an audience that is not usually made up of artists alone. Framing a work as Art and Science at the same time implies some specificities, such as targeting a public (this is not the usual goal of scientific research) or questioning tacit scientific standard that we may roughly gather under the banner of objectivity. An artist has a right for raising a much more subjective voice: by claiming *"this is an artwork"*, his work becomes indeed an artwork, as per trans-substantiation. There is no similar option in science. Non-orthodox researchers such as Whilelm Reich or Emile Benveniste, among many others, were excluded from the scientific community at their time for non-conformity with the constitutive rules of science. This inclusion / exclusion framework is a bit caricatural: Art also sets tacit rules for the cooptation of its members, and objectivity in science is a complex and widely discussed concept, having a History and assumably different meanings in hard and soft sciences. This example, however, outlines just one variable in the tricky *equation* the community possibly emerging at the intersection would have to solve.

Science ☲ Art ☷ Science ☲ Art ☷ Science ☲ Art

Art seems non-linear in its historical progressions. Scientific knowledge, in comparison, is cumulative, there is a notion of progress that is not so pregnant in art. This point could be discussed, though: one cannot address the question of randomness in art after the drippings of Pollock or the question of the unconscious after the works of the surrealists as if nothing was already done. Whether we call it progress or not is a subtle debate, but at least an artist knows that he/she does not start from scratch. History plays an important role in art, in appearance maybe more so than in science. A physicist, a mathematician or a biologist may be trained only with recent formulations of physics, math or biology and have only a reduced knowledge of the History of his discipline (we imagine that the revolutionary figures, in contrast, always know the History of their science). Art and Science practices must contend with this perhaps subtle difference between art and science in terms of progression.

Certainly science has a different epistemological background related to its concrete functioning – the study of knowledge and its methodologies for justifying its belief. We can explore this from multiple perspectives in the writings of Bachelard, Latour, Kuhn, Feyerabend, Popper and Stengers.[7] We here orient our focus on the work of Kuhn, whom we find illuminating for our concern (a critical discussion on the relative positions of the former epistemologists is beyond the scope of this paper). When arguing that science does not explicitly articulate its rules but functions instead according to *paradigms*, Kuhn offers a conceptual apparatus for ongoing change. We might compare this to the notion of the avant-garde in the arts. Normal science, Says Kuhn *"does and must continually strive to bring theory and fact*

into closer agreement, and that activity can easily be seen as testing or as a search for confirmation or falsification." [8]

Where science must uphold strong standards of truth - here labeled falsifiability (Popper's concept) - art is more open in its strategies and relation to the truth. The famous quote *"art is the lie that tells the truth"* from Picasso, illuminates the complexity and perhaps polarity to that of science in terms of the relations that art explores in the domain of practice. Art has this potential to extend the traditional boundaries of Truth and we provide the hypothesis that there is a similar expansion of logical truth which is at stake when in mathematics one thinks of a visual demonstration of elementary geometry or a computational proof in number theory. This conception and the subsequent debate or controversy it stimulates could be compared to the contemporary understanding of what an artwork is, after Duchamp. Witness here Duchamp's ideas surrounding a *playful physics.* [9] While a painting includes the viewer's gaze in its definition, a contemporary proof (as many contemporary artworks) may include the viewer's cognitive faculties within its boundaries. Interestingly, Hans Diebner who has also worked and written exploring art and science relationality, has defined a new approach to scientific inquiry he calls Performative Science. [10] His work explores in part complex systems and suggests that certain results are time-based and not repeatable. He is deeply interested in a proto-hermeneutics. This is an example where the performative notion relevant to the arts functions in the service of scientific inquiry.

(Art → Science) & (Art ← Science)

Scientific knowledge is traditionally organized hierarchically: is it inherent to its nature? For example, in mathematics, it is hard to start teaching to a student what the cohomology of finite groups is, if he/she does not even know what a group is in the mathematical sense. It may simply be difficult to understand the need for the invention of such a structure without a prior manipulation of different kinds of simple operations in various contexts (multiplication on numbers, rotations in geometry, etc.).

Bourbaki, a collective pseudonym standing for a group of mathematicians of the 20st century, wrote a series of books presenting an exposition of modern advanced mathematics. With the goal of founding all of mathematics on set theory, the group strove for rigor and generality. Each volume starts with an introductory explanation: *"The method of exposition we have chosen is axiomatic, and normally proceeds from the general to the particular."* [11] and also, with a possible coefficient of irony (ranging from zero to one, up to the reader's beliefs), *"In principle, it requires no particular knowledge of mathematics on the readers' part, but only a certain familiarity with mathematical reasoning and a certain capacity for abstract thought."* There exists a propensity to organize scientific knowledge hierarchically. Yet, it is interesting to think about how Science might gain from Art at this level: finding a different way to organize and access its knowledge, as well as a means to stimulate insight and new knowledge production through the potentials of association and juxtaposition.

In exploring the relationality of language used in the service of Art ↔ Science Relationalities, language should be understood in the broadest sense: there is an intimate relation between a given language and its potential expressiveness. The limits of language, for Wittgenstein as discussed in the Tractatus, [12] indicate and set the limits of thought, or the limits of a particular world circumscribed by these thoughts. Mathematicians often use words as simple as group, field, action, natural transformation, etc. to name high level abstract algebraic objects: what is at play here is the complexity of the concepts this language embodies (Deleuze and Guattari would rather speak about *functions* in science and leave *concepts* to the philosophers, *affects* and *percepts* to the artists). [13] In general, scientific language seeks

to be precise and monovalent. Language supporting the arts moves from the clarity of art historical and formal definitions to the poetic, having obscure, and polyvalent potentials. The word may also function as part of an image as both an aesthetic object and a linguistic signifier, superimposing signifying domains. In terms of Art ↔ Science collaboration, certain goals related to the construction of a bridging language may be undertaken. Simplifications have always existed in general-public magazines of science or in lectures intended for a wide audience, but the close interaction with scientists offered to artists in residency in scientific laboratories may lead them to function at times as bridges with a wider or different non-scientific audience; these lucky artists may in return inform their own practice by methodologies imported from science while at the same time illuminate science with an unusual light spot.

Art % Science

Embodying both approaches, Leonardo Da Vinci has become an icon in Art ↔ Science rhetorics because he has been known as a major character for his unequaled contribution both to the sciences and the arts of the Renaissance. A focus on Leonardo's work confirms that History is an important factor in the study of Art ↔ Science bridgings. Leonardo lived a long time before the modern and contemporary conception of science, now concerned with falsifiability and reproducibility of experiments, ie. at a time when the operational concept of objectivity was not yet normalized by an advanced meta-discourse on scientific practice, combined with the intensification of scientific and technological productions. It is interesting to think how an artist like Leonardo functions today in relation to our contemporary conception of the image: *"Another unusual feature in Leonardo's writings is the relationship between word and picture in the notebooks. [...] Leonardo gave absolute precedence to the illustration over the written word in his teaching method. Hence, in his notebooks, the drawing does not illustrate the text; rather, the text serves to explain the picture. In formulating his own principle of graphic representations — which he called dimostrazione (demonstrations) — Leonardo's work was a precursor of modern scientific illustration."* [14]

We understand and believe that Leonardo's work, rather than being a mere discovery of illustration in science, may have been precursory to scientific visualization as we conceive today: the art of gaining insight into a problem by visual means. Taking data visualization as an example, we realize this form of practice can fall within the Art ↔ Science spectrum of relationalities where one may either work on an abstraction of data visualization with the intention of creating a work of art or may draw on art and design concepts to make a more effective display of scientific informations. Visualization not only relaxes the mind from getting lost in too much abstraction, but helps shape a given problem along particular lines of thought, that, when cognitively dismantled into understandable units by the viewer's eyes and brain, provides what Leonardo called *dimostrazione*. It's worth remarking that science might sometimes still call this methodology a demonstration, keeping the dual and ambiguous meaning of *concrete representation* and *logical proof*.

The intrusion of such methodologies from outside of science, reminds (and provides an example to) the strong encounter of Art and Science claimed by Malina, who states: *"[...] the history of science does not follow a logical path of increasing completeness. Instead the history of science is punctuated by the introduction into the scientific methods of ideas and methods from outside of science. The scientific method itself evolves. Facts, theories and methods which would not have been considered scientific a hundred years ago, are now mainstream science. ... I argue that one of the reasons for encouraging the interac-*

tion of art and science is to facilitate the migration of ideas and methods from outside of science into science. I call this the 'strong case' for art-science interaction." [15] One can imagine a dual strong interaction where the intrusion of methodologies from outside of art also transforms artistic practices.

Art ☆ Science

Having reached the conclusion we find ourselves just at the beginning of a vast study. We certainly hope that we have in part reflected the plurality of practices involved here and started to articulate a multi-perspective approach which allows for a circle that encompasses many foci and multiple points of view. At some point this appears to be a paradoxical undertaking, and probably we are pulling out the rug beneath the very footing that we are currently bootstrapping, by embracing this multiplicity of perspectives. But each person involved in Art ↔ Science practices positions *themself* differently and our remote goal is to embrace these inner and outer diversities.

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YOU HOLD THE CAMERA NOW: AN ACTION RESEARCH CASE STUDY OF PRE-KINDERGARTEN TRANSMEDIA NARRATIVE DESIGN

Gabriel Peters-Lazaro

This paper presents findings from a pilot research project called the Junior Audio-Video Club. Through an account of our experimental pedagogical approaches this paper aims to identify key insights and challenges to the pursuit of early childhood media arts education, and to explore the relationship between art practice and research.

Student participants in the Junior AV Club collaborate on a video editing project. Copyright University of Southern California.

"It's like somebody telling a story, except it's on a screen." This observation about the relationship between movies and storytelling was made by a four-year-old student at the outset of a project called the Junior Audio-Video (AV) Club undertaken by a group of media arts scholars and practitioners at the Institute for Multimedia Literacy in the fall of 2009. A research and teaching unit within the University of Southern California's School of Cinematic Arts, the Institute for Multimedia Literacy, or IML, is dedicated to promoting media literacy within networked cultures at all levels of education. The Junior AV Club, an ongoing action research project investigating how digital media tools facilitate learning for early

primary students within a pedagogical framework based on computational literacies, represents the IML's first foray into pre-K and early primary education. As an IML staff person and PhD student in Media Arts and Practice (iMAP) at USC, my role within the Junior AV Club has been that of curriculum designer, lead instructor and researcher. I am in the process of expanding the research goals of the project and making it the basis of my dissertation work.

This paper is an "in-progress" introduction to the project; it is not a comprehensive report of findings and conclusions as we have not yet reached that phase of the process. At this stage we are focused on a practical approach to developing classroom interventions and have yet to assess the outcomes of those interventions. I share our work at this phase as an example of how the processes and skills of an arts practice background may contribute to research endeavors.

The Junior AV Club was inspired by a 2009 evaluation of the Ready To Learn Initiative that found positive effects on the basic literacy skills of preschoolers when exposed to media rich educational materials. The IML partnered with a neighboring preschool and conducted a one-day workshop in digital storytelling and recombinative narrative with a group of 18 four- and five-year old students. The success of that pilot workshop led us to develop and implement a 10-week project in the spring of 2010.

Students came to the IML each week in groups of 10 for 90-minute sessions on transmedia digital storytelling. An early lesson dealt with still image production, analysis and categorization. Students learned to take photos using digital still cameras. Once students had their photos loaded onto IML computers, they each chose three pictures to arrange on a single page with a sentence of text (dictated to an adult) explaining their choices. Compositions included groupings based on color, personal preference, and the idea that the same thing can look very different depending on how close or far away the camera was when the picture was taken.

This lesson illustrates our pedagogical approach to the Junior AV Club in a number of ways. For one, it created an opportunity for practical media production skills in a context that promoted critical media literacy. Additionally, the language of visual literacy that we introduced to describe and categorize images tied in to the traditional literacy skills students were learning in their regular classroom, supporting concepts of patterning, seriation and classification. The activity also illustrated a common student relationship with technology: students expressed excitement about using digital cameras and shared anecdotes about their prior experiences using or observing such technologies in familial contexts.

Since completing that first 10-week session and reflecting upon our experience, we have gone on to conduct two more iterations of the Junior AV Club in the summers of 2010 and 2011. We refined our lessons and activities, expanded our approach to include computational literacies and game design alongside visual literacies and storytelling, and have focused as much on how we teach as what we teach. We strive to create a learning-rich environment facilitating challenge-based peer-driven inquiry where technology is a naturalized part of the landscape.

In the latest iteration of the Junior AV Club we examined how iPad tablet devices function as learning tools and encourage computational thinking. We found that iPads were useful for information recording and sharing between students just learning to read and write, and that well designed iPad apps could be effective models of abstract concepts such as computer programming. However, we found that many iPad apps encouraged single-user experience at the expense of group cohesion and we would like to see development of more apps that can support the creative learning activities of a defined group of local users, creating an effective virtual extension of classroom spaces and activities.

Technology in the classroom is not an answer in itself to the changing needs of educational systems. However, as the affordances of new technologies support novel structures of social interaction, skill sharing and network building, there are opportunities to re-imagine what teaching and learning look like. There is much positive work being done around these ideas, and I am particularly excited by the research, writing and pedagogical examples of Mizuko Ito, Douglas Thomas, John Seely Brown and Katie Salen, along with the field building efforts of the MacArthur foundation in the area of digital media and

learning. Within this investigative space I see a place for the research contributions of arts practitioners and educators, and offer some context about my own arrival within this community as an illustration.

When I first began making documentary video art, I learned by instinct and self-guided research. I later expanded my self-developed processes and skills with a formal arts practice education, earning an MFA in film directing and production from UCLA.   But my richest learning experiences were those that I pursued on my own. As an arts educator, I strive to create circumstances in which students can discover and strengthen their own vision and creative process rather than presenting them with a predetermined set of rules.

I came to the research process of the Junior AV Club much as I did to the art practice process, working from a desire to do, to explore and to learn. This openness to experimentation carried over into my interactions with the students through a willingness to adapt our approach to their feedback and needs rather than try to mold them to a preconceived plan and concept of how an activity was supposed to go. This flexibility and openness to the reality unfolding in front of and around me has always been key to my successful creative experiences. We carried out our research like art practice, and it turned out that one of our main research goals was to learn how best to structure learning that way too. Moving forward with the project along the iterative feedback loops of an action research system, I hope to enlarge the Junior AV Club's community of collaborators, to incorporate more expertise and methodology from education research, and to develop functional tools and publications that can benefit communities beyond the laboratory space of the IML.

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PURSUING THE UNKNOWABLE THROUGH TRANSFORMATIVE SPACES

MAJA PETRIĆ

My work is about changing the perception of space in function of art. Therefore, the subjects of my work are perception, space and, art. To change perception, I study sensation, experience, and phenomenology. To create spatial situations, I practice designing spaces, fabricating structures, manipulating materials, and integrating lighting and audiovisual systems. The core of my artistic research is the pursuit of the unknowable— the sublime.
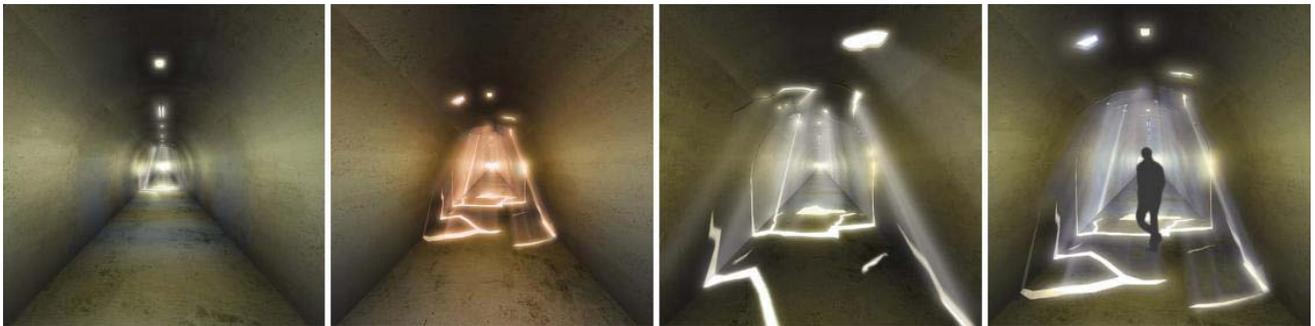
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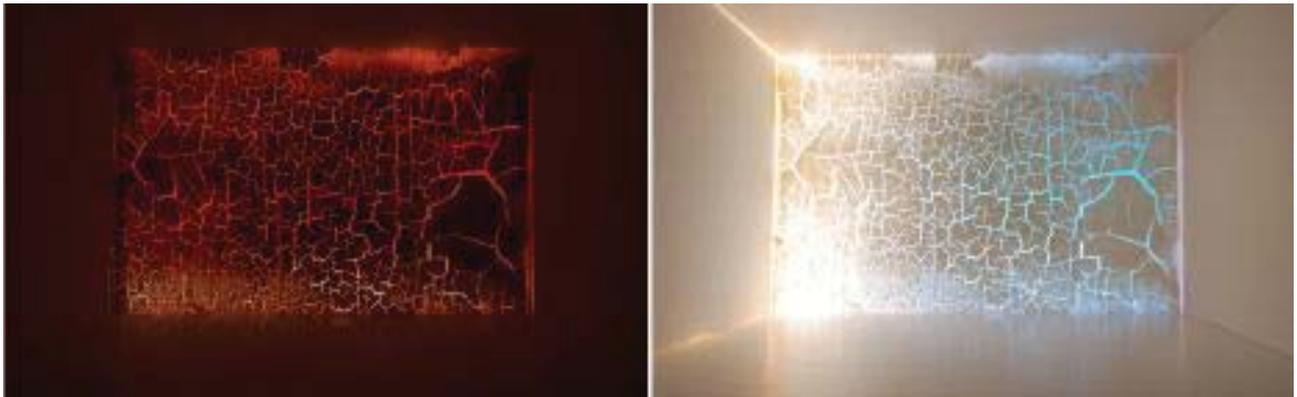
Fig 2. "As It Is Cracking". Maja Petric, 2010, Light installation for a room, Seattle, WA, US © 2010 Maja Petric

Fig 3. "The Snow Storm—Steam Boat off a Harbour's Mouth Making Signals in Shallow Water, and Going by the Lead". Joseph Mallord William Turner, 1842. Oil on canvas; 36 in x 48 in., Tate Britain, London, Turner Bequest

Historical Background of the Sublime

The core of my artistic research is the sublime. To illuminate my artistic engagement, I will elaborate on the history and theory of the sublime. While the term has had a long life full of passionate relationships with philosophers and artists who have attempted to reveal its essence, that has not led to a unified definition of its meaning. "What is the sublime? It does not appear to have been defined. Is it a figure of speech? Does it spring from figures, or at least from some figures of speech? Does the sublime enter into all kinds of writings, or are grand subjects only fit for it?" (La Bruyère).

The first mention of the sublime is found in writings of Longinus, the Greek rhetorician and philosopher of the Neoplatonic school. In "On the Sublime", which is thought to have been written between the third and first century AD, Longinus discussed the sublime as something great, elevated, or lofty that manifests itself in what is beautiful. In the seventeenth century, British philosopher John Dennis expanded Longinus' definition by introducing horror as an additional aesthetic quality that can create the sublime. After embarking on a journey across the Alps to Italy John Dennis described the term as "delight that is consistent with reason," and "pleasure to the eye as music is to the ear," but also "mingled with Horrours, and sometimes almost with despair" (Pack and Dennis).

Several years later, British philosopher Edmund Burke proclaimed that horror is not only another potential source of the sublime, but the most potent one. In 1756 he published "A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful". Burke wrote: "Whatever is fitted in any sort to excite the ideas of pain, and danger, that is to say, whatever is in any sort terrible, or is conversant about

terrible objects, or operates in a manner analogous to terror, is a source of the sublime; that is, it is productive of the strongest emotion which the mind is capable of feeling… Terror is in all cases whatsoever, either more openly or latently, the ruling principle of the sublime" (Burke).

Prominent German philosopher Immanuel Kant followed Burke's enquiry in 1790 by writing a theory of aesthetics that was published in Critique of Judgment. In the chapter "Analytic of the Beautiful", Kant disassociated the beautiful from the sublime. While the beautiful is concrete, he explained "it is connected with the form of the object." And, the sublime is intangible, "it is to be found in a formless object" (Kant). Beauty can be reasoned, but to experience the sublime it is necessary to go beyond reason and employ sensibility and imagination. The ability to transcend reason by fusing it with the nature of senses is the vehicle of the sublime that Kant called a "supersensible substrate." He associated this ability with individuals who pose both superior mindfulness and superior sensibility of the body.

For Kant sublime is not an object—it is a state of mind we must enter that enables us the experience. We experience the sublime when our imagination fails to conceive the greatness of events solely by means of reason but compensates for this failure with pleasurable sensations that can be manifested through synthesis of senses with virtue of reason. Sublime as an experience is independent of any conceptualization or perception by the human mind. It is a thing-in-itself that Kant called the noumenon, postulated by practical reason but existing in a condition which is in principle unknowable.

Kant's theory prompted even more vivid discussion about the nature of the sublime, which created new possible frameworks for the subject. None of these were accepted as a unique model of the concept through which they demonstrated the impossibility to frame the sublime. This only confirmed Kant's definition of it as the unknowable. So essentially if what we experience is unknowable, the question is how do we experience the unknowable. All the previous theories depicted it as a dichotomic experience that is both wonderful and terrible.

Getting to Know Unknowable as Both Wonderful and Terrible

Multiplicity of that experience, the dichotomy between bliss and horror, beauty and ugliness, pleasure and pain, comfort and torment, divine and hell as distinct instances of the single sublime that can be experienced through integration of cognitive and sensory ability is the most persistent in religious mythology. Religions that promote transcendence through light and darkness have illustrated the sublime as the crossing point towards the numinous, the presence of a divinity.

According to the German theologian Rudolf Otto, crossing the bridge of the sublime is encouraged both by mysterium tremendum et fascinans ("fearful and fascinating mystery"), the pains and terrors overwhelming those who have arrived affront of God, and "nostalgia for paradise" (Otto), aching desire to reach the abode of perfection. In Christianity, the God is light, but the God is also darkness. "And the light shineth in darkness; and the darkness comprehended it not" (John 1:5).

Contradictions of the sublime have been depicted in art since the beginning of art history. These works differ in a degree of simulating and emulating the experience of the sublime. For example, Dante's "The Divine Comedy" uses the narrative to create a representation of soul's journey through Inferno, Purgatorio, and Paradiso. It simulates, projects the idea, of experiencing Dante the Pilgrim's journey. To a de-

gree, it also emulates the actual feeling of being on a path from hell to heaven. It can make a reader experience the poem as if they were the first person of the poem. But it is predominantly a representational narrative of the sublime simulated in an afterlife of any everyday sinner.

Myths of heaven and hell have functioned to interpret the world and its counterparts, but also to entice the audience into experiencing its parts. The enticement into the fearful and blissful mystery is where the art comes in. Postmodern French philosopher and literary theorist Jean-François Lyotard recognized avant-garde art as a novel opportunity for accessing the sublime. He argued that the nature of avant-garde modern art has the unique potential to manipulate the balance of senses, reason, and emotion in a manner that results in a sensation of pleasurable pain. My further investigation is in practice of art that carefully entices senses, reason, and emotion in a way that results in an experience of the unknowable.

Works of art that predominantly emulate the experience of the sublime are aligned with twentieth century French philosophy in the domain of post-structuralism that views the structural relationship between the signifier and signified as inseparable but not united. In the artistic discourse the structure creates nonlinear meaning, and the audience replaces the author as the primary subject of inquiry. These ideas extend to the philosophical concept of phenomenology that focus on the "first person" viewpoint, which can then be examined as phenomena that not only appears to "my" consciousness, but to all consciousnesses. According to German philosopher Edmund Husserl, "the synthesized experience is what constitutes total human knowledge."

One of the first artists exploring the phenomenological experience of the sublime was English Romantic landscape painter Joseph Mallord William Turner. His most notable painting, "The Snowstorm: Steamboat Off a Harbour's Mouth Making Signals in Shallow Water" (1842) portrays a ship in distress off the English coast with a high degree abstraction, asymmetrical composition, and monochromatic palette. The painting documents the ship caught in the storm by depicting the experience of witnessing the ship in the storm, instead of merely realistically reproducing the look of the scene. The painting not only informs us about what happened to the steamboat at the Harbour's Mouth during the snowstorm, but it also physically immerses us in the event. It is a beautiful and terrifying visceral experience, creating an example of the sublime in painting.

Several centuries after Turner, vision as the highest in the historical hierarchy of senses was slowly making space for other senses—and a fuller sensory experience. The industrial revelations of the twentieth century made an impact on art and how it is experienced. Artists including Anish Kapoor, Mark Rothko, Bill Viola, and James Turrell marked the twentieth century as an age of expanding our sensing apparatus to experience the sublime. Through their abstract but integrated use of materials, space, color, light, and image, they excite our senses and intrigue our minds to the point of reaching the essence of the unknowable.

The technological age is allowing for more multisensory engagement. My interest is in exploiting those technological advancements that can fuse perception of senses and add to the phenomenological experience of my artistic intention of presenting the presence of the unpresentable. "My perception is [therefore] not a sum of visual, tactile, and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once (Merleau-Ponty).

To be fully present in the world, one needs to use all available senses and intimately interact with the environment using their eyes, nose, ears, and skin. Only through receptiveness of the entire sensing mechanism is it possible to have a profound sensation of the place that can then be emotionally and cognitively processed into a meaningful experience. In the context of art, maximized engagement of the senses can direct memory and imagination into a place where the sublime can be experienced.

Pursuing Both Wonderful And Terrible Through Transformative Spaces

I was born and raised in Croatia during the violent fragmentation of Yugoslavia. It is then that I became preoccupied with using art to transform the traumatized sense of the surroundings. My work is about changing the perception of space in function of art. Therefore, the subjects of my work are perception, space and, art. To change perception, I study sensation, experience, and phenomenology. To create spatial situations, I practice designing spaces, fabricating structures, manipulating materials, and integrating lighting and audiovisual systems. The core of my artistic research is the pursuit of the unknowable— the sublime.

My interest is not to define the sublime. Critical history has proven that the sublime cannot be precisely put into words, just as the meaning of life is inherently unknowable. Nineteenth century Danish philosopher, theologian, and psychologist Søren Kierkegaard argued that logic of the objective knowledge and rational belief is unimportant to existence. If the deity could rationally be argued, existence of the supernatural being would be unimportant to humans. It is because God cannot rationally be proven that his existence is essential.

The sublime, as an agnostic term, cannot be made into an object of knowledge through language, reasoning, logic, and concepts. But it can be experienced. Since it is unknowable but can be experienced, it is profoundly valuable to experience it. My interest is in the experience of the inherently unknowable sublime. This experience has been described both as awe and terror. My interest is in the division and range between two mutually exclusive, opposed, or contradictory sensations as distinct instances of the single sublime. Therein lies the opportunity for the multiplicity of an experience, which can than also be created in art.

My approach combines traditional and progressive principles of spatial design fabrication, lighting design, audiovisual systems, and multisensory devices. By utilizing technological advancement in traditional mediums and untraditional integration of those mediums I aim to discover, interpret, and develop novel body of knowledge for enhancing the multisensory spatial experience that provides access to the sublime in the purpose of art.

One of the first projects that clearly illustrate my fascination with transforming the poetic experience of the space is the "outSIDEin". It is an interactive light installation that was created in year 2004 to transform the atmosphere of the shattered pedestrian tunnel at New York City Subway's 191st Street station of the number 1 train. There, I use artificial light to simulate a striking natural effect of light emanating from the sky, which is projected through false cracks of the ceiling in the pedestrian tunnel. Lights are programmed to imitate the color and intensity of the daylight outside of the tunnel. When the weather outside is very sunny, the light projected inside through the cracks is bright and yellow. When the weather outside is foggy, the light is blue.

The "outSIDEin" project has been an inspiration for further investigation about the live transformation of the spatial experience. In light and video installation "As It Is Cracking", the wall in the room cracks in real time. As the wall cracks, lights and video appear through the cracks to create an experience that ranges from frightful to pleasurable. Daunting cracking of the wall in real time happens over the course of eight hours. Light and moving images appearing through the cracks simulate slow and steady change of daylight. This change is interrupted by sudden and startling appearance of lightning.

In 2009, I have collaborated with a choreographer Jennifer Salk in a dance performance "The Eyes of The Skin". We explored the often twisted and delicate nature of tenderness, which is defined as a tendency to express warm, compassionate, or affectionate feelings. But in medicine it stands for pain or discomfort when an affected area is touched. By definition, tenderness is both a pleasure and pain as a result of susceptibility that is being defined by juxtaposition of the two opposed characteristics. I focused on the dichotomy of tenderness that ranges between pleasure and pain and as such relates to her research of the sublime and the multiplicity of the sublime experience. My ideas were combined in a form of the deteriorated wall that covers the north wall of the stage and that cracks over the course of a performance. As the wall is cracking, the light appears through the cracks and changes color and intensity in response to dancer's behavior and dance narrative.

In the mentioned projects, the crack is an instigator of the spatial transformation that becomes both wonderful and terrible. As such it is a symbol and emulation of the sublime that can be captured only through the personal sensing mechanism. Capturing the presence of the unknowable remains to be the goal of art.

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BIG BIRD IS WATCHING YOU! ART, ACTIVISM AND TECHNOLOGY IN THE PUBLIC ARENA

DENITSA PETROVA

Many contemporary artists working in the public arena have recognised the potential that the rapid development of digital media technologies presents. This paper discusses the potential of art and technology collaborations stimulated by the continuous transformation of our cities. It explores the intersection between art, activism and technology as a new art practice used as a tool for creating situations prompting cultural change.

Introduction

Today, George Orwell would have felt like a prophet if he was able to walk the streets of London and see the thousands of CCTV cameras following, and recording, pedestrians and vehicles. Perhaps he would have been inspired to write another novel if he knew how technology had progressed, allowing satellites to track down car license plate numbers and mobile phone signals to within a matter of meters of their geographical location, all from outer-space. Some people now believe that most of Orwell's predictions are now being integrated into our free society. Finger prints, retina recognition, phone taps – these are all now mechanisms that governments use to manage countries and people. Do we now live in the modern day Oceania? [1]

Perhaps Orwell was right - war really is peace; we simply need to look back to the not so distant Cold War decades to realize that fear was keeping peace on this planet. Globalization impacts our lives and is widening the income gap between the rich and poor. This is strongly reflected in public space, which is now becoming more increasingly managed and controlled. Perhaps the reason that we have so many brain-numbing reality TV shows today is because governments and media are embracing the mantra that ignorance is strength. This is strength for the powerful economic conglomerates, the financial corporations, insurance companies and banks. Could the TV Show *Big Brother* be the present-day *Newspeak*, that makes "all other modes of thought impossible?" [2] Because whilst we are watching *Big Brother*, our minds are occupied and we do not question what is really happening with the world around us or what is happening with the public space that is meant to belong to us, the public. But is this just a camera trick?

What is the role of the artist today in relation to the challenging political, social, and economical climate? The Dutch painter Piet Mondrian thought of the artist as someone whose position is humble and who is "essentially a channel." [3] Mondrian lived and worked at the end of the 19th and the beginning of the 20th century, the dawn of Modernism. He was interested in theosophy, a movement launched in the late 19th century, which was centered on the importance of the interconnectedness of the whole universe. Perhaps this fact relates to Mondrian's description of the role of the artist as a channel - a channel of ideas, a link between real and imaginary, or as someone who is able to reconcile their creative pursuits with their understandings and believes about life.

Precisely, this role of the artists as a channel of ideas reveals itself in the projects discussed later in this paper. However, the artist today is more than a generator of objects or channel of ideas. Many artists

today are becoming catalysts for political, social, and cultural change. This notion is strongly reflected in the concepts of various activist art practices, which are most commonly seen outside the gallery space as their creators are trying to reach a larger audience. These artists are trying to point out what is happening in the public space today; their strategies are becoming more vocal and effective and many art groups and individual artists are working anonymously in order to deliver their true message.

There are various ways in which activists interfere with our physical and social environment today. This paper presents a selection of examples which illustrate, in a witty and playful way, the tactics and methods used by artists and art collectives. This essay examines the works of contemporary artists and art collectives who use the power of technology to publicly engage political, social, and community issues.

One may rightly ask the question, "Why do we call these practices art?" It could be "community practice", or perhaps "political action", or none or all of the above. The majority of these works are project, rather than object, orientated. Nina Felshin describes it as an activist cultural practice with "…one foot in the art world and the other in the world of political activism and community organizing." [4] In his book, *Art Matters*, Peter de Bolla suggests that our attention should not only be directed at the obvious aesthetic values of the artwork but at our experience of it. He also notes that "…the great value of art lies in its power to prompt us to share experiences, beliefs, and differences." [5] Perhaps we can find the meaning, value, and significance of activist art not in the art object itself but in the idea of conveying a message, provoking thought, and creating a dialogue not only between the artists and their audience, but between the audience members themselves as well.

Who can initiate, create, or take part in activist art projects? Anyone can. Not being an artist does not mean that a member of the general public can not initiate or participate in activist activities. At the same time, artists are part of the public and they have as much right to intervene with the public space as anyone else. These projects and actions are representations of the messages that the artists are hoping to spread. The outcome of these practices is not necessarily the actual artwork, but rather a passage to the particular idea that the artist had in mind. Furthermore, these practices are inspired not by the intimate world of the artist but are focused on what is happening in our public space today.

John Henry Strikes Back

Often, activist art projects are collaborative and done anonymously. They have no specific author and, most often, are the result of teamwork between artists, architects, programmers, engineers, and activists. The individual authorship is not important, especially as the number of the members of the art collectives is never a constant. Additionally, the vast development in technology has contributed to the decreased notion of expression of the individual. As described by Marchal McLuhan, "…as new technologies come into play, people are less and less convinced of the importance of self-expression. Teamwork succeeds private effort." [6]

Founded in 1998, the Institute of Applied Autonomy (IAA) is an art group dedicated to creating activist projects which call for social or political change. Most of the IAA members are anonymous, not simply because some of the promoted works are conducted 'guerrilla style', but because the authors are trying to keep public attention focused not on the artist, but on the problems that the work is dealing with. They use the name John Henry as a collective nickname which unites a group of artists, engineers, and activists under the idea of using technology to raise pubic awareness on social and political issues.

One of their more recent works, the *GrafittiWriter*, was developed in response to the increased government funding for military robotic development. By 2030, the Pentagon is planning to replace about 30 per cent of its armed forces with robots, or as Professor Bill Smart, one of the project leaders from Washington University, calls them "autonomous systems." [7] Powerful robots will lead human soldiers into battle within the next decade. In response to these plans, The Institute of Applied Autonomy developed the *GraffitiWriter.* The robots can operate in parks, shopping malls, and buildings and its purpose is to disseminate subversive and politically controversial texts. With the help of an operator and a remote control, the *GraffitiWriter* sprays linear messages on the ground. In 2004, the robot was set up to take part in the Grand Challenge, a military robotics event organized by the research and development office for the U.S. Department of Defense. GraffitiWriter's mission was to print Isaac Asimov's First Law of Robotics – "A robot may not injure a human being…" – at the starting line of the event.

In a similar fashion, in 1993, the art collective RTMark conducted a controversial act of product hacking by developing a project called *Barbie Liberation*. The mission of the project was to challenge gender stereotypes in the children toys industry by performing voice surgery. The project involved swapping the voice boxes of Barbie Dolls and GI Joe toys in a number of toy stores in the United States. The toys were returned to the stores with switched voice clips and, without the knowledge of the staff, were released back on the market. Many children heard their Barbie dolls shouting "Vengeance is mine!" and GI Joe soldiers saying "Let's plan our dream wedding!" The website of RTMark provides a manual with a step-by-step guide how to perform the voice surgery. Since then, Barbie has evolved and embarked upon many different professions such as becoming an astronaut, doctor, police officer, and even a presidential candidate.

One Nation under CCTV

In 2001, The Institute of Applied Autonomy initiated a project called *ISee*. It was created in response to the vast growth of CCTV surveillance of public spaces. The web-based application was first developed for the streets of Manhattan mapping the locations of the cameras. Via the *ISee* website, anyone can generate a route with the least number of cameras watching them and walk around the streets without the uncomfortable feeling of being filmed without permission.

Research has showed that most CCTV cameras in New York were placed in the financial district of Manhattan but not in the poorest and most unsafe areas of the city. [8] One has to wonder if the cameras are actually keeping people safe or protecting the property of the wealthiest. Another study done in the United Kingdom revealed that CCTV cameras in Glasgow's city center did not actually have a significant impact on crime in the area. [9] Projects such as *ISee* do not question the use of video surveillance to prevent crime as a whole but rather its effectiveness. Furthermore, the authors are trying to draw attention to the fact that many of the public space cameras are actually privately owned by banks and stores, which undoubtedly makes the recordings private property.

Created in 2007, Celine Shenton's *Bird City* also tackles similar issues. The project consists of series of bird houses for urban areas. The birdcages look like surveillance cameras but, in fact, they really offer refuge to birds. Shenton installed real video cameras inside the bird houses which were able to broadcast video of the bird's life to the nearby homes. As an alternative to TV shows such as *Big Brother*, *The Bachelorette* and *Celebrity Detox Camp*, this work offers multiple thought provoking points regarding our dehumanized urban spaces and increasing detachment from nature.

In the same fashion, apart from trying to convey a message, the work of Tad Hirsch's *Tripwire* also offers a real solution to a specific problem. The project is designed for a specific suburban area of California near the San Jose International Airport. Hirsch's custom built sensors were mounted inside coconuts and attached to real trees in the noisiest areas of the neighborhood. When an excessive aircraft noise was detected, the sensors would trigger automated phone calls to the complaint line of the San Jose Airport on behalf of the citizens.

Another public space intervention, involving media memory, is represented in the *Image Fulgurator*. This is essentially a photo hacking project which embeds an image onto the photos of an unsuspecting photographer. The result of this photo graffiti is only visible after the original film has been developed, or after the image is viewed on the camera screen or on a computer.

The *Image Fulgurator* is, technically, a classic photo camera which uses exposed and developed film with images on it. A device inside the Fulgurator detects when a flash goes off and automatically projects the image onto the object which is being photographed. The photo intervention is particularly effective when used in public spaces that have particular political significance. The author of the project, Berlin-based artist Julius von Bismarck, sees it as a piece of art which could be a dangerous attack on the media.

Mash It Up

The rapid development of technology during the past few decades, plus the open access to information facilitated by these new technologies, has created a new public space for politically orientated dialogue – the internet. The internet is also a creative space, an enormous arena for social interaction, and at the same time, an open canvas for work and collaboration.

The term "mash-up" originates from the hip-hop music genre and represents a specific style of mixing two or more songs. In technology, the concept of combining different software is not new. Internet "mash-ups" consist of combining information and services of different websites in order to create a new project. Most commonly, internet mash-ups use a combination of online maps, such as Google maps, and mapping locating service applications.

A creative mash-up that locates informal play spaces in Sao Paolo was created by the Spanish art collective, Basurama. As part of a research project, the group developed an interactive map of urban spaces which could also be used as informal playgrounds. The images can be uploaded by any member of the public, and Wikimap reveals outlaw street football pitches and improvised playing fields. The mission of the art collective was not only to provide information about these areas but to also bring about a discussion on topics relating to the re-use and reclaiming of city spaces.

Another creative use of data available on the web is represented in a video project initiated by a Tunisian cyber activist and blogger called "Astrubal". He created a video work in response to the claims of the Tunisian Government that the their president has only left the country three times in the past few years as he was preoccupied with important government matters. Astrubal investigated flight information available on the internet relating to the Tunisian presidential airplane. He collected images from various mapping websites, which identified the plane at specific locations and at certain times. The result of this investigation, represented in a video, proved that the president has been out of Tunisia far more often than stated and not on government matters, but on holidays and shopping trips, which are

funded by Tunisian tax payer's money. This project is a fantastic example of creative use of online data, which is gathered collaboratively by various internet users and combined in a video work, available through video sharing websites.

Another innovative model of online activism can be found in internet political mash-up sites, such as www.PublicWhip.org.uk and www.TheyWorkForYou.com. These websites provide information on the activities of the members of the United Kingdom Parliament and, more specifically, on their voting patterns, parliamentary debates, and expenses. All of the House of Commons and House of Lords debate transcripts are available online, however, via these websites, each member of the public can view summarized information for their MP and his or her activity without having to browse through hundreds of Parliament pages and newspaper articles. The creators of these projects work on a voluntary basis and their mission is to "…to help bridge this growing democratic disconnect, in the belief that there is little wrong with Parliament that a healthy mixture of transparency and public engagement won't fix." [10]

The internet has come a long way since the 1960's, when it began its existence as a Government project. It now provides various creative opportunities for activist art collectives to share concerns, viewpoints, and, essentially, engage the public in dialogue and actions prompting change. The global net is now a new public arena with enormous democratic potential for political and social action.

Final Thoughts

Patricia Philips defines public art and activist art as inseparable and, "…united in an inherently cooperative model of social-aesthetic practice." [11] According to this notion, art can be defined as "public" based on what it does, but not where it is located.

It is apparent that in the public activist art projects discussed above, the meaning of "public" is identified precisely via the messages that these works are trying to communicate to their audiences. Artists define their own commutative relationship with the public by observing, trying to understand our culture, and by producing works that challenge and provoke emotions; attempting to make us angry, make us happy, or, at least, make us think.

It has been more than 60 years since Orwell wrote:

They were born….they passed through a brief blossoming period of beauty and sexual desire, they married at twenty, they were middle-aged at thirty, they died……the care of home and children, petty quarrels with neighbors, films, football, beer, and, above all, gambling filled up the horizon of their minds. [12]

Have we become more or less concerned with what is happening around us since then? It is perhaps not surprising that in the contemporary urban space, constituted of social and political power, artists and activist groups are trying to engage the public by provoking some kind of response calling for social change or simply raising awareness. I believe that a good artist is one who is aware of what is happening around them and who manages to translate their thoughts using the power of images, objects, technology, text, and performance. Site-specific interventions, product-hacks, and internet mash-ups are offering the public the opportunity to re-examine its relationship with the urban, social and virtual spaces.

I do not attempt to plead that all art should focus on activism or that the artists should only be concerned with political issues. I also think that it is unreasonable to expect that art can resolve major issues in the political or social sphere. What I do believe is that art has the power to help us imagine, think, understand, and care.

Art can be seen as a tool of communication with the other, but also as a tool of relation to the other; a method of conveying a message that otherwise may not be understood. Breakthroughs in technology have had a vast impact on the way activist art projects are initiated and developed. Furthermore, the internet, as a virtual public space, has presented the artists with an opportunity to organize and promote their practices. At the same time, I can't help but wonder if the increased use of virtual space has not affected the way we think about the physical public space. I do, nevertheless, think that being indifferent to our surroundings may put too much power into the hand of banks and corporations and restrict, even more, our right to enjoy the public places that belong to us - to the public.

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MASS BODY INDEX: BIO-OS, A BIOLOGICAL OPERATING SYSTEM

Mike Phillips, Birgitte Aga, Gianni Corino & Simon Lock

Mass Body Index describes an ongoing project being developed by i-DAT called Bio-OS, a Biological Operating System. Bio-OS builds on the i-DAT's 'Operating Systems' (www.op-sy.com) [1] to develop open tools for gathering data from environments (buildings and landscapes) and organisms (crowds and bodies) to dynamically manifest 'data' as experience in order to enhance perspectives on a complex world.

Figure 1. Bio-OS Data Lab, 2011, i-DAT. CC BY-SA.

Figure 2. Human Internal Landscape, Ultrasound Pornography, 1988, Phillips, M., CC BY-SA.
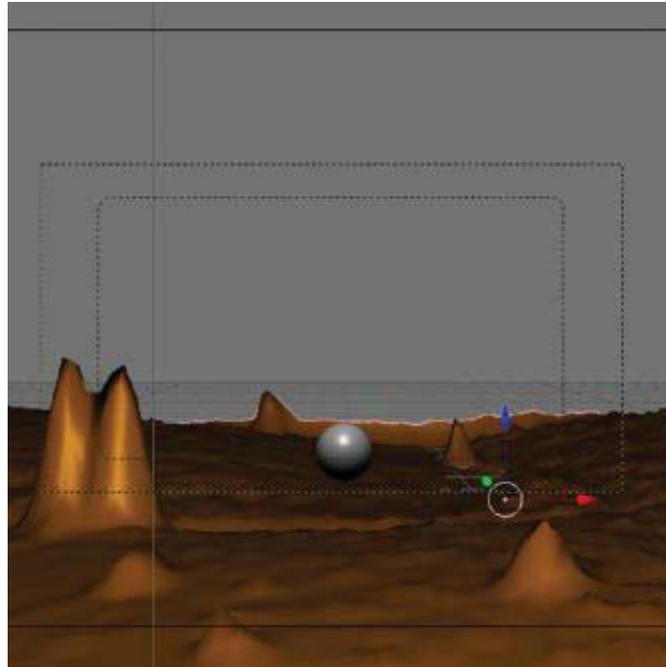
Figure 3. Human Geography, 2011, i-DAT, Atomic Force Microscopy Data in Blender Game Engine. CC BY-SA.

Isotonic Aids Recovery

In many ways, apart from the trauma of general bodily ownership or being owned by a body, 'Bio-OS' [2] was inspired by a longstanding collaboration with the Artist Donald Rodney. As much as it was a continuation of i-DAT's Operating Systems mission, Bio-OS built on the production of collaborative projects such as 'Visceral Canker,' [3] 'Psalms' [4] and 'Autoicon.' [5] Donald's death, in 1998, followed the a long slow degenerative disease of the Darwinian curse Sickle Cell Anaemia which caused his regular incarceration in hospitals and various medical technological apparatus. Donald's work political work was entwined with the attributes of this genetic decease, providing a rich palette of medical paraphernalia that became incorporated into his work, blurring the edges between a personal, racial and political heritage.

'*Visceral Canker*' (1990), now in the Tate collection, was a work that literally incorporated the artist's bloodline. Like many of his works, *Visceral Canker* contained elements of his own body, such as skin and scars. '*Psalms*' (1997), an autonomous wheelchair attempts to articulate the presence or lack of presence of the body. And '*Donald Rodney Autoicon*' (2000), a collaborative project Rodney was working on at the time of his death. The intention was to integrate his 'body' of medical data with an 'expert system' synthesised from interviews, and a rule based montage machine that would allow Autoicon to carry on generating works of art.

From the remnants of Donald's body, whether it was the politics of a bloodline, the space of an empty wheel chair that defined his absence or the attempt of Autoicon to continue the body of creative work, it was clear that the physical body is more than the material of flesh and blood. The body was defined by an absence, an event, a trace, a measurement and it was essentially perfomative and time based. It is this temporal fragmented entity that Bio-OS engages with.

The Mass Body index attempts to define a collaborative body that is neither ill nor super fit, but an aggregation. Whilst Bio-OS positions itself within the field of information visualisation/literacy, the generation and collection of bodily information through the use of instruments overlaps coherently with the history and contemporary fascination of body hacking. However, a preoccupation here is often with the body as object for adornment rather than an engagement with bodily process. Where the body hack converges with the performative it is often in framed within the constraints of choreography. Bio-OS builds on a previous engagement with these frames and constraints.

Previous collaborative projects attempted to capture the body in the form of a Corporeal Archive. The idea of the a corporeal archive emerged as a real time archival process that attempted to capture, articulate and disseminate 'unstable' 'difficult' or 'live' body-based media (particularly forms of dance, theatre, and performance art) through software and conceptual tools. The prototype '*Liquid Reader*' (*Liquid Reader™ v1.1*) [6] explored the reciprocal relationship between 'live' performance and its dissemination through other media, how ephemeral, body-based practices can be captured, analysed, shared and communicated. Here the temporality of the body was the focus of attention. Its spatiality was of importance but its transitions as a flow through time, a trace to be captured and communicated, became the important ingredient in understanding the dynamics, mechanics and physics of the physical body.

A historic fascination with the body, its mutability and its relationship to technology runs deep through the modernist machine aesthetic. The trauma of triage in World War One left more than surgical scars on returning troops. Like perspective and social order the nature of the body had suffered a significant rupture. No longer was the marble edifice of David enough to satisfy, the white exterior had fragmented into a car crash of flesh and bone popped inside out by munitions. The contemporary body freely melts into the technology that surrounds it as distinctions between body and instrument dissolve. The symbiosis evident/required in the cyborg is one of meat and metal, a Léger painting manifest, not one of soul and intelligence or intuition and logic.

As our instruments evolve from an isolated artefact, through physical and social networks into an all-pervading system or process, the nature of our relationship with them will inevitably change. There is now a sophisticated symbiosis between our instruments, and us, what happens to that relationship when the instruments we manufacture become ubiquitous and decentralised from hospitals and medical institutions. Imaging systems and digital instruments have revolutionised our relationship with the inside of our bodies creating a new pornography. This pornography is played out nightly on our TV screens, from House to CSI, or witnessed in the transformative marketing campaigns of soft drink manufactures. What reimagining of the body took place when a drink for sick old people became a drink for the super fit young people?

The Body - not, and, or, if...then, if and only if - ill/well

i-DAT is developing a range of technologies and software under its core program, 'Operating Systems' (op-sy.com). The current Operating Systems are:

- Arch-OS: [architectural operating system] An 'Operating System' for contemporary architecture (Arch-OS, 'software for buildings').
- S-OS: [social operating system] - The S-OS project strand provides an Operating System for social life.
- Eco-OS: [ecological operating system] - Eco-OS collects data from an environment through a mesh network of environmental sensors called ecoids.

- Dome-OS: Dome-OS is based around i-DAT's immersive vision theatre (Full Dome). A transdisciplinary instrument for scientific and artistic production of immersive environments and the manifestation of material, immaterial and imaginary worlds.

The intention of Bio-OS is to make the data generated by human biology tangible and readily available to the public, artists, engineers and scientists. The Operating Systems project explores data as an abstract and invisible material that generates a dynamic mirror image of our biological, ecological and social activities. The Operating Systems project proposes a range of tools and initiatives that have the potential to enhance our ability to perceive and orchestrate this mirror world.

Bio-OS builds on this open technical framework to offer the opportunity to collect and manifest biological data. Dynamic visual and sonic experiences derived from human movement are being tailored to enhance public understanding of the collective, mass biology. In this context Bio-OS and its distribution and engagement mechanisms provide an open tool for public engagement with a domain that is primarily owned by medical, scientific fields.

Bio-OS provides accessible tools (through 'hacks', wearable devices, phone Apps and domestic and public health technologies and social media tools) that are being deployed in daily life for monitoring health and activity. Data collected from these tools feed dynamic databases that facilitate a shared understanding of the mass body index through visualisations and sonifications – a data body culture of health.

The Bio-OS project is supported by the Arts Council England and was delivered through a series of 'Collaborative Data Lab's,' [7] in order to design and share 'instruments' or 'provocative prototypes' topically described as the 'Internet of Things', in this case the human body becomes a networked and shared 'thing'.

Bio-OS generates a rich mix of quantitative and qualitative data. Collectively these processes establish an open participatory 'techno-ethnography' - mechanisms for evaluating engagement and participation. It is the body as a temporal event and the trigger for a whole series of interactions that underpins Bio-OS as a platform. Here the body is seen within the context of numerous external frameworks and social cultural and economic systems. For instance, embracing the preoccupation of the Banking system where processes are based around key stages in the life of a body, birth, marriage, divorce and death (not necessarily in that order). Or the body on a more short-term basis, as the source of sewerage or food consumption around which provoke massive engineering, financial and ecological problems. As such, the body acts as an active node in a dynamic network, linking resources, technologies and social processes.

Human Geography

As a Mass Body Index Bio-OS intends to pervade these human manufactured structures by being part of the material of our shared understanding of our bodies and the collective body. Bernard Stiegler articulates the emergence of this new embedded technological landscape as a "global mnemotechnical system." [8] With such mnemotechnical system in place, information never leaves the world. It just keeps accumulating, simultaneously more explicit, more available, and more persistent than anything we have experienced. In this context Bio-OS strives to contribute to an emergent definition of interaction design strategies for spimes, sentient objects, blogjects or whatever they are going to be called. Bio-OS instruments become more then just biological probes, they emerge as cultural probes, permanently embedded in the body as part of the physical nature of the 'thing' and part of the physical digital ecosystem.

Figure 3. *Human Geography*, 2011, i-DAT, Atomic Force Microscopy Data in Blender Game Engine. CC BY-SA.

The body operates as conduits for exchange for ideas, knowledge and the passing of physical objects. The body is also a node on more problematic network, such as supply chains for food, traffic and amenities. Bio-OS explores the temporality of the body and the latency of the network of bodies and the impact on the environment. Bio-OS engages with the body and the 'things' that cluster around it through a process of participatory design of 'provocative prototypes' that will elicit real time data.

As such it is easy to see how the body becomes institutionalised. How the needs of servicing the organism, feeding, relieving and fixing it become instrumentalised and systematised. A de-humanisation or a re-humanisation? The shift from the body as the focus to the institution that builds up around it is a process of bureaucratic aggregation. Measuring and instrumenting a single body is intimate, a whole hospital of bodies is institutional. Bio-OS is pragmatically engaging with the implantation of instruments into these institutions in order to recover the 'lost' or aggregated body. Most notably through the inclusion in the development team of the E-Health and Health Informatics research group and the deployment of Bio-OS prototypes within the National Health Service Derriford Hospital (Plymouth, UK). For instance, the application of sensors to beds not only provides location (the number of misplaced beds is quite shocking) but also context (urine and temperature sensors can inform on bodily activities and occupation – the number of misplaced patience is even more so).

Without an appreciation of context, interpreting streams of bio signal data is fraught with difficulty. Consider for example attempting to interpret the pulse rate of an individual who is running to catch a bus, without knowledge of what they are doing or why. Human behaviours and external influences interfere with biological signals and can result in misleading data and lead to erroneous inferences. Instrumentation and recognition technologies are not yet sophisticated enough to allow us to accurately distinguishing between different contexts. In order to reliably interpret bio signal data, our focus must shift from considering absolute values to the analysis of relative and somehow correlated values.

Data Body

One such approach to relative values is the use of signal coherence. This concept is easily illustrated with the use of a simple example. During physical exertion, both heart rate (pulse) and breathing rate (respiration) increases. Conversely, during periods of rest both readings will fall. The rates will depend on numerous factors, some of which are accurately measurable, others somewhat less so. As such, these absolute bio signal values tell us little about the health, fitness and general well being of an individual. What is insightful however is the relationship, interdependence and importantly the divergence between these values. This 'coherence' provides a much more sophisticated mechanism for interpretation, inference and understanding. Differences in the rate of change (during both increasing and decreasing phases) provide us with an accurate and reliable appreciation of human physical condition. By considering these relative values we can cancel out and remove much of the noise and interference caused by factors such as external stimulus, exertion and conscious control.

Baselines are another value tool in the interpretation of bio data. We can compare an individual's bio signal patterns with a previously recorded baseline set in order to determine variation and deviation. Similarly, we can perform comparisons of collective community patterns with that of community baselines. By comparing like with like (i.e. a community with itself) we can gain insight into the impact of

short-term events (e.g. illness, bereavement, or other major life events) as well as revealing longer-term trends (caused by aging, diet, environment, exercise regimes etc). More provocatively, we can compare individuals or communities with idealized baselines - allowing comparison and even competition between them and the most fit or healthiest individuals and communities. This provides us with a unique insight into previously unexplored aspects of group and community health.

Bio-OS will engage in the sharing of the Mass Body Index using a similar paradigm to the recent Open Data governmental initiatives (for example in London and Manchester). These attempts by local and regional government to make their activities, achievements and deficiencies open and transparent have had the effect of revealing (anonymised) data regarding the attributes and behaviours of individual citizens and communities. Bio-OS harnesses the technological infrastructure developed for use with Open Data (namely Resource Description Frameworks, Triple Stores, SPARQL etc) yet with a grass roots, "bottom up" and voluntary ethos. Individuals and communities self-exposing there own Bio signal data in this fashion would result in a culture not unlike that which Sousveillance has achieved within the realms of audio visual data - an evolution of body instrumentation and institutions that smother it, and a further exposure of our most intimate parts.

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THE CHOREOGRAPHIC HORIZONS OF ISABEL ROCAMORA: "INCALCULABLE" EXILES

ANNALISA PICCIRILLO

In the workshop "Exile Writing", we explored the question of exile in its multiple technologies. Here, I would like to present a technology of writing that specifically relates to the body: contemporary choreography. The example of the video-dance *Horizon of Exile*(2007) by I. Rocamora will help me to discuss how 'dance', 'exile', 'writing' and 'femininity' intertwine in creating the alternative "horizons" provided by the video digital support.

Writing/Choreography

 I would like to introduce, with a lapidary definition, what I mean by 'choreography'. I will quote a statement by the French-Algerian philosopher Jacques Derrida, in his *Writing and Difference* (1978):

And thus we say "writing" for all that gives rise to an inscription in general, whether it is literal or not and even if what it distributes in space is alien to the order of the voice: cinematography, *choreography* of course, but also pictorial, musical, sculptural "writing". … All this to describe not only the system of notation secondarily connected with these activities but the essence and the content of these activities themselves. [1]

Beyond its 'differ*a*nces' – historical traditions, multiple styles and incalculable expressions – 'choreography' can be defined as a system of signs always 'differed' and 'dislocated' in time and space. It is an embodied language that reveals a *technè*, a technology, a shared knowledge of gestures, and a system of memory apt to remember. Its privileged instrument is the body, what writes and expresses its own textuality, with all its "incalculable" differences and all its "incalculable" choreographies.

INCALCULABLE CHOREOGRAPHIES

"Incalculable choreographies": I borrow the expression from the interview conducted by Christie McDonald to Jacques Derrida, where the philosopher is invited to talk on sexual difference, and on the "place" of the feminine in contemporary social-cultural representation. Beyond any binary opposition, beyond the masculine/feminine that governs the decorum of codes, Derrida dreams of – and believes in – the "multiplicity of sexually marked voices … mobile and non-identified sexual marks whose choreography can carry, divide, multiply the body of each 'individual'…". In his conclusion, he remarks:

Then too, I ask you, what kind of a dance would there be, or would there be one at all, if the sexes were not exchanged according to rhythms that vary considerably? In a quite rigorous sense, the *exchange*alone could not suffice either, however, because the desire to escape the combinatory itself, to invent incalculable choreographies, would remain. [2]

Fascinated by Derrida's expression, I will use it as a deconstructionist 'trope', in order to disseminate the meanings of the dancing event; in order to investigate the interaction of multiple bodies in a live dance

performance or in a video-dance work; it will possibly allow me to observe its encounter with the 'other' and its alterity.

FEMININE WRITING

One of my aims is to investigate how 'dance', 'writing' and 'femininity' intertwine; along this focus, it is Hélène Cixous who provides me with theoretical and methodological tools. The French feminist invites us to explore the sources of otherness in the female body, by stating the 'hospitality' of writing as a privileged space for manifesting women's agency and physicality. In *The Newly Born Woman* (1986) and in "Coming to Writing" (1991), Cixous brings the matter of physicality into writing: "When I say "writing" seized me, it wasn't a sentence that had managed to seduce me, there was absolutely nothing written, not a letter, not a line. But in the depths of the flesh, the attack. Pushed. Not penetrated. Invested. Set in motion." [3] Cixous' insistence on the physicality of the writing body seems to imply a direct relationship between the female body and "feminine writing". The work by Isabel Rocamora is an example of such "feminine writing" – where exiled women find hospitality by means of the technology of video-dance. Her choreographic writing hosts exiled voices and bodies; her is the space where women can share, elaborate and, possibly, overcome experiences of displacement and, finally, acquire an identity 'in suspension'.

Isabel Rocamora: *Horizon of Exile*

Isabel Rocamora (1968) was born and brought up in Barcelona by an English father and a Spanish mother. She has been based in the U. K since 1986, and she now is working between London and Barcelona. Graduating in Performance and Cinema Studies from Bristol University, her practice has developed throughout performance, live mixed media and artistic cinema, centered on a rigorous investigation on the performative language of human gesture in its relationship to individual and cultural identity. [4] A technique of aerial movements distinguishes Rocamora's dance – better known as "anti-gravity choreography". The author says: "It uses the hanging body and its 'subversion' of gravity as a metaphor for changing states of consciousness, paralleling the experience of weightlessness with freedom from the rational. Distinct from zero/micro gravity (as experienced in parabolic flights), anti-gravity performance needs the force of gravity to move against." [5] In Rocamora's work, slowness, stillness and anti-gravity forge the movement of the dancing bodies to re-elaborate and negotiate dance's ontological essence: it is movement itself:

 As an anti-gravity artist I have spent the last ten years experimenting to push the boundaries of what the body in suspension is able to do. During these investigations one opens up areas of the body that were previously tightly held. At the point of opening one may feel the release of an experience, a memory, an emotion that had been housed in that area for years. [6]

Horizon of Exile, a 2007 video-dance work, follows the exile journey of two veiled women across timeless deserted landscapes. The testimonies of Kurdish and Iraqi women, living today in London, inform the unfolding of the narrative; alongside are the stories of two older women, themselves exiled, and local to the landscapes of the Atacama desert, in Chile – where the film is actually shot. The chorus of these voices carries, on the one hand, strong memories of the female circumcision, erasure and escape, and on the other hand, it provides the images of a distant childhood home. The female body writing intertwines with the live memories: the live experiences of exiled identities forced to leave their countries

in order to protect a sense of themselves. *Horizon*... talks of a double exile: in one of the video sequences, a spectral female voiceover insists: "Our existence is wrong, being a woman is wrong, it's like that". Some of the voices were recorded in England, as if to reveal a second exile, the one that joins with the 'internal' exile that being a woman signifies.

Rocamora's Voice

Positioning itself between the cinematic, the real world and performativity, Rocamora's work sits between fiction, representation and the metaphor – this creative overlapping mirrors her own personal experience:

These resonant narratives awake a personal desire to treat complex feelings surrounding my own story of exile and self-finding at the age of eighteen (Spain – U.K). While reflecting female Middle Eastern experience of exile and drawing an understanding from my own autobiographical material, *Horizon* is foremost an installation about woman and identity.

Faced with issues of first person representation (Middle Eastern woman from a Western perspective) and wishing to present an essence rather than a given cultural context, I have chosen to construct a fictive character and environment which are drawn from various common denominators: Palestine (lead performer), Central Iraq/ Kurdistan/ Iran (interviewees), Jordan (nomadic desert culture), trans-national Bedouin/ Iran/ Jordan (costumes), Saudi Arabia (call to prayer) and Armenia (music). [7]

In occasion of an informal conversation, the artist told me of the inner drive that pushes her to give voice and movement to exiled/veiled women. She was educated in a private school by nuns; thus, in her childhood, she had a familiar and accustomed understanding of female veiled bodies. After the London bomb terroristic attacks in 2005, an uncanny change took place: Rocamora's perception of the 'veiled body' transformed – no matter what race, religion or ethnic group, she began to perceive those 'veiled' bodies as unfamiliar, as if her gaze was beginning to interiorize the fears and stereotypes intersected to the veil. The veil's issue is complex and impossible to discuss here; still, I find interesting to see how and why Rocamora decides to challenge and re-elaborate the image of veiled bodies'. In her coreography, she offers us her re-vision, her "horizon", of veiled identities.

I will extract three sequences, three "incalculable movements", from Rocamora's work, in order to show the exact places where, in my reading, the essence of exile writing/choreography comes to be realized; the exact loci where the female quest for agency becomes visible.

THE SECRET BEHIND THE VEIL

 In the first sequence, the dancer looks into the camera – it is the moment when she meets our 'other' and privileged gaze. In this situation, the confrontation with 'the other', allowing for self-recognition, remains 'suspended' through the use of the veil itself. Slowly, the dancer covers her face – she performs the act of hiding. We cannot see; our western gaze cannot understand what lies behind the veil, incapable of grasping the weight of private sorrows, the pains and the losses carried by the woman's timeless and 'incalculable' journey into exile. There is there a secret: what lies behind the veil is 'incalculable'.

'COUNTER-DANCE'

 The second sequence is when two dancing bodies, sitting and falling in a vast scape, betray a 'serene' violence. A flux of primitive energy seems to drive the scene. The choreography is developed through gestures of resistance and subversion. A "counter-dance" is displayed: the women seem to fight with/for their bodies, in order to release a natural instinct, to liberate a prohibited sexual instinct. At this stage, Cixous' call "to write" would resound; her writing becoming the flesh of the two dancer's bodies in subversion:

Write your self. Your body must be heard. Only then will the immense resources of the unconscious spring forth…. To write. it will give her back her goods, her pleasures, her organs, …; it will tear her away from the structure in which she has always occupied the place reserved for the guilty (guilty of every-thing, guilty at every turn: for having desires, for not having any; for being frigid, for being "too hot"; for not being both at once; for having children and for not having any; for nursing and for not nursing. [8]

BODIES/IDENTITIES 'IN SUSPENSION'

The third chorographical movement is visible at different stages of the work as if to reveal the signs of Rocamora's writing. Exile writing is embodied in the 'anti-gravity choreography' manifested in the rolling bodies of the protagonists. The anti-gravity body moves through space, travelling as if it encountered no resistance: "as if the matter of the body itself was no different from the air that is moving in, as if it were rising and descending at one and the same time." [9] In the apparently 'silent' space of the desert, Cixous's writing would resonate once again, seeming to choreograph, comment and be carried along by the dancers' movements:

She doesn't "speak", she throw her trembling body into the air, she let's herself go, she flies, she goes completely into her voice, she vitally defends the "logic" of her discourse with her body; her flesh speaks true…she conveys meaning with her body. [10]

In *Women of Algiers in their Apartment* – original title: *Femmes d'Alger dans leur appartement* (Paris: Des Femmes, 1980) – the Algerian writer Assia Djebar asks us not to forget that "even those bodies who have been incarcerated, no matter what their age, class, or race, may have imprisoned bodies, but have souls that move more freely than even before." [11] In the ending of *Horizon,* the veiled body is near the bank of a river or the shore of a sea; here, the woman encounters water, slowly starting to "unveil" her-self. It is the water to choreograph her body; liquidity becomes the matter, the matrix, and the material of her subversive writing – the space of her survival and of her expression. The act of self-affirmation in water depicts her agency, the movement of her choice – "freely than even before", as Djebar would say. In the kinetic dynamism of anti-gravity, and in the poetical suspension of the body, her female iden-tity is able to find a new place, a new home, a new "horizon", and a new hospitality…

I would like to conclude my comment to this singular example of "exile writing" with the concept of "hospitality". Rocamora chooses multiple places in order to choreograph exile: as a language and as a technique, dance itself makes its journey towards other technologies and other languages; it is choreog-raphy itself to 'exile' towards the video technology.

An act of hospitality can only be poetic

(J. Derrida)

The hosting of dance on the screen provokes specific reflexions. Video-dance differs from a typical live performance because of the multiple features interacting on the digital support. In the first instance, the dancing body is perceived as hyper-visible in being re-presented and re-visible in the time and space "a-venir"/"still to come". With its gestures, the body seems to acquire a 'spectral' dimension – since its performative act experiences the temporal disjunction in a given moment that does not belong to time any longer; it actually returns when we "recall" it in a specific time and space. It is how digitality challenges the so – called 'ephemeral' value of live dance performances – the dancing gesture does not disappear once it is done, but it 'lives on' differently inside the 'spectral' dimension of the digital screen. [12]

Here the discussion could be very productive if we think of digital dance; if, for instance, we might consider here the "motion capture" technology so widely used in contemporary dance. Still, this would take us along a complex path; what we can rather say is that, on the other side of technology, still as its own contersignature, the histories of female displacement find a fruitful hospitality in natural spaces. In *Horizon…* two women leave the urban space, a 'still' space, the space of law and convention where the masculine power penetrates all intimacy from the minaret; they move to the Atacama desert, which, in its landscapes made of ice, vapour and sand, materializes the projection of the two women's interior spaces. The desert and, in the end, water signify an undefined place, possibly arid and vacuous, possibly devoid of points of reference; nevertheless, it is open enough to be crafted by the act of theatre, fertile enough to host the act of female agency. Water is the last horizon; in its impossible frame because too fluid, the dancer restages the wonderful *Ophelia* by John Everett Millais (1852); like the Shakespearean figure, the woman-dancer, 'suspended' there, can affirm her freedom. In this work, nature really hosts female writing – the desert and water absorb the bodies, the traces, the memories – the "incalculable choreographies" of their exile.

"INCALCULABLE" EXILES

There is still one last consideration to make: the journey of Rocamora's exiled bodies reminds us of the dance of contemporary 'real' exiles, which might be part of the 'choreography' of the not-yet-elaborated trauma experienced nowadays by the European collective memory – specifically, by the Italian memory. The Southern coast in Sicily are witnessing the infinite migrating flows of people, carried by innumerable boats, who arrive from Northern Africa to Italy through the Mediterranean Sea. In these 'incalculable' transits, the image of the female body is often absent, even more 'suspended', because of her in/visibility. In this time of 'historical myopia', we should start interrogating the 'veil' covering our own western gazes (predicated on their certainty and belief in absolute knowledge): it might be the necessary way to have an insight into our historical and political contemporary 'choreography'.

Hospitality is culture itself and not simply one ethic amongst others. Insofar as it has to do with the ethos, that is, the residence, one's at-home, the familiar place of dwelling, as much as the manner of being there, the manner in which we relate to ourselves and to others, to others as our own or as foreigners, ethics is hospitality; ethics is entirely coextensive with the experience of hospitality, whichever way one expands or limits that. [13]

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THE ESTONIAN EXPERIENCE: NON-INSTITUTIONAL MEDIA ART PRODUCTION IN ESTONIA

Piibe Piirma

Speaking about media art in Estonia at the present moment, I will bring out 4 main lines (DIY phenome-non, financial situation, blending of various forms of culture, artist's ironic attitude and manipulation with media), which characterize current media art in Estonia and show us, that Estonia has adopted de-velopments underway elsewhere and thus media art is also moving strongly forwards.

Artists have always been curious and open to implementing new opportunities. The rapid development of new technologies has given us fantastic possibilities for expressing ourselves in a modern way, and one cannot underestimate the role of media art in our society. By indeed belonging to the group of "Eastern-Bloc Countries" in geographic terms, we can boldly say that Estonia has adopted quite quickly developments underway elsewhere and thus media art is also moving strongly forwards. This has cer-tainly been helped along by an open society and constant expansion of opportunities. This has certainly been helped along by an open society and constant expansion of opportunities – Western countries' artists' interest in what happens in Estonia and efficiently functioning international contacts.

About the past and present of Estonian media art in brief

Speaking about media art in Estonia at the present moment, I can boldly claim that the media art being created is, for the most part, indeed non-institutional and quite self-generating. We nevertheless also have our own historical heritage, the roots of which stretch back into the 1960's (for example experi-ments in pop- and kinetic art etc). However, a new wave of media art arose in the mid-1990's, when Es-tonia accepted the Internet as a new tool of creation and when barriers between Estonia and the rest of the world disappeared. During this period appeared the pioneers of 'net art', who actively and freely began asking questions about computer gender (Mare Tralla, e-mail questionnaire and first web pages), the possibilities of social networking (Raivo Kelomees, "Cybertower") and hypertextual poetry on the Internet (Nelli Rohtvee). The majority of media art in the 1990's was created at the initiative of the stu-dents and faculty of the Estonian Academy of Arts. The reasons why artists interested in media art at the time carried out activities at the university are simple - a computer class equipped with Internet capabil-ity was created at the Estonian Academy of Arts. The E-Media Center was established in 1994 by the ini-tiative of artist Ando Keskküla. In 1995, artists Ando Keskküla, Sirje Helme and Eric Kluitenberg carried out our first international conference "Interstanding – Understanding Interactivity".

In the present age, where Internet and computers are available to everyone, media art is arising in small groups that do not depend as much on a university or official creative organizations - interest-based groups indeed are formed on many occasions by former new-media university students; however fertile activities still take place by artists' own initiative.

What characterizes non-institutional media art in Estonia?

While speaking of non-institutional media art production in Estonia, I rely upon my personal experience organizing the annual media art festival 'Plektrum' in Tallinn. The festival was conceived just as are many good ideas in the world: in a small suburban attic apartment, where young people decided during a gathering of friends to create a festival of club parties. The small party has grown to this year's already ninth-annual, ten-day-long festival comprising music, exhibitions, audio-visual experiments as well as organized initiatives in public city spaces. The fact that makes it fresh and youth-oriented is that festival organization is controlled by young volunteers, students are allowed to speak at exhibitions and a great number of greater- and less-known figures are able to come before the public with their projects. It is foremost a meeting place for professionals and amateurs that certainly does not solve the large problems of media theory, but which showcases significant trends.

  Art events and workshops that have taken place at the festival over the years superbly exemplify the DIY phenomenon that I regard the first characteristic feature of Estonian media art - art projects and workshops transpire with low-tech resources, using a hands-on method. The availability and simplicity of technology, which enables us to function almost without boundaries, is the most important aspect in the activities of contemporary artists. It is not a question of a lack of topics or the complexity of tools, but rather the limitation of capabilities and time to ourselves.

The second important aspect of characterizing Estonian media art is problems financing it. Naturally, we possess support structures that also support good projects when necessary; however they do not number many and I believe the constant search for new, alternative opportunities has by and large even benefited art. This leads in turn to looking for cooperative possibilities with foreign partners and the desire to also acquaint one's activities outside of Estonia's national borders.

The third attribute that characterizes our contemporary media art is the dissolution of various forms of culture. Software programming and innovative technological solutions have mixed actual creative works with coordinated events, actual communication holds an important place alongside that done on the Internet and everything seems to be permitted. Therefore it is often very difficult to determine, from what point one is dealing with software art and from what point it is performance or some other phenomenon. This is, of course, not a unique experience for Estonia alone - the blending of mediums is happening everywhere. Yet the fact that cooperation in the field of culture is functioning wonderfully between Estonians from creative backgrounds and those from other walks of life demonstrates greatly that Estonian artists are closely following developments elsewhere and are capable of locating their activities within a wider context.

The fourth phenomenon that I can certainly regard as characteristic for Estonia is a certain joyfully ironic attitude towards widespread problems. Work performed with media artists and exhibition curation has shown that fears and taboos become a part of humorous commentary rather than heavy philosophical discussion. An interesting paradox surfaced while putting together the exhibition "Transparent Generation" in 2008 - the issue, which elsewhere in the world has become popular, did not incite works with fear or negative undertones in the least; our artists regarded the topic rather with happy superiority. Through the works, we found that surrounding cameras and carefully-checked personal data is an unavoidable part of contemporary society with which one must come to terms, and which must be utilized in the very best way in art. It is worth noting that a review of the exhibition in a major Estonian daily newspaper was given the headline: "What the knowledge that Britney Spears is pregnant gives us". Following this, the article, which was published in the online press, received an immense number of views and proved in a lively fashion that manipulation with media is one part of our culture.

In summary

The current age shows clearly that Estonian media art is generated through very practical activities regardless of the existence of a definite institution. Several artists using new media as a tool today originate from very different fields of life and thus provide media art with ever newer interdisciplinary dimensions. At the same time, the annual festival undoubtedly helps to boost the reputation of media art, to allow people to grasp the coexistence of art and technology as a whole, to work and brainstorm actively in this field. And the most important aspect it helps to foster is the meeting of interest groups.

Estonia has certainly done a great amount of work in the IT sector, however cultural figures must be successful, taking into account their few opportunities. As a small and quite poor country, we are in a situation in which the act of making art and especially "underground" manifestations must successfully make do on their own. On the other hand, such a situation directs one towards greater creativity that is not dependent on material values - towards establishing exciting cooperative groups, high-volume and constant self-learning as well as searching for international contacts.

Nevertheless, I find that the current age provides us with fantastic opportunities because we live in an environment where a high number of both technologies and cooperative networks are at our disposal, several diverse kinds of events take place and all ideas may be realistically feasible in the context of media art.

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THE RHETORICAL ART OF DATA VISUALISATION

JEREMY PILCHER

Art that visualises data is commonly understood to enable a transparent understanding of a large amount of factual information. I argue that art which employs such a technique may also be understood to critique the value-systems and hierarchies of importance that give rise to the networks and data flows that are visualized. Art may open an engagement with what society has to occlude in order to maintain its existence without change.

Data visualisation techniques have been used by artists as a means to critique society, and in particular capitalism. Such art is often understood in terms of the reduction of an overwhelming amount of data to a meaningful representation. The availability of data, and its visualisation, is attributed with improving greater transparency and accountability of the systems that structure our lives. It is commonly regarded as desirable that the way in which data is presented should be transparent. [1] Data visualisations are understood as evidence of, and as an explanation for, the world. So called 'new media art' is regarded as a particularly effective site for such visualisations because of the opportunities it provides to interact with the underlying data.

It is arguable that a transparent representation of affairs as they exist is, in itself, not a critique of how things ought to be. The work of Arthur Danto provides an approach to art that responds to this issue. He argues that art that employs factual data does more than represent the world; it expresses a point of view about the content of the work. However, Danto's argument is weakened by maintaining a distinction between the form and content of art. Instead, starting from Derek Attridge's understanding of the work as a performative event, I will explore how art may provide the opportunity to acknowledge that which must be ignored by any given society if it is to remain unchanged. My argument is that, approached in these terms, interaction with data may uncover the contingencies in the way societies are constructed.

They Rule

My argument will be progressed by engaging with *They Rule,* [2] which is an activist work of art by Josh On that has won a number of awards, including the Dutch Electronic Art Festival in 2003. It provides the viewer with the opportunity to interact with data about some major institutions and the boards of directors of the top 500 companies in the United States of America. The work exists in two versions, which respectively incorporate static data collated in 2001 and in 2004. This is clearly acknowledged on the site, which states that "*They Rule* is NOT a Live database of board members and companies. That information changes constantly. I hope to update the database annually, and try to ensure that the links are accurate at the time of launch." [3]

Each of the companies included in *They Rule* is represented by an icon of a company board table, which appears on screen surrounded by avatars representing the directors on the board. The size of an avatar reflects the number of company boards on which a director sits. As icons and avatars are clicked, the work allows connections between companies to be traced by the construction of network diagrams. It is

possible to discover, for example, that "the members of the boards for the so-called competitors Coke and Pepsi actually sit together on the board of a third corporation, Bristol Myers Squibb." [4]

The Representation of Data and *They Rule*

Christiane Paul describes how the work may be understood to employ technology against companies using the Web as a marketing tool, which "turns us into transparent customers." [5] The subversive effect of the work is commonly understood in terms of a greater understanding of the world as it exists. It has been observed, "If only the economic realities it depicts were as transparent and intuitive as its navigational structure, this would be a more benevolent world. The ease and transparency of the design layout, combined with an intriguing subject make *They Rule* an exquisitely idiosyncratic icon of activist web-design. Visit it today before They Outlaw It." [6]

Yahya M Madra explicitly contextualizes Josh On's work in terms of a critique of capitalism: "In *They Rule*, the moment of appropriation, in its exploitative capitalist form, is represented as a system of networks. While 'they' do have proper names, what is represented here is not particular individuals, but rather 'they' as a collective of appropriators." [7] However, directors qua directors are company employees. As such, it may be questioned whether networks of directors should be regarded as an underlying class of appropriators. In terms of global capitalism, my view is that the term "appropriators" is better reserved for the shareholders and their interconnecting portfolios of company shares. Such shareholders will include not only individuals, who may also happen to be directors, but also other companies.

The important aspect of Madra's description is the attention it draws to the work as a systemic critique. The work focuses attention on a feature of the legal system of the United States of America. *They Rule* does not reveal that companies will always have boards of directors that are interlinked. It enables people to realise that companies may, but won't necessarily, be connected in this way. *They Rule* illustrates that there are some directors (of companies recognised by the law as separate legal personalities) who sit on more than one board and, in the process, connect competitor companies. However, as an exploration of the work reveals, there is no guarantee that links between companies will be found. Indeed, it is entirely possible that even when networks of boards of directors are identified from *They Rule*, neither these nor even the companies, will still currently exist.

The content of the database employed by the work is fixed at given points in time. Accordingly, many of the connections it is possible to identify by using *They Rule* are out of date and may even have been so at the time it first appeared online. The implied premise of continuing to understand *They Rule* as having an impact is that, irrespective of whether the individual networks depicted remain in existence, the work enables users to visualise specific networks that illustrate an ongoing feature of the economy, which is permitted by company law. My argument is that the critical force of the factual representations of data in *They Rule* lies in the exploration of the underlying legal system through iterations made possible by the work's interface.

The Art of *They Rule*

They Rule, through depicting factual information, has been understood to reveal that there is something wrong with capitalism, or perhaps more specifically with the legal system of the United States of America. The existence of any specific network of directors may be unknown. However, the generic existence

of interconnections between boards and even the widespread extent of such links is not a revelation. This feature of the legal system of the United States of America has previously been identified and understood without the interactive creation of network diagrams. It is not immediately apparent that *They Rule's* features, such as the manipulability and interactivity of the work's data, make it significantly different from other diagrammatic representations of historic data about a given state of affairs. Understood as art and approached through the work of the philosopher and art critique Arthur Danto, *They Rule* might be regarded as the expression of a value judgement. This would involve arguing that the work goes beyond representing the world as it is and visualises the point of view that it is wrong for a legal system to allow the formation of networks of interconnecting companies.

In 'The Transfiguration of the Commonplace' Arthur Danto engages with what distinguishes representations, such as diagrams, from works of art that may be visually indiscernible from such images. He argues that an artwork must be about something, which is to say that art expresses something about its content. In art there is a "double role of representation and expression" that must be engaged with when interpreting the work. [8] Artworks not only depict content, they also "project a certain point-of-view about whatever they are about. Whereas mere representations aspire to transparency, artworks express ideas and attitudes toward whatever they represent." [9] Approached in terms of Danto's argument, art that employs diagrams manages to do this, at least in part, because of the connotations diagrams have in our culture due to their use in disciplines such as economics and engineering. Understood in terms of the diagrams constructed in *They Rule*, the work simply represents the links between companies. However, as an artwork *They Rule* expresses condemnation of the interconnectedness of companies and their directors.

Danto's argument is an intriguing one but it raises a number of questions to which satisfactory responses are not provided in 'The Transfiguration of the Commonplace'. It is not clear to me that an account of *They Rule* in these terms provides a means to understand how, or indeed why, it is regarded as expressing a value judgement about the fact that company boards interconnect through directors. In addition it is possible to argue that the attitude expressed toward the content of the work does not itself escape from being part of the content. It is what might be described as meta-content or content about content. Danto briefly acknowledges this issue and reflects on the possibility that, when any representation is in some way self-referential, it will be an artwork. The task of examining content for the point of view expressed in it may recede away without end. Danto identifies this as a significant problem and suggests only that "the question in this form has not, to my knowledge been raised before in the entire history of the philosophy of art" [10]. My argument is that these issues may be engaged with through the work of Derek Attridge, which he explicitly acknowledges is much indebted to that of Jacques Derrida.

A Legal System Less Violent

In the 'The Singularity of Literature' Attridge argues that art works should not be understood instrumentally as communicating meaning, but rather as events that give rise to new meanings and feelings. Despite the title of the book, and the fact that much of his argument deals specifically with literature, Attridge makes it clear that he considers his work is applicable to art in general. He proposes that works should not be understood in terms of an opposition drawn between form and content or meaning. Instead, Attridge understands art as "bringing into existence a configuration of cultural materials that, at least to a certain group and for a certain time, holds out the possibility of a repeated encounter with alterity." [11] Viewers respond, not to "an attribute or a substance, but to an event: more clumsily we

could speak of the performing of narrativity, metaphorizing, imitating, describing." [12] The focus is moved away from a concern with the extraction of a work's meaning toward an engagement with it in performative terms. Art stages an opening with that which an existing cultural order has to disavow in order to be able to continue without change.

Approached in terms of Attridge's argument the critical force of *They Rule* may be understood in terms of the way in which it opens an awareness of the violence of the law. More specifically, this manifests in the way that the legal system of the United States of America allows companies to interconnect through their directors. My argument in this respect starts from the way that the work invites the focus of attention to be widened out from the factual accuracy of the data visualised to include the process of how that data is explored. The fixed nature of *They Rule's* database, the concomitant datedness of the data, and the way in which the identification of the extent and nature of connections between directors is contextualised by the links that cannot be traced, all make the work weak when understood as a set of factual representations of networks.

The effect of the characteristics of *They Rule* is that it may be understood to hold the data as a fixed given, which directs attention towards the way in which meaning is constructed by means of the selection and manipulation of data to create visualised networks. The screen quickly becomes cluttered with data after expanding a few companies' boards. Directors with no contacts between the companies selected to be searched need to be deleted from the screen. In the process of locating networks of interconnecting boards of directors users are, in effect, compelled to be selective about the data that remains in sight. In the event that users want the remaining data to appear in the form of a visually appealing diagram then the icons and avatars that remain, together with the lines that connect them, have to be moved around the screen until the desired pattern for the network is achieved.

There are many fascinating diagrams saved on *They Rule* but it should not be forgotten that not all investigations using its database result in establishing the existence of network connections. I propose that the critical force of *They Rule* arises out of the process that users work through to identify and construct the visualisations of connections between (competing) companies (that have been) permitted by the legal system of the United States of America. The work invites users to focus on the interface to, and the interaction that it provides with, its database. It opens the opportunity to reflect on the multiple visual iterations of data derived from a legal system. *They Rule* directs the attention of those users who repeatedly explore the work's databases toward the legal system that underlies all of the visualised data. In the process it stages the chance of judging whether it is just for the networks that are identified to (have been allowed to) exist.

The work may be understood to open an engagement with justice because *They Rule* stages an aporia in which every legal system is entangled. All laws are necessarily applied at times that are different from those at which they were formulated and brought into being. This means that any given law will need to be applied in specific individual situations, not all of which can be anticipated. As Derrida points out "Each case is other, each decision is different and requires an absolutely unique interpretation, which no existing, coded rule, can or ought to guarantee absolutely." [13] The problem is that, in addition to being applied in specific situations, laws are also required to be general enough to allow them to be enforced equally and in a way that is not arbitrary. [14] Legal systems will always need to make efforts to recognise the specific circumstances of each case so as to enable there to be justice despite the generality of the law. However, ultimately it is impossible for decisions to be made as to the legal merits of every case on an individual basis whilst at the same time maintaining the universality of the law.

The more established and general laws are the more apparent become the difficulties associated with trying to reconcile the general with the particular. In broad terms, the laws that enable companies to be brought into existence and provide the framework within which they are operated are well established and accepted in the United States of America and other countries around the world. The inevitable violence of the law is in the way it asserts the authority to determine what is generally acceptable and to demarcate when exception(s) will be permitted in the name of justice. *They Rule* enables the visualisation of iterations of combinations of companies and in doing so opens an opportunity to evaluate this violence. This is because it provides the opportunity to consider the (im)possibility of a legal system that is general enough to apply equally and at all times to all directors, whilst at the same time being able to respond to specific circumstances that may mean that connections between companies are entirely legitimate and justifiable. *They Rule* invites reflection about whether the law could be less violent and in the process become more just. The force of *They Rule* is in the way that it directs critical attention, from outside the legal system, to the application of the law and the inevitable violence of the contingent boundaries it establishes.

Conclusion

I have sought to argue, through an interpretation of the work *They Rule*, for an approach to art that employs data visualisation that goes beyond understanding such work as a transparent depiction of content about the existing world. My aim has been to engage with *They Rule* both in terms of its factual content and by identifying the significance of the interface that has been provided to its content. The work enables the creation of visual iterations of networks made possible by the laws of the United States of America. This process invites users to become aware of the (im)possibility of a legal system that can be sufficiently general to be both fair and equal for all and at the same time able to make exceptions in specific cases. Attention is drawn to the violence of the legal system of the United States of America in the way it claims the authority to create and enforce the regulations that govern the way in which such an aporia is to be resolved. As such, *They Rule* stages an opening with that which an existing system has to disavow in order to be able to continue without change. While the law must necessarily be violent, when the possibility is raised that the law could be articulated differently and "grounded on less arbitrary modes of authority", there is always scope for a more just legal system. [15] The political impact of *They Rule's* visualisations is to unsettle claims to transcendence by the law, and in so doing open it to transformation by those it presently excludes.

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DIGITAL AND INTERACTIVE CHOREOGRAPHY: INNOVATIVE WOMEN IN THE DANCE HISTORY

LUDMILA PIMENTEL

We are interested to describe, analyze and propose to dance a new concept: the concept of Interactive Digital Choreography. So our focus is in the digital choreographic possibilities with interactive quality, and contributions and new ideas proposed by women who participated in the recent history of Interactive Dance.

Fig. 1. Bluebody, 2008, by Ludmila Pimentel and Mariana Carranza, interactive installation, Copyright Ludmila Pimentel.

Fig. 2. RGBodies, 2008, by Ludmila Pimentel and Mariana Carranza, interactive installation, Copyright Ludmila Pimentel.

The Interactive Digital Choreography explored in this work shares some features with Interactive Art. We consider that the concept of Interactive Art comes from a continuation of the artistic movement advent of interactive installations that arise with the first facilities of videos installations that team together with *happenings* and conceptual art; all of them are part of the artistic movement of the 60s.

To understand the Interactivity of contemporary events we need to understand the events that happened in the history of art since the beginning of 20th century with Futurism, and continued with Fluxus, Process Art, Kinetic Art, Conceptual Art, until the contemporary stage of Art and Technology. We need to understand the collaboration of the work of John Cage, Robert Rauschenberg, Nam June Paik, also the new concepts proposed by Cybernetics, and of course the progressive 'dematerialization of the art object', which involves the active and physical public 'participation' in the event.

So, considering this context we need to mention the contributions of Allegra Fuller Snyder [1] that in 1965 proposed three distinct categories of dance and film. One would be the simple recording of a dance, where with just one camera, and also just a unique point of view, the dance danced on stage was recorded, another is the documentary film category of dance, where the narrative is respected but dance is adapted to film by using the camera close-ups, made distinct, and other technical capabilities, and more cameras available, and finally the cinedance, or 'choreocinema' (a term proposed by John Martin), [2] that is the creation of a new art, which can transcend the biological potential of our gravitational body and where it was introduced, according to Snyder, new possibilities of the body. Last category is the one most closely related to the topic of this work and in the emerging Interactive Digital Choreography alternative ways of moving bodies, new body shapes.

Comparing with interactive installations and digital art works, sound sculptures, immersive experiments, computer games and more recently Internet based forms of tele-presence, the Interactive Dance, in a more restricted survey of designated assisted art computers, can not vindicate to itself as long and heterogeneous history.

According to Gretchen Schiller, [3] since the beginning of the theatrical art, the artists have been expanding the concept of body through the materials and technologies, as a precedent for Interactive Art based on the movement. Sure there are many examples of dance choreography in which technologies were used, not just digital, transcending biological limitations of the body, such as the introduction of pointed shoes, in 1832, in the ballet *La Sylphide*. But, Loie Fuller was the first artist to stage the real technological breakthrough in the late nineteenth century when she began to make use of the lights not just to make the scene visible but also to create an atmosphere. She also used artifacts to extend and multiply her body image, or even transform it into animated shapes, and by doing so she brought into the world a new and revolutionary concept of dance.

After Fuller, the first experiments in the area of dance and technology are the films by Maya Deren (1940), and even before, studies on the chrono movement photography and cinema made by Muybridge, Marey and Mèliés, all of which may be considered in the historic route of digital animations systems called 'motion capture'. In addition, choreographers, researchers and teachers have used video, since this technology has been available, as an important tool to analyze documents or existing works.

In order to recognize the importance of women in Dance History and Technology we should not forget Thecla Schiphorst, [4] a graphic designer and dancer. She led a group of graphical researchers at the University of Simon Fraser (Canada), in the beginning of 1980. Schiphorst actually invented 'Lifeforms', a software that allows the creation of the choreography in a virtual platform where one can also watch

the choreography. It makes possible to the artist to see the movement from several points of view, a condition not available for real stage. Therefore, it was a woman who developed the software 'Lifeforms' but her name is not connected to the software she created. Instead, it became wordly famous through the name of a man, the north-american choreographer Merce Cunningham, who first worked with the 'Lifeforms'.

We cannot forget to register the contemporary choreographer Dawn Stoppiello, [5] one of the creator's of the software Isadora with Mark Coniglio of Troika Ranch Dance Theater, as another important modern matriarch in the history of dance and technology, specially her contribution to the development of a choreographic interactive language in dance performances. Stoppiello highlights the importance of interactive systems to meet these available to the largest number of artists interested in an increasingly simple and accessible to anyone with some training and familiarity with the computer.

We believe that in this new architecture for interactive dance, we have a new philosophical condition that enables us to be harmonic within the spatial context that we live, in wich we are immersed, and it is inseparable of our bodies. In short, a performative relational architecture that invites participation, and does not exclude the virtual architectures, besides it, includes the body in the experiment. We can not forget to mention the brazilian artist Lygia Clark that in the middle of 20th century and together with the Neo-concrete movement participants invited the body of the visitors to come inside of the objects and art installations, as a pre-historic stage of the Interactive art. For us is fundamental reveal this kind of no-mentioned history, the women contributions in the history of art and technology, in the history of dance and technology…

The dance creators have widely performed dance work in multimedia scenarios, sophisticated structured for consumption and aesthetic contemplation of the audience. Dance installations and online interactive dance, which invite user's participation are rare events. They form a new field of studies open to analysis and aesthetic evaluation of this new interface.

Each of these experiences and creations developed by choreographers with their software, offer different notions of what is the conception of dance, movement, body and the proposal of interactivity or even ideas of what is an interactive choreographic system.

The dance is seen in Brazil even as something to embellished and sculpt the female body, and not as a form of expressionist art, rebellious, much less as a way of developing the feminine discourse of her own body and authority, with few exceptions of recent contemporary dance productions. It is part of our school of Dance (UFBA) role to expand the notion of female corporeality building a more libertarian way, including tools for these bodies to be more independent, supplying ways to construct creative and technological autonomy in order to make a significant change in the former model and greatly strengthened in the countries of South America where most people think that technology is not a field of research for women.

How to change a trajectory of these female bodies used to attend the wishes of the choreographers who are mostly men? How to change the fate of little girls whose bodies are being forced into being more feminine and docile since childhood? How dance can change this reality and not just be another tool of body domestication?

This paper is rather an attempt to write the history of dance in interface with new technologies, highlighting those contributions often hidden in official discourse, which is the history of dance written by male.

There is still much to write, to fight, to do … I write this paper for us all women…

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THE FOOD SIDE OF SOUND AESTHETICS

LEANDRO PISANO

This paper describes some art examples related to sound/food topic starting from a scientific perspective and investigating the field bounded by performance art, sound art and research. Through comparing molecular gastronomy to digital music and analyzing the connection among sound and food as a way to re-design a rural territory, this paper outlines how the knowledge of food and sound can add important information in the 'tasting' process.

Our evaluation of food is related to a variety of contextual information perceived through the senses: the pleasure we get from eating is obviously influenced by the taste and the smell of food itself. Also, visual presentation and colour are important, as well as the feel of the food in the mouth, with its temperature and texture. The senses of taste and smell are so tightly combined in the evaluation of flavour that it is sometimes considered a form of synesthesia which is common to us all. Recently, researchers have been focused their attention to various cases of synesthesia. They are also analyzing if the perceptual experiences of syntesthetes are so very different from those of non-synesthetes.

Our senses undoubtedly are not isolated from each other. Indeed, living in a multi-sensory world, our brain constantly works combining data from different sensory modalities in order to make sense of our environment. Through reporting a number of cross-modal associations such as pitch and visual size, colours and tastes or brightness and the frequency of vibrotactile stimuli, some researchers have shown that these associations "are different from those present in syntesthetes in that they are bidirectional, and a stimulus presented in one sensory modality does not elicit a conscious experience in another modality. However, the existence of these cross-modal associations supports the hypothesis that synesthesia might originate in feedback connections from a point of convergence of the two sensory pathways." [1]

According to the latest research on the matter conducted by Sagiv & Ward (2006); Ward, Huckstep, & Tsakanikos (2006), cross-modal associations and synesthesia can be usefully compared in order to better understand both phenomena. Also, it has been shown that there are implicit associations between tastes and particular pitches: in particular, on the one hand sweet and sour tastes are associated with high-pitched notes, on the other hand umami and bitter tastes are preferentially matched to low-pitched notes.

As Charles Spence of Oxford University has stated, the perception of the crispness and staleness of potato chips can be affected by modifying the sounds produced during the biting action. Participants of the experiment were asked to bite into 180 crisps that had different freshness. The sound produced by the bite of each crisp was processed through electronic devices (microphone, computer, headphones) and edited in real time to evaluate the participants reaction. The results showed that crisps were rated 15% fresher and crisper if the crisp sound was played louder, or if just the high frequency components of the biting sound (above 2 KHz) were boosted.

Another experiment conducted by Spence was investigating the role of auditory cues in the perception of carbonation in beverages. The results showed that it's possible to modify the carbonation of a fizzy drink by changing its sound. As Lorimer Moseley writes, "In the future, we may be able to reduce the

amount of 'tooth-rotting' carbonic acid in fizzy drinks simply by changing the sound that the drink makes in the can. Prof Spence's research may also suggest novel interventions to bring back the enjoyment of food for the growing elderly population who have started to loose their sense of taste and smell since there is currently nothing we can do to bring bask those senses once they have started to decline." [2]

Recently, an aesthetics experience called "Foodfrequency" and based on synesthetic and cross-modal research of Charles Spence, was presented by the chef Giulia Massimiliani, the dj Michael Byrne and the sound designers Marco Galardi and Sara Lenzi. During the "Foodfrequency" experience, participants were required to immerse themselves into the taste of Italian foodscape while listening via headphones to binaural immersive sounds of the origin of the ingredients alternating a multichannel soundscape without headphones. Through the sound experience, a connection was created with the tastes and flavours: the stories of the ingredient were narrated employing specific frequencies able to increase the food experience.

Charles Spence has also collaborated with Heston Blumenthal, English chef and owner of The Fat Duck, a world renowned restaurant in Bray, Berkshire, which researches the molecular compounds of dishes aiming at enabling a greater understanding of taste and flavour. Together, Spence and Blumenthal have experimented that it's possible to flip the flavour of bacon and egg ice cream by changing the background sound. The ice cream tastes more 'bacony' if who is tasting can hear the sound of bacon sizzling in a pan, while it tastes far more 'eggy' if some farmyard chickens acoustic samples are played as a background sound instead. Even seafood taste nicer when eaten while listening to the sounds of the seaside: The Fat Duck tasting menu has as one of the signature dishes a course named "The sound of the sea", a plate of seafood presented to diners together with a seaside soundtrack played through an iPod put into a seashell on the table.

Blumenthal is well known for being one of the chefs that in the past decade have inspired his work to methodology, philosophy and experimental approach belonging to the Molecular Gastronomy movement, in terms of experimenting the advances in biochemistry and soft-matter physics to analyse and comprehend culinary processes in an innovative way.

Although the term "molecular cuisine" cannot indicate a specific style of cooking, "as the chef labelled as 'molecular' have very different styles and the role of science in cooking is usually limited to the development of a new technique or a new recipe and there is very little 'science' in the final preparation of a dish," [3] it's interesting to notice that in the poster for the first "International Workshop on Molecular and Physical Gastronomy", held in Erice, Italy in 1992, specified that this meeting aimed to explore four points: "to what extent is the science underlying these [cooking] processes understood; whether the existing cooking methods could be improved by a better understanding of their scientific bases; whether new methods or ingredients could improve the quality of the end-products or lead to innovations; whether processes developed for food processing and large scale catering could be adapted to domestic or restaurant kitchens." [4] Two things need to be emphasised in this brief excerpt: on the one hand, the interactions between science and cooking, which at the beginning of the past decade led to the first collaborations between chefs and scientists: in France, chef Pierre Gagnaire teamed up with Hervé This; Heston Blumenthal with Peter Barham in England; in Spain, Andoni Luis Aduriz and later Dani Garcia with Raimundo Garcia del Moral, and Ferran Adrià with Pere Castells; on the other hand, an innovative research oriented to deconstruction (or reconstruction) of cooking in terms of the 'simple' chemistry and physics of the food.

In a way, these approaches can be compared with sonic technique of Granular Synthesis, in which sound samples are used often as grain contents. Through distributing grains in time and selecting parameters from the synthesis of each grain, the sonic quality of a granular texture can be obtained. Usually, the duration of grains is short and they are often distributed densely in time, so that the resultant sound can be perceived as a blend texture. "Granular Synthesis or Granulation is a flexible method for creating animated sonic textures. Sounds produced by granular synthesis have an organic quality sometimes reminiscent of sounds heard in nature: the sound of a babbling brook, or leaves rustling in a tree. Forms of granular processing involving sampled sound may be used to create time stretching, time freezing, time smearing, pitch shifting and pitch smearing effects. Perceptual continua for granular sounds include gritty/smooth and dense/sparse. The metaphor of sonic clouds has been used to describe sounds generated using Granular Synthesis. By varying synthesis parameters over time, gestures evocative of accumulation/dispersal, and condensation/evaporation may be created." [5] Granular Synthesis technique is the result of long-standing ideas about the nature of sound. In the second half of the last century, quantum physics have demonstrated that sound can be atomically reduced to physical particles. As Isac Beeckman has later explained, sound travels through the air as globule of sonic data.

Starting from 1950s until the last decade of XX century, some theorists or composers including Dennis Gabor, Iannis Xenakis, Curtis Roads and Barry Truax have contributed to evolve the particle theory of sound into a synthesis method whereby the natural sound particle is reproduced, being layered with other imitation particles, and the particle itself can be cloned or extracted through being processed with a similar method as the original, in order to create different sounds.

Definitely, Molecular Gastronomy and Granular Synthesis are featured by a common approach, not only through deconstructing and reconstructing molecular structures in order to act on the chemistry and physics of food/sound, but also creating through texturization process (in molecular cuisine with gelling agents, emulsifiers and thickeners; in granular synthesis with granular synthesisers/granulators) an evocative narration between micro and macro, liquid and solid, accumulation and dispersal, condensation and evaporation.

In the last years, linking sound and food is becoming an interesting research topic not only in the psychology of perception but also in new media art studies. The latest research is focusing not only, as we have seen before, on the key factors of hearing related to multi-sensory perception of food, but also on some vernacular expressions that are rising from a performance-oriented aesthetics research, analyzed through a multidisciplinary perspective.

Every recipe, as a list of operations to be executed in a time interval, could be considered as a contemporary full score that is at the same time well-defined and unpredictable in its sonic development. The sound and the taste of food can allow us to journey around the world by putting us in touch with different cultural traditions, localizing us in a precise context and by mixing cultural elements it can allow us to cover distances. If Heston Blumenthal once said that food is especially evocative in conjuring memories, we could extend the meaning of his words by saying: food and sound.

Among the most significant projects operating in the field bounded by performance art, sound art and aesthetics research, we can find The Vegetable Orchestra, a musical ensemble founded in Vienna in 1998 based on the concept of using fresh vegetables as source material for the creation of instruments (which are built for every rehearsal and concert from scratch), all sounds and all music. Dealing with expanding the borders of the notion of what is understood as music and by working with vegetables, the Vegetable Orchestra musicians also rethink the concept of sound as a permanent transformation from

food into an instrument and back to food again. During their performance, the instruments already fall apart. They change their consistence and loose water and shape. The sound elicited by the vegetables turns into smell and later into taste when the musicians enjoy with the audience their instruments at the end of the concert in form of soup.

One of the founding members of The Vegetable Orchestra, Ulrich Troyer, was invited for a residency project together with the cook Philipp Furtenbach and the musician Kassian Troyer during the 2006 edition of Interferenze new arts festival - a new media art event immersed in the forest of Mt. Partenio in the rural region of Irpinia, South of Italy. During the three days of the festival (the theme was "Naturalis Electronica"), the artists have condensated culinarically and sonically local food and sounds, through recording on location the soundscape of the site and combining acoustically this material with the sounds that emerged during the process of the preparation and condensation of the food. The process of the condensation has evolved slowly over the period of three days and in certain time slots during the festival it was possible for the audience to listen to and to degustate the condensation of the tastes and the sounds collected. A way to let the naturalistic and gastronomic identity of the place play together and to link together technology and tradition. What emerged from the project was not so much the result, but the process during which people were made aware of some ancient and very slow processes: visitors could come, taste and listen to the sound of the performance that was presented as a social sculpture, something focused on the value of the time, the importance of slowness, the sense of the place. [6]

This project was part of the Interferenze festival section called "Click'n'Food", which offers a panoramic of performances based on the relation among food, music and new media arts. Food represents one of the main theme of the festival, through a strong involvement of the typical food and wine of Irpinia, a tradition of high quality standards presented in an international context. The aim is to propose a path that, through projects based on evidence, creative intelligence and sensory experience, is designed to promote/foster a virtuous cycle where the quality of production and the consumption of food is inextricably bonded to sustainability, environmental quality and social relations. Through choosing "Rurality 2.0" as the theme for the 2010 edition of Interferenze festival, the curatorial board decided to offer a different perspective on rurality starting from the territory itself. Moreover, the location of the event, the Ducal Castle of the little village of Bisaccia, has become for some days a laboratory where a rural territory and its characteristics (identity, traditions, natural environment, landscapes, gourmet) lead to a more open expression where languages of aesthetics of new media become new forms of sharing. In this perspective, food was analyzed both from an economic and a cultural point of view. In the first taking into consideration detailed tracking of the supply chains, whereas on the latter it considers it as a trigger for sustainable local development and tourism, and as an important part of the 'Slow Life' philosophy.

This year, the Click'n'Food section was based on three residency projects that started some days before the festival: the first one, entitled "Noble Milk" has involved the sound designer Yasuhiro Morinaga and the video artist Antonello Carbone, that were asked to make a sound and visual reinterpretation of a field trip at high altitude on the Podolian pastures which the two artists had on the mountains of Irpinia in the days before the three days event. Podolian cattle originates directly from a big structure and long horny cow, called "Bos Primigenius", who is supposed to have been domesticated in the Middle East during the IV millennium BC and later coming from Ukraine to Italy during the barbarian invasions. Being a cattle who always walk along, Podolian needs big extension pastures: this requires to shepherds to practice the transhumance, that takes place in the Apennines mountains along the so-called 'tratturi', the wide grassy, stony or hard soil paths that have been originated from the passage or trampling of

herds. Nowadays, only 50.000 head of Podolian survive in Italy, due to its less adaptability to intensive stock-breeding. Although the milk produced by Podolian cattle is really not much and it is obtained only during limited periods in the year, but the quality is extraordinary: Podolian lives exclusively on pasture and never goes in the stall, also eating grass in areas of high mountains that are very clean and not contaminated and thus they can produce milk of high value both from a nutritional standpoint and as well from the point of view of transformation. Caciocavallo Podolico is a type of cheese made out of Podolian cattles' milk and is one of the finest food products of South of Italy, with its smell of milk, butter, fresh grass, smoked hay, stall, wet straw and with its taste sweet and sharp together in the most mature shapes. Yasuhiro Morinaga and Antonello Carbone performance at Interferenze festival took place in conjunction with a tasting of "Noble Milk", produced by cows fed by only forage and pasture howthough GMOs or silage.

The second Click'n'Food project was "Viand", asking Tana Sprague to analyze processes of production of Irpinia artisan cheese (mainly Caciocavallo). Reading through the filter media of aesthetic craftsmanship, sound, images of a secular tradition were merged together. "Viand" was presented at Interferenze 2010 in the form of a live performance articulated on the concept of multiple simultaneous perception. While the cheese maker Giovanni Di Roma was working to produce a Caciocavallo shape, Tana Sprague played background sound captured during her visit in the historical center of Calitri village at the Di Cecca & Di Roma's Caciocavallo cheese cave ("Grotte dei Formaggi"), which is a tuff cave where Caciocavallo shapes are aged. In such an ancient place, where formerly farmers lived together with pack animals, different devices have been recently installed in order to monitor the microclimate according different parameters (temperature, dampness, oxygen, carbon dioxide, ammonia, breeze speed) that let us know about maturing process.

In the last project "Foodjob: frequencies to dissolve under the tongue", the sound designer Enrico Ascoli and the local cook Pompeo Limongiello introduced the festival audience to the delicious tasting of sounds extrapolated and mixed live from the sizzle of codfish, a typical plate that has an important tradition in Irpinia, because it's one among the few types of fish which can be preserved for a quite long time. The performance was divided on different synaesthetic levels (taste, smell, tough, sight, hearing) based on a real time recording with panoramic and piezoelectric microphones of resonances captured during food preparation.

Finally, the artists involved in the Click'n'Food project are asked to live together for few days, in order to experience the preparation of a foreign experience that underline social and aesthetic aspect of it. They will eventually re-interpret processes acquired during this experience either in live and studios performances. The idea behind the Click'n'Food is to transform the elements that characterise the rural and peripheral region of Irpinia - where ancient roots of food culture are tightly intertwined with the territory and its local culture - in a fascinating mixture of imaginative narrative of tradition and pure aesthetic fun.

As Alessandro Ludovico writes, "How many other festival crews are able to organise such events overstimulating your senses, with free local fresh and delicious food (the caciocavalli cooking and tasting live session was a hit) coupled with new audio/visual interpretations? The intertwining of local specific culture and natural roots with the infinite narrative possibilities of electronic has been once again been exploited in this beautiful and peripheral land." [7]

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VISUALIZING NEW MEDIA ART IN CENTRAL EASTERN EUROPE

Agnieszka Pokrywka

Numerous amounts of facts connected with new media art in the territory of Central Eastern Europe go unused because of the inability to see relationships between different kinds of information. To face this issue the idea of CEEMAC2000+ has emerged. This paper briefly discusses the basic terms needed to understand the new media art situation in the region as well as presenting the possibilities for CEEMAC2000+ development.
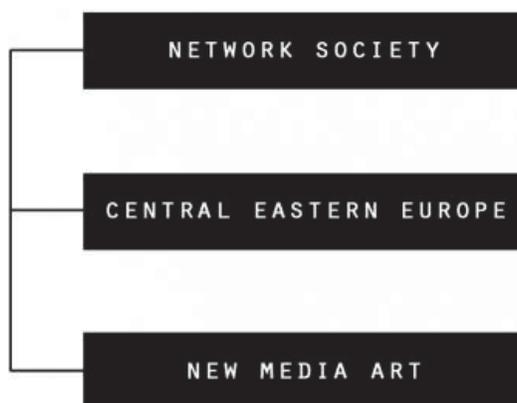
Fig. 1. Possible connections between three main terms described in section 2. Image by Agnieszka Pokrywka.
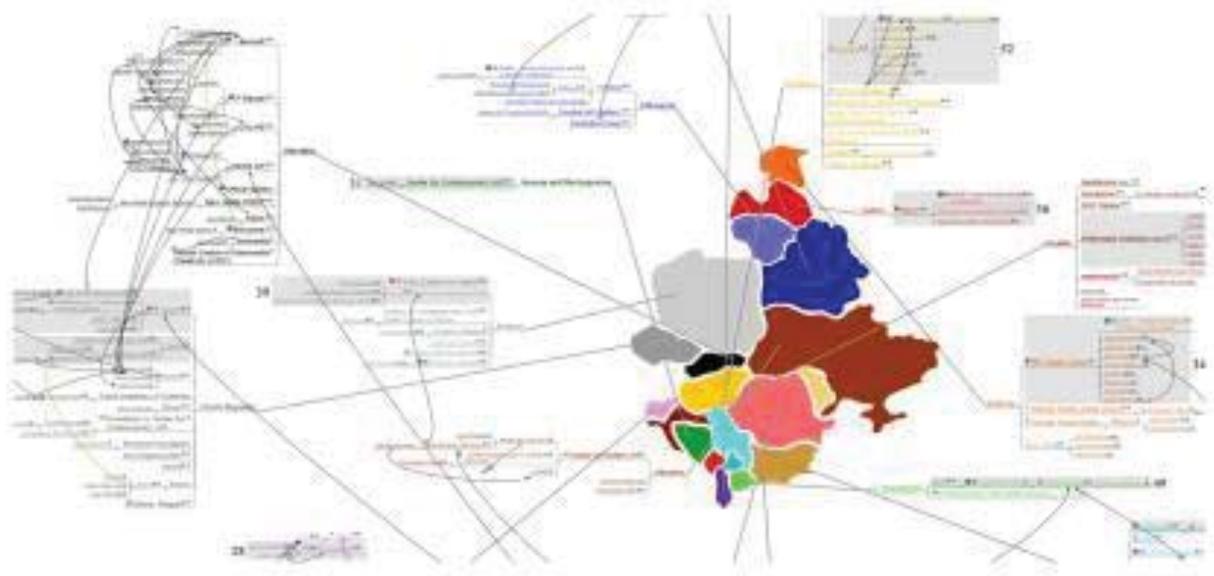
Fig. 2. Sketch of CEEMAC2000+. Image by Agnieszka Pokrywka.

1. Introduction

Central Eastern Europe (CEE) has for a long time been hidden behind the Iron Curtain in many aspects and is still an undiscovered hybrid built out of the past and present. Similarly, local new media art (NMA) is a tangle of historical and political dependencies mixed with current global influences (e.g. networked society, high technologies). In addition, the very dynamic specificity of this region blurs a wider view of CEE and NMA activities. As a result, considerable amounts of data and facts connected with this topic are unused simply because people cannot see any relation between them or visualize their quantities. The concept of CEEMAC2000+: Central East European Media Art Chart (2000-now) is intended to be a collaborative interactive map which could be able to present most of the networks, dependencies, connections between art centers, projects, and people which focus on local NMA development. CEEMAC2000+ aims to collect, share, and present large amounts of data in a non-linear, clear and visually attractive way, simply to create new artistic cartography.

The paper is structured in the following way. Section 2 briefly presents emerging terms such as CEE, network society, and NMA. Section 3 gives examples of how these terms can be merged. Section 4 focuses on data visualization and its use in the context of CEEMAC2000+.

2. New Europe, new society, new media

The first step of the CEEMAC2000+ project development is to explore stereotypical terms like CEE and NMA with a special focus on the history of CEE (Soviet times) and its current situation (network society, technological development).

2.1. CENTRAL EASTERN EUROPE

Norman Davies [4] states that borders between Western and Eastern Europe were changing a lot. However, the territory on which these bounds were moving did not belong to any of the aforementioned parts. Because of this, terms such as CEE have appeared. According to Piotr Piotrowski [10] Central Eastern Europe is a territory which from the late '40s up until 1989 was dominated by the Union of Soviet Socialist Republics (USRR). Nowadays, countries of this region (Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Montenegro, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova , Poland, Romania, Serbia, Slovakia, Slovenia, and Ukraine) are located between the so-called Western countries (Germany, Austria, Italy) and Russia.

2.2. NETWORK SOCIETY

According to Manuel Castells, [3] a network is a decentralized matrix of nodes through which communication can occur with a multidirectional freedom and which is not restricted by time or space. A common feature of all networks is the synchronization of each part and the simultaneous independence of every single node. These nodes have different levels of development and infrastructure which depends on the political and economic situation of the region in which they are located. The level of nodes development determines the whole network. Networks establish the new social order of current societies. This is caused by passing from the industrial age into the information age, and from energy to information. Castells sees the information technology revolution as one of the processes which leads to the production of new social morphology within a society.

2.3. NEW MEDIA ART

Marshall McLuchan [7] understands the medium as the message itself, which can create a new environment simply through its presence. To describe this idea he uses the metaphor of a light bulb which does not have any content but which certainly has a social effect and enables people to extend their daytime activities into the nighttime. Art creativity, which is based on media, can be explained as an art form which makes use of facilities such as electronic equipment, computing, and new communication technologies. As Louise Poissant [10] states, technology and its various processes are often used in experimental ways to produce different works of art. Additionally, Lev Manovich [8] explains that today's new media interpretation can be understood as the mix between older and newer cultural conventions for data representation, access, and manipulation. Here, the old data means a representation of visual reality and human experience, and often an understanding of culture. The new data is understood as numerical data.

3. New Europe + New Society + New Media

There is strong dependence and fusion between three terms mentioned in section 2. The most prominent of these terms are discussed below.

3.1. NETWORK SOCIETY IN CEE

Development of network society, where the key social structures and activities are organized around electronically processed information networks, is deeply connected with technological advancement which is lower in CEE (according to Digital Opportunity Index in Europe, 2006). Moreover, Manuel Castells [3] claims that it is not just technology which defines modern societies, but also cultural, economic, and political factors which make up the network society. Therefore, it is necessary to reflect on the network society in the context of its nodes' location which are in mutual relation.

3.2. NMA IN CEE

Net art, as one of the branches of NMA, has been strongly influenced by a context of cultural crisis in CEE at the beginning of the '90s. After experiencing separation and underground movements for some time, CEE net artists were able to notice that the Internet "a space where you can buy is a space where you can steal, but also where you can distribute." [5] Another example of dependency of new media artists on their location is the fact that tools which are needed for NMA creativity are mostly results of technological development, which is on a much higher level in so-called Western countries. It can mean that the specificity (or even existence) of NMA differs according to location, although recently these differences have seemed to become smaller.

3.3. NMA AND NETWORK SOCIETY

Upgrowth of network society is influenced by technological advancement. This means that underdeveloped regions with limited access to new technologies are simultaneously on margins of networked society. As Manuel Castells states: "If you are not in this space of electronic communication, you do not

exist, in our society" [1]. Moreover, reduced access to technology both limits creative possibilities of new media artists and makes it more difficult to promote their works on a larger scale.

4. Data Visualization

The second step of CEEMAC2000+ project development is to thoroughly research data visualization. This can help to improve classification and understanding of large quantities of different data connected with NMA on the specific territory.

4.1. CEEMAC2000+ CONCEPT

CEEMAC2000+, networked graphs visualization, aims to record the relations between artists, curators, projects, events, and organizations which shape NMA in CEE. Time based dynamic topology of creative collaborations as well as patterns of contributors are planned to be freely-accessible and regularly up-datable by the community of users. An interactive interface for navigating and exploring the network of artistic collaborations is embedded in the CEEMAC2000+ dataset and can bring benefits for both NMA creators (possibility of more aware collaboration) and its researchers (access to knowledge about particular nodes and their position within the larger network). CEEMAC2000+ wants to deliver new interfaces for flexible interaction with collected datasets and productive collaboration across borders.

4.2. CEEMAC2000+ REALIZATION

The main purpose of data visualization is to communicate information clearly and effectively by graphical means. Ideas can be communicated effectively thanks to a balance between aesthetics and intuitive functionality. Moreover, understanding leads to interacting which can help with the development of new media based art on this territory. According to Ben Fry [6] there are seven stages of data visualizing which can be found useful during CEEMAC2000+ implementation.

- Acquiring: obtaining the data.
- Parsing: providing some structure for the meaning of the data, and arranging the data into categories. Basic categories and subcategories are planned to be structured in the following way: people (artists, curators), events (projects, single events, cyclical events), organizations (media labs, centers, museums, galleries).
- Filtering: removing all but the data of interest. Network graphs can become confusing if there is a substantial growth in the amount of data. Because of this, CEEMAC2000+ omits events which took place before year 2000. Obviously only territory of CEE is in the scope of CEEMAC2000+ interest.
- Mining: applying methods from statistics or data mining as a way to discern patterns or placing the data in a mathematical context.
- Representing: choosing proper visual modes.
- Refining: improving the basic representation to make it clearer and more visually engaging.
- Interacting: adding methods to manipulate the data or to control what features are visible.

5. Summary

NMA in CEE is dynamic and changeable. This is why CEEMAC2000+ can be helpful in understanding the specificity and tendencies in the field. NMA creators, thanks to CEEMAC2000+, gain unique opportunities to have an overview of the movement of which they are a part. In the case of NMA researchers CEEMAC2000+ delivers new ways of documenting artistic activities, story-telling, and knowledge formation.

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DIGITAL ART AND CULTURE AFTER INDUSTRY? – TOWARDS AESTHETIC BUSINESS STUDIES

Søren Pold & Christian Ulrik Andersen

The article discusses art's potential to critically probe new media economies and sometimes even develop new economies. With references to theoretical concepts from early marxist art theory it focuses on digital art, where the production, distribution, showing and selling has become part of the artistic work. The main example is *Electroboutique*(Chernyshev, Shulgin et al.), a series of works that address the current value of critical art.

Fig. 1. The exterior of the Electroboutique by Chernyshev & Shulgin, Trondheim, Norway, 2009.

Fig. 2. Commercial Protest (from Electroboutique by Chernyshev & Shulgin): A viewer sees her own portrait as a mosaic made out of transnational company logos.

Fig. 3. wowPod (from Electroboutique by Chernyshev & Shulgin): a huge distorted but still functioning iPod.

Digital Art and Culture After Industry? – Towards Aesthetic Business Studies

Who dominates in this country without morals, without faith, without any feeling; and from where do all feelings, all beliefs and all manners come, and where do they end? Gold and pleasure. Take these two words as guiding lights and travel through this great plaster cage, this beehive of black streams, and follow the serpents of this thought that agitates and lifts the work. You see. Examine first the world that has nothing. (Honoré de Balzac, *La Comédie humaine, Scènes de la vie parisienne*)

We live in a so-called 'new economy' and this is nothing new. New economies have emerged, boomed and crashed several times. Art and culture have played prominent roles in such new economies, from the 1880's panoramania to the various new media crazes during the last 30 years. Art often serves as the backdrop to champagne soirées and helps the nouveau riche establish themselves and gain some cultural capital during economic boom periods. In many instances this leads to a rather traditional, mainstream and sometimes even pre-modern view on aesthetics, far from the ruptures of contemporary art and aesthetics. A central example would be the concept of experience economy that Joseph Pine II and James H. Gilmore launched in the late 1990s. [1] If one looks at Pine and Gilmore's concept of aesthetics it borders on the escapist and is characterized by immersion and passive participation. Their principal guidelines are "Theme the experience", "Harmonize impressions with positive cues" and "Eliminate negative cues", and their primary examples are Disneyland, Las Vegas and the Hard Rock Café. [2]

However, art's most valuable contribution is perhaps not the icing on the cake or the aesthetic harmonizing of contradictions, but exactly the opposite: the ruptures, disruptions, clashes and breakdowns – all the ways that contemporary art explores things, situations and constellations that break apart, contain paradoxes or contradictions in relation to business. In many ways this seems to be the drive when "avant-garde becomes software," [3] net-art becomes web design or software art invades the app store. Instead of arguing that art might be a means to serve economic ends, we should ask whether the economy could potentially become artistic in some way.

Actually, we see traces of this already happening. When a cultural content industry, such as the music industry, is in crisis and its business model is deteriorating because of dwindling CD sales, competition from easy web-based distribution and copying, then both new and major acts bypass the industry by carrying out the marketing and distribution themselves, using the web and social networks. Instead of an industry of major record labels handling the relationship between artists and audiences, this becomes part of the artistic work defying industrial standards and forming less standardized and industrialized relations between artists and audiences. In fact, the business model, including how to finance, market, distribute and profit from the content, becomes part of the artwork and it becomes part of the artistic statement to question common models. This is of course helped by lowering production costs, easy networked distribution, new relations between artist/author and audience/consumers mediated by more flexible, dynamic or situational artworks. These new relations between artists and audiences are also indicated by diverse but related concepts such as "relational aesthetics," [4] the "craft consumer," [5] Free Software production and Free Culture including a culture of modification and remix. [6]

AESTHETIC BUSINESS STUDIES

Consequently, it becomes evident that art's relation to the market and economy is part of the artistic development and innovation, but this also means that art becomes 'about' the economy in a more direct way. How should we interpret this, how do we learn from it, and how do we develop aesthetic business studies?

In order to look into this, we first need to introduce a few theoretical concepts from early marxist art theory, because here we can find positions that discuss how art can potentially play a critical, constructive, progressive, if not revolutionary, role. In the 1930s materialist art theoreticians such as Georg Lukács and Walter Benjamin were discussing how the change in the base, or "Unterbau", of reproduction technologies affected the superstructure, or "Überbau", of culture, economy and thinking, and how art could respond to this. A prime example is Georg Lukács' reading of Honoré de Balzac's *Illusions perdues*, which he sees as a novel about how literature becomes part of a capitalistic production process, and he discusses how this becomes a theme in terms of both form and content in the novel. The novel explores relations between developments in printing technology (personified by the printer and inventor David Séchard), book trade and the failure of romantic poetry (personified by the main character, the failed poet Lucien de Rubempré). As such, it is a novel about the commodification of literature and the capitalization of the mind ("Geist"). It is, however, not just a product of this, but rather a media-realistic, disillusioned although clear-sighted, literary exploration demonstrating relations between the base, the superstructure and literary strategies in this changing economy; and it does this through the literary form of the novel (e.g. the portrayal of the main characters, the use of melodrama, etc.). It is an example of a conscious exploration of a new discourse economy, exploring how material changes influence the formal conditions of the artwork. [7] The main character and poet, Lucien de Rubempré, becomes disillusioned, but the novel develops a view on the literary market and contemporary society through its development of an alternative formal, novelistic language.

With his concept of "Tendenz" (tendency) Benjamin also argues for a formal relationship between art and the production process in a way that might help elucidate how art can function as a probe for investigating change. Technological revolutions in media lead to fractures in artworks and art history, making the deep "Tendenz" visible. [8] In this way, the normally hidden, deeply layered fractures, constellations or contradictions become observable if probed by art. Furthermore, while constructing a marxist dialectic view on art history, Benjamin is clearly not interested in 'politically correct' literature and art:

...rather than asking, 'What is the attitude of a work *to* the relations of production of its time?' I would like to ask, 'What is its position *in* them?' This question directly concerns the function the work has within the literary relations of production of its time. It is concerned, in other words, directly with the literary *technique* of works. [9]

In continuation of these arguments by Lukács and Benjamin it is important that art is not created uncritically on the premises of media and economy but that it seeks a conscious, reflective and critical exploration, and this has of course become even more relevant with the rising importance of media. How the production process and market relations are positioned *in* the work is what to look for, rather than the work's attitude to the market and media. Contrary to the view on art and aesthetics promoted by Pine and Gilmore, we should look for art which focuses on the fractures that reveal deeper tendencies (Tendenz) when carrying out aesthetic business studies. Or, in other words, as suggested by the initial quotation from Balzac, follow the money; if not to collect it, then to see which new routes it takes and to observe the creatures and creations it passes by.

ELECTROBOUTIQUE

Let us start our aesthetic business studies and look briefly at some relevant art. Under the concepts "Media Art 2.0" and "Electroboutique" a group of artists, including Aristarkh Chernyshev and Alexei Shulgin, have made a series of artworks – each produced in a "limited number of copies (like Ferrari)" and sold "at affordable prices (like Sony)" – which they show and sell at galleries, festivals, museums and on-line, often installed in a shop-like environment. [10] The intention of the project is to create opportunities for new media art in galleries and museums, which have often neglected it because of technical difficulties and its immaterial character, making it difficult to exhibit and sell. Furthermore, many of the *Electroboutique* works also perform a humorous and poignant criticism of the (art) market and the relation between art and design.

One of these pieces, *Commercial Protest*, which is a flat screen TV equipped with a live camera contained in a shopping cart, showing the captured images – e.g. images of the viewer – as company logos, is introduced in this way:

It is difficult to protest these days against capitalism, especially if you are a member of capitalist society and enjoy all its benefits. Any convincing form of protest very soon gets appropriated by the system and starts being used for its sake: in politics, in advertisement, in design, etc. But we want to protest! – and offer the new, realistic form: *Commercial Protest*. We protest in the form of a critical but/and commercially suitable artwork. *Commercial Protest* reveals the essence of modern people; – it shows what we are all made of. A viewer sees her own portrait as a mosaics made out of transnational companies logos (variant: consumer goods). These images are globally recognizable and constitute the visual language of today. The supermarket cart that contains the TV set emphasizes the ugliness of the ultimately consumerist world. We protest against such state of things with this piece and set a fair price on it. [11]

It is obvious that this is a criticism of consumerism, which is paradoxically packaged as a nice, fairly-priced art object for galleries and collectors who can see themselves as live logo portraits. The irony is, of course, an integral part of the artwork, where the artist realizes that "criticism in art becomes an aesthetic category and eventually acquires itself the features of a consumer project," [12] and, as such, critical art becomes a brand in the art market. However, it is not only ironic but also a comment on a situa-

tion where software art is not accepted by the large institutions that still need objects, though the experimental and experiential dimensions of software have become an important part of the market, e.g. in smartphone app stores. Much commercial design is driven by innovations in art: however, artists often do not get a share of the revenue, especially in the copy-paste culture of new media. With this in mind, *Electroboutique*openly copies concepts from not only art history, including Russian Constructivism, and media art in the tradition of Nam June Paik or Jenny Holzer, but also from design icons, and relaunches them as new artworks – a good example being the huge distorted but still functioning iPod, *wowPod*, or the various distorted television remakes.

In short, we will point to the following tendencies guided by *Electroboutique*:

- The recuperation of critical art by design and the market, which *Electroboutique* answers by recuperating commercial aesthetics and rhetoric. This is done in a sincere, manifest and, to some extent, successful attempt to sell art and make a living, which is again creating some provocation in the new media art ghetto – e.g. when it was presented at the transmediale festival, Berlin, 2008. Recuperation is not new, neither in art nor design, but *Electroboutique* highlights its way of working by using it artistically and by recuperating design in media art for sale.
- Fractures between the immaterial and the object or between software and hardware in the art market and in the general economy – in this case, handled and highlighted by constructing object-based software art. This both mimics the more traditional contemporary art world alienated by new media art, such as net-art and software art, and alienates parts of the new media art scene; though more former net-artists are following the same route (cf. e.g. the attempt to enter new media art into the contemporary art scene of the Brussels art fair with the exhibition *Holy Fire*). [13] It is hardware-based art building on insights from software art, especially around the visual culture of interfaces, as stated in one of the manifestos: "We live in a world of visual interfaces. Televisions, print advertisements, politics, shop-windows, show-business, internet services, bank systems are primarily interfaces whose task is to shape the process of information transfer and the translation of ideas. Working with visual interfaces, we make them visible and tangible. We uncover the structures of today's world." [14] As such, *Electroboutique* smuggles software art into the art world disguised as artistic objects.

Of course many other examples could be made pointing towards these and more contemporary tendencies, but we hope you get the general idea: art has the potential to simultaneously question and develop the economy. There is a straight line from *wowPod*to iPad, and to the future of sculptured and visually attractive entertainment centres from Apple that will replace our TVs and hi-fis, or from *Commercial Protest* to the narcissistic self-promotion through one's iPhone and the many branded platforms on Web2.0 (just start watching how portraits mix with brands and logos on an average Facebook page…). As Piero Manzoni has already demonstrated with his Merda d'Artista in 1961, which was 30 cans of artist's shit sold at the equivalent price of gold, the artist is the modern day alchemist making artificial gold. However, the smell of it, or its non-existent traditional use value, also casts a critical light on the virtual foundation of our money-based capitalistic economy. The main point is to focus on how art develops an artistic economy, and thereby reflects critically on the current economy while developing alternatives. As Shulgin himself puts it: "Contemporary art has got one more function. It finds out the possible borders of consuming." [15]

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THE BIG BANG OF ELECTRONIC ART: MERGING ABSTRACTION AND REPRESENTATION IN THE AGE OF DIGITAL IMAGING

ANAT POLLACK

In the society of the spectacle, the art of the mass media changes the Modern relationship between art and its audience. The art resides in the shaping of this unseen, diffuse spectatorship where the medium is the masses. Co-opted imagery in massmedia challenges the meaning of Abstraction & Representation. Artists who appropriate and decontextualize mass media images from consumptive value to the sublime is a form of utopian remediation.

"objet petit" #2 & #3. Diptych by Anat Pollack 2010

In the society of the spectacle, the art of the mass media changes the Modern relationship between art and its audience. The art resides in the shaping of this unseen, diffuse spectatorship where the medium is the masses. In mass media, context transmutes image from scopic to semiotic. The onslaught of media-images sublimates the image to the message, and renders it meaningless. In my work, I transmute semiotic to scopic.

In the "objet petit a" series, digitally modified images taken from television commercials shift the meaning of classical notions of Abstraction and Representation: the definitions of which are fungible within this context. Ads sell an abstraction: desire, fear, and or an idea, but not concrete matter. In the ads that I use, that which is represented, that is, the supporting signs and signifiers used to sell something are, at best, indirectly tied to the generic product at hand. They represent an idea, not the image represented, or even the product being sold. The connection is tied as a consequence of the context- nothing more.

This paper brings attention to my process of employing the appropriation, compression, and decontextualization of mass media imagery. The "objet petit a" series is comprised of digitally layered images that result in the erasure of an idea or commodity, taken out of context from what a TV viewing audience would consider normalized and concrete. I re-appropriate the signs and signifiers that were co-opted by advertisers to sell predictable and normalized commodities to an original state of sublime beauty.

Information systems within the context of capitalism, or, as Fredric Jameson calls "millionairism" has resulted in the normalization and commodification of all components of life. This has created great confusion regarding the very nature of our existence, destabilizing our perceptions of self, body, desire, and the social.

My artwork encourages interaction, offering the opportunity to engage thought, and a space for the individual to check and consider conditioned responses: like trauma. While automatic response and recognition is necessary for advanced thinking and rapid placement of information moment by moment, it also leads to automata – mindless, thoughtless behavior.

The ever-heightened velocity of images and ideas presented to us by mass media discourages analysis and promotes amnesia. The pleasure reflexes gleefully consume data like sugary soda pop. Memory doesn't fail- it is merely unnecessary. I use signs outside of their trusted, codified systems, devoid of time, stripped of context, and re-present nothing but what is in the image. Frozen video stills of blurred landscapes forces at the very least interpretation and analysis, and at the most, pure experience. For some, to experience the Real is an experience of the sublime, through a momentary revelation of the immense power of the natural world or of the divine.

The blurred image is as desirable and untouchable as the ad. And yet, unlike advertising, which render us always incomplete, this traumatic experience of an encounter with the sublime distances the individual from their habituated modes of perception and response.

Using the familiar is meant to create an oscillation between the habitual and the existential. By using the language of a purely contemporary experience, in this case, exploited data that has been created for entertainment, for supporting market capitalism and fear in television ads, I hope to refer the audience back to their own experiences, to disrupt it, to "expose it; … [that I] might reveal its automatism, even its autism" (Hal Foster, Return of the Real), and to offer a space for conscious action and choice. The experience of an encounter with beauty thus reveals the flattening of the human soul caused by exposure to mass media.

It is here I wish to create a space for the audience to come in contact with themselves, to feel themselves *experiencing* and room to reflect on their conditioned responses. Codified media images are sublimated to market whims, and create a self-loathing rooted in existential malaise. My work aims to strip the images of their consumptive value in order to offer new experiences that will contribute to new ways of seeing oneself. The resulting images epitomize the ineffable. An exquisite little object to own called experience. The "objet petit a" series is meant to be a return to the flesh.

As in JMW Turner's famous painting Snow Storm: Steam Boat off a Harbour's Mouth, 1844 (coll: Tate Modern) where the only sign of Modernity is blurred and thus reveals the luminous brilliance of Nature, contemporary artists resist cultural amnesia and objectification through deliberate attempts to fight the

inversion of the human spirit. This process is one of utopian remediation towards memory instead of cultural amnesia and the objectification of the human to presence within the flesh. The space provided by these contemporary artworks redeem the soul and offer a transcendent experience of the sublime.

The collapse of time, space, and matter has been a desire of scientists and inventors for centuries. The time machine, transcendental mediation, and metaphysics, are all means of escaping the corporeal, the gravitational pull of the earth, and a freedom to exist in/on new planes of consciousness. In Buddhist practice, there is a constant move in the direction of experiencing the Real, to let go of earthly attachments, to let the pain in and to let it flow through, rather than being pushed out. For some, to experience the Real is an experience of the sublime, through a momentary revelation of the immense power of the natural world or of the divine. Through art, I seek to create a space for reflection, and an opportunity both for the audience to leave their bodies and to return changed. All images end at the flesh.

OPERA & THE CULT OF THE DJ

Justine Poplin

Video as projected light form can 'be' the Diva and take on its own physical presence. By using projection as a vehicle artists can initiate an alternate dialogue by creating a screen or screens that are physical in presence and through this physicality take on their own psychological space.

Fig. 1. Swimming in Foreign Places, 2000, Justine Poplin, Video Installation: custom made screen: cotton & pvc 1m × 1m Melbourne Australia © 2011 Justine Poplin.

Fig. 2. Habitat: Being the Alien, 2006, Justine Poplin, Video Installation: custom made screen: Perspex 152cm x 160cm x 2cm Beijing China © 2011 Justine Poplin.

The title of this paper 'Opera & the Cult of the DJ' was chosen to initiate a dialogue and to question the place of Opera in today's culture. The word opera in Latin simply means 'a work'. So, what is opera in the 21st century when opera is the amalgamation of all arts and supposedly a reflection of the times? It could be stated that the DJ or VJ for example is the contemporary New Media Diva. Michael Rush points out, that Bill Viola's video works are "explorations of light and form, matched by his interest in spiritual source material." [1] Video as projected light form can 'be' the Diva and take on its own physical presence if used in an extraditional way. There are several Artists that will be discussed throughout this

paper that are making work that embodies a physicality in video projection, later I will discuss how video's physical presence became one of the driving forces of inquiry in my own work.

Artists working in the field of video art and new media have at times limited the creative outputs of their work exhibited in the gallery or public space by the notion of 'the screen'. The screen I am speaking of is generally rectangular in shape within the interface of a computer screen; or majestically projected onto flat, uninspiring surfaces boasting an aspect ratio of 4:3. There are however; other possibilities that artists have explored to create 'physicality' in projection, which extends preconceived notions of screen-based culture. Video projection can engage in creative strategies that push boundaries that extend the message of the medium. The patron saint of the digital age (Wolf, 1996) Marshall Mcluhan theorised that media is an extension of the human body. "Just as clothing is an extension of the skin, the axe is an extension of the hand, and the car is an extension of the foot, the media are extensions of the mind." [2] An example of this is Australian artist Stelarc he has taken Mcluhan's theory on literally in his own work where he digitally and/or mechanically extends the human body. We can re-contextualise 'the media' to assume the position of media/medium/new media/ video.

Video art and the New Media discipline have evolved significantly since Nam Jun Paik's shooting of the Papal visit to New York with a Sony Portapak in 1965. The seminal action of showing a slice of life in a public space by an artist created what we now call Video Art. "As collage technique replaced oil paint, so the cathode-ray tube will replace the canvas." [3] Paik became the first spokesman for video art and re-conceptualised the use of television as a medium by spiritualising and sculpting with the monitor. His work explored Fluxus ideas and the cinematic avant-garde that were new to the audience of the time. However, it wasn't until video projection was available and accessible to the artist, which in turn extended the possibilities of video to create a physical presence with video projection. "Video installation Artists are producing environments as itineraries, places to start thinking about art and life, rather than giving us maps that indicate where all the answers are." [4] Video installation can be an environment where the screen is in the centre of the room and the audience/viewer can freely roam and not have to view from a fixed position. Video installation with the use of projection creates a physical form in the exhibition space or installed environment. By using projection as a vehicle artists can initiate an alternate dialogue by creating a screen or screens that are physical in presence and through this physicality take on their own psychological space. This physical presence is illustrated in most of Tony Oursler's work and his video installation 'Influence Machine' 2006 is one example. Oursler projects video onto smoke from a smoke machine; the viewer can freely circumnavigate the work in its holographic–like, free-form state, illuminating video's post-human presence through projection. Oursler's "general theme was to mimetic technology, that is, technology that could be perceived as a direct extension of psychological states." [5] In video work such as this created from projecting pixels onto surfaces that are free-standing take video out of its rigid realm into the transcendental and phantasmagorical.

My interest in extending the possibilities of the projection screen began in my first year at university. At that time I was constructing screens or boxes that were freestanding and would sit or suspend. These were made from heavy gauge fishing line and cling film/wrap. I then projected onto and through these assemblages and the projected light would penetrate the installation and dimly leap onto the nearest wall. This was in 1991 when we were still using linear editing techniques and back projection screens were something quite magical. I then moved on to construct screens that still resembled a similar aspect ratio to a standard monitor but had them hanging or suspended in the gallery or public space. The audience again could choose a viewing point, as there weren't any seats or a bench to sit down on like what are offered in many galleries. I made several works from 1999 – 2006 that worked with these principles. It has taken many years to reach this point as the practice and passion of 'being' an artist has worn thin

on my post 30 approaching 40 year old bones. I trained as a singer from 12 – 22 years of age and was on the path to becoming an opera singer. However, when it was time to choose a university and to plan the next decade or so I chose art instead of music. I entered art school on my painting merit and embraced foundation year with the sheer choice of courses and experimented with photography, film, sound and video. I continued to pursue a connection and my Masters examined Multimedia and the Operatic Form. This led me to explore concepts of the voice and performance as realised through new technologies and cross-disciplinary means of presentation. Most of my work alludes to 'physicality' in projection, which extends preconceived notions of screen-based culture. A selection of work from this period will be discussed; the first two pieces Shower Songs and LaLaLa are traditional screen-based work. Swimming in Foreign Places, My Beautiful Laundrette, Vox Pop Environ and Habitat/Being the Alien are work that embody Opera and the Cult of the DJ and extend projection possibilities.

Futurist performance artist Marinetti showed his work 'Feet' in 1915. "To compress into a few minutes, into a few words and gestures, innumerable situations, sensibilities, ideas, sensations, facts and symbols." [6] Marinetti's work inspired the video installation 'Cropped'. Two custom made screens hang in the centre of the gallery space. Performers are shot from the waist down in bars, cafes and other public/private spaces. Cropped surveils the body language that takes place under the table. The placement of the projection screen was crucial to the work. A perspective that was normally reserved for under the table was now subverted to eye level. The screens were suspended in the centre of the space, so that projection could be seen from 360 degrees angles extending projection physicality in the space.

There are many artists that use song in their video work. Is this then the opera of our generation? When the word opera is used it often conjures up images of overtly theatrical stocky men and women gesticulating wildly and extending their voices with trained prowess. The use of voice and song as an art form has been used in the avant-garde performance work of Meredith Monk; John Cage, Laurie Anderson and most recently with Turner Prize recipient Susan Philipsz in 2010. These artists used techniques such as vocal extension, amplification and sound recording to create song and sound that crossed genre. This cross over became quite popular in Australia in the late 90's early 2000 with Artists such as Philip Brophy who in his sardonic satirical critique says, "An artist using a pop song in video art is like anyone either enrolling in a DJ course or wearing an iPod in public: Tragic." [7] Brophy's combination of buzz words; song, video, Dj and iPod all in one sentence have a resonance and cadence, as these elements are a prevalent reflection of art and culture today. Artists can work with these contemporary elements to transcend the 'tragic' to become more engaging by harnessing this cross-fertilisation of genres and extending projection possibilities.

American artist Robert Whitman's work 'Shower' 1964 is one of the earliest examples of the shift away from the cinematic experience of film and into projection possibilities in projection in installation. It was only after I made the work Shower Songs that I found Whitman's work. Shower Songs is an Audio Visual Environment that was created for 1st Floor Gallery in Fitzroy Melbourne, sound recording by Jennifer Sochackyj. In this work, video was projected onto the gallery wall. The position of the projection was on the inner corner of the wall wrapping the 90-degree angle. This work demystified the singer having them tangible and in a familiar space. The bathroom is usually a scene of intimacy and exposure of fragrant wet white lathers, of glass, ceramic, curtain, Hitchcock and song. The viewer is taken into a steamy, aural, visual environment where several people sing and bathe. Is it erotica, routine, love-scene, post-coital wash-down or recitative?

La la la is a screen-based work that explores voice and presentation. What is good pitch, tone and timbre when they can be digitally altered? What is a good voice? In an overexposed room flooded with light 9

performers sit in front of the camera one by one and repeat a sequence of 3 notes, that are played to them on an analogue Dictaphone, an aural examination of the recognition of time and pitch. A screen test. Each shot is a tightly framed over-exposed headshot. The close-up composition was used to create tension and to put the viewer in the place of the singer. Ultimately each singer's 3 notes la la la were edited audio visually constructing a composition that lasted for as long as the average pop song 2'33.

Swimming in Foreign Places was a site-specific work curated by Camilla Hannan and Nat Bates (Liquid Architecture). There were two sound artists Hannan and Bates and two video artists Van Sowervine and myself. The couplings were to perform a live surround sound mix to pre-recorded video. At the time I was reading a lot about Bauhaus and Dada performance and came across László Moholy-Nagy "Nothing stands in the way of making use of complex APPARATUS such as film, automobile, elevator, airplane, and other machinery, as well as optical instruments reflecting equipment, and so on. It is time to produce a kind of stage activity which will no longer permit the masses to be silent spectators, which will not only excite them inwardly but will let them take hold an participate—actually allow them to fuse with the action on the stage at the peak of cathartic ecstasy." [8] Laszlo inspired the work I created for Swimming in Foreign Places. I custom-made a circular screen that hung in a tree like a strange fruit. The projection started with a gradual ripening of colours from green to earthy browns this being used as a metaphor for a fruit ripening on a tree. After several deaths of fruit a tightly cropped singer's headshot appeared. The head (the artist) was hanging in the tree singing a song without melody. This was layered with sur/subtitles taking us into a place not many of us have been. The lyrics projected were from Abel Meeropol's 1936 poem, which 3 years later became the well-known blues ballad 'Strange Fruit' sung by Billie Holiday.

My Beautiful Laundrette performance installation is a site-specific work. Behind the doors of an after hours laundrette in Melbourne, a piano introduction to a Mozart aria from The Marriage of Figaro is audible. Two whopping speakers spill the melody into the street. The audience assemble outside (the doors are locked). Inside the dimly lit laundrette the diva is plugging in pieces of equipment preparing for the performance. The aria she will sing is from an opera where the character has lost a pin; she has misplaced her stereo jack, and ponders whether the mix is good. She is standing behind a dj booth wearing a powdered wig, mixing herself into the soundtrack with karaoke sur-titles on the custom made screen above her head. The aria ends and other lyrics appear on the screen, another Mozart aria 'Batti Batti', then Kate Bush's 'Hounds of Love', followed by Britney Spears' 'Hit me Baby', all songs are about love, all sung by women and all transcending time when seen in text form. Voltaire once said: "anything too stupid to be said is sung". Seeing the lyrics displayed in this form whether classical or pop amalgamated the texts and made one no higher art form than the other, a blend of genres transcending time.

Vox Pop Environ is another site-specific work that was made for a Melbourne pub's disco room. Manzoni, the artist who is most favourably know for selling shit, sold his bodies of air (artists breath) in the 1960's for 3000 lire and he wasn't a singer. 'Vox Pop Environ' digitally replicates and projects the gestures we use when we sing; the eyes, the mouth, the hands, all vehicles for external physical expression, the mechanisms > the trachea the vocal chords the diaphragm hidden. Multiple projections of operatic gestures were projected onto balloons (the screens) atop slim wooden rods with a plaster base. The singer is now a balloon (a diaphragm) on a stick inflated by artists breath, performing to a pre-recorded soundtrack composed from voice samples, extending vocal performance and projecting a physical performative presence.

I further examined extraditional notions of screen culture and performative presence in 'Habitat/Being the Alien' exploring notions of cultural identity. If you are Australian what exactly does that mean and

what image do you portray to other cultures? In China if you introduce yourself as Australian, most Chinese immediately say "kangaroo" – big rat. The work is a dialogue between the lyric and the visual. I created masks around the standard format of the rectangular workspace in preparation for the projection. The first mask was surrounding the kangaroo this mask was black as black does not project. This gives the screen the illusion of a freestanding kangaroo and in turn initiates a physical presence in the gallery space. The second mask was inside the kangaroos face; here I inserted moving footage of a face speaking, uttering and gesticulating with various marsupialistic facial expressions. The soundtrack created was ambient Australian bush sounds mixed with utterances in Chinese and Mandarin about wanting, waiting, and missing someone or something that give a sense of disconnection, longing and isolation. Songs and the land make us; we are defined by our culture and history. There is a sense of displacement and familiarity, knowledge of being an alien that creates a dialogue between the lyric and the visual.

The work I have discussed was made over a very intense period of time; I was investigating multi media and the operatic form examining the place 'opera' in 20th –Century Art. The work created mostly explored the use of voice in contemporary art whilst simultaneously extending methods of presentation to reach a broader audience. The hybridisation of new media is synonymous with the way we live our lives. There will always be a place for Opera in its historic sense for dramatic deaths and augmented librettos with 15 year-old Japanese girls falling in love with polygamous American sailors. There are also many contemporary Opera companies that John Jenkins and Rainer Linz discussed in their book 'Arias – Recent Australian Music Theatre' 1997 that employ video and new media in their work. However, these still mostly follow pre-existing conventions of opera, such as having Directors, Designers and Composers. To reiterate, the word opera simply means a 'work' and in the current climate of cross fertilisation of art forms this leaves a lot of room for artists to interpret and create works that reflect this. "The concept of the moving, temporal image is a key modality through which artists have articulated new strategies and forms of image making; to understand them, we need to fashion historiographic models and theoretical interpretations that locate the moving image as central in our visual culture." [9] Opera and the cult of the dj is a reflection of the times and work that uses technological devices that extend the possibilities of video installation and its physical and psychological presence in a space. This in turn creates a shift in the expectations of the viewer and preconceived ideas about opera/multi -media and modes of presentation in the 21st-century.

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NEW MEDIA CONTEMPORARY INFORMATION PARADIGMS: THE REORDERED MEMORY ON FILE ARCHIVE STRUCTURES

GABRIELA PREVIDELLO ORTH

New Media contemporary information paradigms, leads the discussions that increase the perceptions about digital art Memory content, highlighting the FILE Archive, under the perspective of intelligent systems. With an Information Science theoretical approach, the study will raise perspectives in using these expert structures, considering the recent goals to develop a new FILE Archive environment.

"(…) the technologic machines of information and communication operate in the core of human subjectivity, not only within their memories and intelligence, but also within their sensibility, affections and unconscious ghosts." [1]

From Information Science point of view, this study on the cultural practices of the contemporaneity incorporates the fluidity of its research object: The electronic and digital art archives, considering here the postmodernity highlights in the information, its constitutions of mediation and access.

In this sense, the digital art information environment works its discursive communities, providing directions for its flow. This flow, which inserts its agents in culture and technology issues mediated by the information device, enables the reflection of these agents in its emancipation instruments. The parameters for this reflection are not individual, but subjective.

Art document intermingles with artwork and artwork becomes a means of art documentation. As well as the contemporary dialogue between men and machine, the memory diachronies rebound on individual and social spheres. The contemporaneity reorders the memory. In this logic, the memory is the future and its present comprises all the histories, emphasizing the randomness of the information flow in contrast with its stable linearity. The examination of this flow through digital Documentation asserts the development of the field through signification routes and provides its contextualization in the technological tools that are absorbed by it.

The digital art archive is manifested as the nature of its works. It has a memory importance, a variety of concepts and a heterogeneity in its exhibition standards which asks for an intelligent system model that operates with several types of media and languages. In today´s archives and Documentation centers of digital electronic art, spaces still not interoperable are being designed and constituted individually as assorted pieces waiting for their whole. This isolated information requires a complex reading of its connections.

Distinguishing the potentiality of the artistic objects, while producing new artworks and communicational flows, is a way of Documentation. The potential elucidates the appropriation of memory and stimulates the generation of knowledge.

In the analysis of electronic and digital art information environments, the complexity concept is present in their Documentation structures. Parameters for information treatment and flow will be addressed under the FILE Festival perspective and will be contextualized in the digital culture memory axle.

The Festival gathers works of aesthetic expression that are diversified in the following areas: artificial life, hypertext, computer animation, games, interactive movies, digital panoramas (360° photos), electronic and robotic art installations, in interactive and immersive rooms. FILE Festival also organizes in each edition the FILE Symposium with several theorists and artists of digital culture presenting their researches and since its last edition, with the creation of the FILE PRIX LUX, it awards best Brazilian and international works registered in electronic and digital art.

The digital electronic art works documentation initiative has been happening since the first event edition (2000) and prioritizes access to the works presented in the Festival through its website. [2] In this web interface, the Festival promotes a fruition environment in digital culture through the navigation in two main search environments: an Archive database and the Hotsites produced annually for each edition of the Festival.

In this environment, connections are available for the conceptual overview of the work, artist's biography, photo and for the work itself, if it is online. This is the interface available for the user through web environment or in digital art centers such as the Oi Futuro space in the city of Rio de Janeiro. [3]

FILE does not own art works of these databases and in order to be exhibited again they have to go through a new negotiation process with their copyright holders, whom may be artists, collectors or research institutions. For an immersion through the categories of works and their contexts, the interfaces available are the websites of the previous editions.

From the documental point of view and for the access of the Festival professionals to the information available, data is organized as a reflection of the exhibitions. The FILE Archive mission is guided under the perspective of audience and works presentation. Information is inserted in system through registration forms that are filled by the authors. In these forms, there is the first (conceptual and technical) information about the work and also about the artist. These forms are a guide during the whole process of trusteeship and organization of the Festival. It is signed by the work copyright holder, allowing the work exhibition in both the festival and the web interface. With the exception of installations, the works are sent through FTP and start to integrate the Festival off-line collection.

From the choice of works until the exhibition opening, the works selected are indexed in a second database that feeds the website, the main interface of audience and researchers with Festival content. Attached to information of databases, Festival documentation consists on technical detailing information sent by the artists that is complemented by email exchanging among artists and Festival coordination crew. The assembling guides, concerning digital art works Documentation, are the core of the work preservation, once they will allow the works to be emulated or recreated in current exhibition conditions in the future, keeping the original conceptual and technical parameters of the works.

On Documentation context, photos and videos registering Festival editions are also filed, as well as catalogs and media clippings of the event, with part of equipment and all production and management documentation of the event filed separately. The theoretical contextualization that inserts the works in digital scope culture occurs through the documentation of articles presented at the Festival Symposium and articles electronically published in the event magazine, as well as books that are launched in each edition of the Festival.

It is important to highlight that FILE Archive has been structured on the Festival exhibitions.

Considering the described informational environment of FILE Festival, the information flow privileges the complex body of works annually registered, comprising the inherent heterogeneity of culture production in the electronic and digital information environment. The documents were selected in an organic and decentralized way, keeping above all, the relation between information, and perception of their totality.

In this moment, FILE Archive is an instrument for curators and also promotes FILE Festival. It also intends to serve as a research information instrument and for that it is focused on its own collection through documentation practicing view, prioritizing cultural contextualization and dynamically monitoring the information flow, which nowadays has intense circulation.

This documentation apparatus tends to become more dynamic and instable. Working with its structures and boundaries demands some contact with the perennial and some dexterity by dealing with the rhizomatic axle that is present in these environments.

These environments are made of interactivity, constant updating of their means and replica potentials of their content, being presented as possible transition systems for the future intelligent network machines. This is not about eliminating all linear documentation, but to build one more layer of informational axle, stimulating the production of memory instruments and interacting in the knowledge sphere provided by Art.

File Archive environment will focus on information transmission and in the potentiality of its objects, absorbing a nonlinear indexation, thus allowing users to become independent on their readings and representations of subjectivity through an interactive relation with the environment. For non-expert interlocutors, the intelligent automation of information flow offers a large amount of entries and possibilities of appropriation of its content.

In general, FILE Archive works nowadays on some guidelines such as: physical treatment of the artistic object and its digital support, expansion of information organizational tools (Topic Maps, Ontology, Controlled Vocabulary), creation of a free codes repository available by artists and creators, linking of theoretical production to scientific universities databases and documentation focused on the production of new works and research. Besides these practices for archive content treatment and diffusion, there is the intention to expand communication channels of FILE Archive with other institutions, professionals, artists and all community involved with the digital electronic art and its developments.

Digital Art archives may also serve as a parameter to other archive areas, from the research in their objects to the analysis of their structures, which present a complex and multimedia nature. "The art humanizes the machine" [4] and in the case of the digital art informational environments such as the FILE Archive the relations among document, technology, art and their interlocutors are considered an important axle to electronic arts Memory, stimulating the creation of new works and keeping the interaction of their actors dynamic and creative.

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CITYSCAPES – EXPLORING THE SPIRIT OF URBAN IDENTITY

Francesco Proto & Richard Vickers

Turned into a mere relic of the modernization process, contemporary cities have stopped providing answers for the people they were meant to serve. Static, often imposing and inscrutable, the city is now a sphinx whose silence costs lives in terms of the psychic response to their complexity and size; most poignantly, to the isolation they engender.

INVISIBILE CITIES: TOWARDS AN ARCHAEOLOGY OF PRESENT TIMES

1.0 THE NARRATIVE

Turned into a mere relic of the modernization process, contemporary cities have stopped providing answers for the people they were meant to serve. Static, often imposing and inscrutable, the city is now a sphinx whose silence costs lives in terms of the psychic response to their complexity and size; most poignantly, to the isolation they engender.   In light of this, the research is framed to uncover how people extract meaning from the built environment and how, in an act of reciprocity, the latter underpins their identity. The goal is to develop an original analysis of the role of contemporary cities in shaping and supporting western lifestyles through the representation of architecture in cinema. A series of short films will constitute the final research output. Shot in significant metropolitan areas around the world, they will illustrate the theoretical background underpinning the whole endeavour in critical theory, visual culture, cultural studies & psychoanalysis.

The starting point of the whole project is Italian writer Italo Calvino's Invisible Cities, a novel intended as a collection of descriptions of the cities that the Venetian explorer Marco Polo visits within Kublai Khan's vast empire. Based on the original The travels of Marco Polo – travel diaries recording Polo's journeys through the 13th–century Mongol Empire –Calvino's book is a reflection on contemporary cities as these become invisible to the eye: buried as they are under an interior, "represented" city, the real city disappears beneath a thick layer of fantasy. Such is the case for Venice, for instance, its Disneyfication rendering the true Venice virtually invisible. Hence,"[t]he only way to get at Venice is to use the water – its refractions, reflections, the play of light and shadow, and to re–create Venice where it has always been strongest – in the imagination" (Winterson : 2001).

It is thus clear that, to Calvino, stories, memories and signs always replace, cover and erase the real city, thus turning the latter into "the trace or track" of something "which is forever absent" (Spivak, in Welsh : 2007).

There are in fact:

the city of dreams;
the city of memory;
the city of desire;
the city of history;
the city of the future;
the city of destiny;
the city of simulacra

the city of spectacle;
the city of consumption, etc

In other words, everything but the city as such. Invisible cities are in this respect nothing but a catalogue of obstacles impeding an "unmediated" perception of the world – as Calvino would put it – each city existing as a metaphor for the "invisibility" of experience. As a result, not only is the experience of the real city impossible; but also dependent on a form of obliteration, of erasure, of 're–writing' of the 'real experience' that, at the end of the day, is all encoded in this very act of re–writing as such.

2.0 METHODOLOGY

Bearing in mind that for French psychoanalyst Jaques Lacan re–writing is a therapeutic mechanism meant to aid recovery from a trauma, it appears that the city has become a massive exemplar of automatic writing, its inability to provide answers being a symptom of that disconnection from reality now days affecting us all. The question thus arises of how to decode it; ie, of how the city is perceived by the observer, which is overall our ultimate aim. The answer is twofold: on the one hand, we have summoned up a model derived from psychoanalysis, ie Sigmund Freud's "interpretation of dreams"; on the other, the cinematic act as an irreplaceable means for doing this.

2.1 THE FREUDIAN MODEL

With regard to the dream–work, Freud used to distinguish between a dream's manifest and latent contents. That is, given a sequence of images as the apparent narrative of a dream (manifest content), it is possible to draw out of it a number of interpretations (latent content). Manifest and latent contents from a dream therefore overlap, although both are perceived as if part of a continuum; and indeed they are, if it was not for the fact that, according to the psychoanalytical model, a dream is subject to interpretation so as is a film. There is, in this regard, a parallel we can draw between a dream and movie, this parallel being based on the narrative (sequence of mages) both are based on. To interpret a dream means in fact to chance its structure exactly as to interpret movie means to change its montage. And it is starting from this assumption that a movie can represent the way our mind works.

On the other hand, the dream–work is never objective; to the degree that the meaning of an image is always affected/distorted by subjective drives and individual history. Hence, the very idea subtending out project: to employ a film to mirror the way in which a dream-work works, under condition that the stimuli aroused by a city are such as to put us in a dream–like state.

This position is particularly clear in Inception, a film in which not only the dream–work is represented as a kind of onion–layered nucleus (beyond the latent content of a dream, another follows, and another,

and another); but such layers – or "levels" (as they are called in the film) are always 'infested' by the dreamers' "projections", i.e. elements belonging to the dreamer's personal history that "colour" the dream-work with ever different meanings.

Once we have established that what we perceive of a city is never a mere sequence of images, but rather the multi–layered overlapping of personal projections, the problem arises of how to "decode" the manifest experiencing of a city. To us, cinema holds the key. Not only because a film is, by its very nature, the thing most similar to a dream; but also because its particular structure, based mostly on montage and film editing, allows for the simultaneous presence of different layers of images, thus resembling as closely as possible the interpretation the research proposes of the city as multilayered field of experience.

2.2 THE CINEMATIC TRANSCRIPTION (OR RE–WRITING)

Sergei Eisenstein, the Russian filmmaker famous for his pioneering film theory, wrote that film montage always represents a moment of "explosion" of the image; ie, the very moment where a film sequence (as a situation, or event), is decomposed into juxtaposed images to reveal the inner meaning of the sequence. It is easy here to draw a parallel with Freud's dream–work and, from the latter, with the model of perception we have indicated for the city: the cinematic montage can operate definitively as a metaphor to illustrate/articulate the multi-layered compression of meanings. However, what we are interested in is exactly this idea of the image's explosion; ie, the possibility of making the latent content of the dream–work available in the form of a hypertext. Hence the use of use of cinema as a means to accomplish this task.

3.0 HOW THE SUBJECT EXPERIENCES A CITY

The methodology rests on the subject–ification of the camera's eye. The short films, in other words, will make objective a condition of generalized unease that is difficult to grasp unless visualized. The films seek to act as an imaginary "screening" in the mind of the beholder, thus "visualizing" the mental and emotional associations that the experiencing of contemporary cities arouses. It is in this respect that the cinematic short will act as a hypertext able to make visible an invisible process: the overlapping between visual stimuli and the random/rational associations the former provoke in the mind of the observer. The final aim would be to provide an account of the impact that the contemporary city has on its user/consumer, thus highlighting the broadest range of experiences possible.

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BEYOND PARADIGMATIC SHIFT: MAPPING CULTURE AND SOCIETY OF DIGITAL AGE

Mikhail Pushkin

Global paradigmatic shift is triggered by advances in digital and network technologies. New, Inherited, enhanced, and discarded features of this paradigm are presented. Digital Age is synthetic with features from modernism, postmodernism and earlier paradigms. The argument is supported by referencing modern, postmodern and contemporary theoreticians. Neo-Marxist criticisms are used to identify the distinctive points of the new paradigm.

Introduction

Making sense of one's own contemporary society and history, forming a coherent holistic image is a complex task, as one is situated "inside the box" of their timeframe, blurring the boundaries of perception and evaluation. Present day individual, however, is faced with an even more difficult condition: that of living at an early stage of an entirely new paradigm. Neither modern, nor anymore postmodern, yet bearing traits of both, our age is evasive of classification and not apparently structured and definable. Precluding the possible postmodern criticism of the need for 'constraining' definition and structuring, one may only point out that we have to establish a system of shared signs and signifiers embedded into a coherent framework to rationalize the principles determining global and local processes surrounding us, even if not fully accurate or all-encompassing. While no theory will likely ever be the universal solution, only through understanding and by now at large reconstruction of post-postmodern reality, will we be able to make conscious effective improvements and take full advantage of social, scientific, cultural and technological progress.

Multiple New Paradigms

Having the advantage of retrospective makes it easier to structure and comprehend previous paradigms, making them appear more coherent, holistic and identifiable, though not in simplistic static homogenous terms. Like the Renaissance or Enlightenment, present Age already has several names, signifying its core elements, its catalysts: 'Digital' Age, 'Information' Age, 'Computer' Age or 'Network' Age. This equivocal yet evident paradigmatic shift leads academicians to generate possible interpretative post-postmodern frameworks coming with a range of neologisms like "digimodernism, pseudomodernism" (Kirby), "remodernism" (Childish & Thomson), "altermodernism" (Bourriaud), "third wave" (Toffler), "neomodernism" (Heller, Grauer), "new sincerity" (Epstein), "posthumanism/transhumanism" (More), "hypermodernity/supermodernity" (Eagleton, Augé). Combination of the stronger sides of these hypotheses is one of the better strategies to develop a solid holistic paradigmatic framework. For instance, Kirby's digimodernism (skeptical, media, culture and society-focused) combined with the third wave of Toffler (holistic, positivist, economics-focused idealistic image of further individualized 'hypercapitalism') [1] can be used in mutually supplementary fashion.

Digimodernism has decisively displaced postmodernism to establish itself as the twenty-first century's new cultural paradigm. It owes its emergence and preeminence to the computerization of text, which yields a new form of textuality characterized (…) by onwardness, haphazardness, evanescence, and

anonymous, social and multiple authorship. These in turn become the hallmarks of a group of texts in new and established modes, which also manifest the digimodernist traits of infantilism, earnestness, endlessness, and apparent reality. [2]

"In a Third Wave economy, the central resource – a single word broadly encompassing data, information, images, symbols, culture, ideology, and values – is actionable knowledge." [3] He further emphasizes extreme decentralization penetrating the production and consumption, national identity, state structure, government and even family institute.

Most theoreticians place 'the digital' and 'information' at the centre of the new paradigm readily offering a set of very clear fulcrums for such shift: Internet, Digital Technologies and Networks. Those are the necessary information transport and dissemination arteries, that basis allowing for a formation of new society with distinct features reflected in global and local scale of existence involving politics, commerce, society and culture. Furthermore, the paradigmatic formation follows in part ancient principles, representing a synthetic ('organic' as opposed to postmodern 'eclectic') Hegelian evolutionary process merging modern and postmodern principles and ideas into a complex multisystem structure. Such synthesis is conceding with postmodern critical skeptical stance on monolithic structuralism, yet upholding the principle of multiple resilient potent empowered structures, essentially a pluralized networked version of modern structure concept. As the new paradigm changes the very basics of reality evaluation, its nature appears paradoxical from earlier perspectives with such features as globalization and interconnectedness as well as nearly unlimited information access coexisting with unprecedented growth of distinct subcultures and glocal communities, interpersonal alienation (computer mediated contacts as opposed to direct ones) as well as grotesque phenomenon of global misinformation and possible reduction of factual knowledge through information overload, manipulation and falsification (e.g. Wikipedia and Wikileaks): virtual becomes more wholesome, detailed, real.

Reversing Baudrillard's negative concept of simulacra, digital virtual reality instead becomes a transformative, revolutionary expansion and informative improvement on predigital reality. Internet is therefore providing space for dialogue and a platform for creating new products, which are real, yet within a different framework not necessarily requiring a physical equivalent (in the same way a novel is real, but more complex), illustrating the key element of the new paradigm: shift of value system from physical to virtual, digital, the information pure.

Tetrad and Digital Age

To identify and understand the new paradigm one needs to establish the points of its distinction, to which adapted McLuhan's tetrad concept, originally dealing with medium evolution, but transformed into paradigmatic evolution model might be of aid.

NEW TRAITS

Global interconnected digitized society completely redefined concepts of time, space and identity (an impact comparable to that of the public railroad transportation emergence for Industrial Revolution), forming multiple new value systems within localized social clusters embedded in globalized conglomerate system. Neither local isolated 'tribes', nor global monolithic culture and ideology. Memory becomes externalized, brain and sensory apparatus extended. [4]

Valid illustrations include international academic, research, religious or subcultural communities. They are interconnected through Internet (or only existing online), sharing own value systems, interests, goals. Sometimes such are largely coinciding with mainstream, other times are unorthodox, even radical. The members do not anymore need to be connected geographically or even know each other's real identity. The communication process (not limited to interaction, results in joint creation of virtual or even physical products and services) may follow an arbitrarily established strict or flexible timeline or even be of a sporadic nature (online forum posts). Specific examples would be gamers waking up in the middle of the night to participate in an on-line in-game event, possibly taking place during the day in another time zone. A now frequent situation that can be compared to a late night business phone call to another continent, or a heart surgery procedure broadcast online for education and consulting purposes, or an entirely online accredited international university e-education with over 5000 degrees, all of which illustrate the creation of new value systems and social structures based on virtual space and identity, often more important to their participants than daily routine and in more radical cases basic human health needs.

INHERITED & IMPROVED TRAITS

From media and entertainment domination to the virtual reality hegemony.

With the shift towards virtual space, media reality, as the main venue of infotainment, socialization and trade, World Wide Web becomes a place of value creation, not anymore wholly based on physical reality external to it, not unlike contemporary stock market. This gradually takes global economic structures further beyond post-industrial into global e-commerce with individuals and small companies offering local customized goods and services worldwide [5] , using Internet as the marketing platform. As the digital requires constant research and innovation, quaternary sector becomes more important and profitable with originally smaller software and hardware innovators becoming world-leading multinational corporations such as Google, Microsoft, Facebook and Apple, all forerunners of the Digital Age, skipping the relatively brief postmodernity in their successful development.

Now digital, media goes in what might be described as 'overdrive', shifting the already immersive experience of a movie theatre into portable entertainment-information-communication products (tablets, smartphones, netbooks), while interactive, personalized, customized, individualized and yet pseudonymous news reporters and bloggers are reaching the audience through even more information channels, creating a complete complex system of (not infrequently misguiding, purposefully and otherwise) worldview. Such worldview becomes a custom-tailored massive digital prism, through which reality is perceived and evaluated. One may argue both for and against this prism, as it might either enhance one's knowledge and understanding, or completely distort it. [6]

Extreme customization of supply and demand becomes one of vital features of contemporary information supply and mining with the suppliers struggling to tailor user profiles to serve the kind of information (in simplest cases – direct advertisement) that will influence the audience. The "prosumers," [7] however, gain the power of manually or semi-automatically filtering out the bulk of undesirable information, thus both shaping the supply and demand structure of virtual reality and its products, and gaining a new kind of control over information production, intake and processing. This situation reestablishes the core principles of reality perception and validation arguably reducing influence of sensationalism and misinformation, as contemporary generation is born into reality (not just online) which is by de-

fault virtual, constructed, relative, fostering and necessitating development of new information selection, filtering, processing and validation mechanisms. Such environment fosters exploration and renegotiation of values, facilitating new forms of creativity and consciousness, shaped by the logic of code, as well as confusion inherited from postmodern explosion of nihilism.

DISCARDED TRAITS

Materiality (of information, identity, wealth, property and entertainment), privacy (contrary to the mainstream media-suggested spreading of democracy), copyright & ownership (due to combination of pseudonymity, remote ownership, digitization and piracy) and memorization.

Material reality has most certainly not vanished and global wars for territory and resources are raging at the same or even greater pace (coexisting struggling global corporate capitalism paradigm described by Toffler as the second wave). For the general globalized population, unless personally affected, they directly translate into local oil prices, (un)available vacation spots. What Digital Age adds or rather alters is the virtual presence and virtual active participation: immersive Video Games "recreating" the hot-spot events, blogging and live feed from the hot spot: real and fake so indistinguishable that one cannot anymore take either for reality. In effect, the actions, events in themselves become important beyond earlier more simplistic good versus bad framework. The audience becomes aware of watching or participating in a created narrative, globally pragmatic, rather than locally dramatic, being forced to ask *cui prodest*? On a less political note, one could consider timeless classics of multiplayer ego shooters, Counter Strike, where terrorists and police forces are equally popular with players, stripped of their ideological connotation.

Furthermore, digitized and digital video, audio and textual products can now be created, copied, advertised and distributed manually at virtually no cost via Internet, placing both publishing and distribution houses in a dubious position of trying to survive in a new pervasive global socio-economic system, which has little real need for their dated services. Most obvious examples point to McLuhan's medium tetrad concept with paper-print and DVDs slowly, but surly becoming obsolete, with portable e-tablets (consider clay 'tablets' as ironic reference to antiquity), smartphones and e-readers gradually making books and printouts a thing of the past. Paper-based text is surviving on conservative medium loyalty, multitude of existing production hardware and routines, as well as through the pressure (economic, political, legal and otherwise) of gigantic non- and semi-digital manufacture, publishing and distribution giants inherited from the pre-digital age.

The very notions of materiality and the means of production are taken to such a different level, that one may consider material world to be chasing after the virtual one, curiously reviving and reworking antique debate on mimesis. An ironic illustration is digital cartoons, films or video games, where living actors and scenery are being digitized into animated characters, enhanced and then inhabiting the new better-than-real diegesis of "Avatar" or "L.A. Noire". One can look further into the way contemporary blockbuster movies are structured and presented, as if molded after videogames, which follow almost immediately.

Remote and outsource jobs number increased dramatically both in material and digital/virtual sector (software, finances, IT support). The former, child of industrial age, is becoming ever more mechanized and self-sustaining via digital control systems or imported, while the latter, the new, is locationless in its

core principle: information (now in itself a product) is likely located on a server in some specific geolocation, however, its identical up-to-date copy is likely backed up elsewhere or even distributed among multiple computers world-wide.

Pseudonymity becomes the new identity with customizable optional gender, race, class, location and visual representation (avatar). On a more global level, potent hacktivist groups are formed. The "Anonymous" can serve as the most notorious example: ambivalent global hackers-activists group, networked, decentralized, yet organized (multiple cells and individuals worldwide), effective (able to bring down websites for government security companies, i.e. HBGary Federal and global credit card systems, i.e. Visa and MasterCard), with own moral principles system, e-anarchic.

Lastly, Internet has already integrated itself into the core processes of human mental activity beyond simplifying communication, but acting as a gigantic "External hard drive for the brain". [8]

RETURNING TRAITS

Dialectical, 'textoral' in its earlier phase culture of "global village" becoming "global theatre," [9] community, holistic thinking, social responsibility, layman philosophizing.

While Internet communication seems to alienate people from their direct physical environment, it at the same time facilitates and intensifies communication with a much wider audience based on interest, rather than random chance. Multiple blogs, forums, social networks demonstrate rebirth of, now online, communities, which become centers of heated debates on global and local issues, suggesting growing popularization of dialectics. Members of online communities are responsible to abide by the rules set out in the said communities, fostering a new sense of social responsibility, usually without harsh consequences, providing a safer environment for personal growth (or leading to infantilization in young adults due to lack of harsh consequences). At an early stage of digimodernism the main bulk of communication is textual, though the nature of communication could be seen as a multivocal enhanced oral one, only written down. There is, however, no reason to assume that with further advance in audio-video digitization technologies text will not once again give in to the oral and visual communication.

Even the family institute goes through a similar transformation with a curious rebirth of arranged marriage institute moving from the hands of the parents into organized or automated virtual matching sites and portals offering any kind of partnership pairing.

Marxist Angles

Marxist and Neo-Marxists are notable for the skeptical angle frequently downplaying the role and magnitude of change in their eternal struggle with capitalism. Gramsci further develops Marx's theory of hegemony, presenting his contemporary world order and class-culture-production system as an adapting self-sustaining flexible construct, maintaining that social order by making subjugated classes internalize value system of the ruling elite. His theory permits one to see a contrast of new hegemony (paradigm) of networked digital reality: classless virtual space; own tastes (signified by Bourdieu), values and morals system, not involving monetary capital, but information cultural capital; the "new intellectuals" born out of Internet "habitus", establishing themselves through skills, abilities and effort inside the virtual environment; use of hi-tech equipment previously reserved to and class-sustaining for bourgeoisie.

Chomsky criticizes contemporary media with introduction of five filters: ownership, funding, sourcing, flak, ideology. Schiller and Lovink further criticize online polyphony of active audience as confusing cacophony of confused impotent audience. Online blogging journalism, social networks coordinated events, political and cultural discussions on forums, hacktivism, pseudonymity and the new values system negate the issues of ownership (free), funding (inexpensive or free), sourcing (more diverse), flak (pseudonym as security, safety in numbers), ideology attack (online always contained multiple ideologies flourishing through lack of censorship and higher anonymity).

Conclusion

The article in a very compressed form confirms and describes the paradigmatic shift, highlighting its advantages, providing references to its conglomerate synthetic nature including beneficial elements of earlier paradigms dating as far back as antiquity, yet forming its own distinct and unique system of values, classes and tastes, made possible with the aid of digital technology and networking. Although this paradigm is growing in parallel with global corporate capitalist framework, it bears sufficient distinct features to be seen as a complete society-based hegemonic structure undermining the evolving invasive preceding global hegemony through passive rejection and active substitution of its incentives and values, while making use of its technological advances.

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DATA TRASH

Melinda Rackham

Data Trash traces the texture and tactility of HTML - looking critically at the evolution of the online inter-face and its appropriation back into object based artefact; clarifying the pivotal place of the network in our cultural realm.

Stella Brennan, Tuesday, 3 July 2001, 10:38am, 2001-2002, detail- cotton on canvas.

Does HTML leave a trace of tactility and texture?

Net art first appeared in a geeky corner, a few degrees removed from existing curatorial and museum practices. When Marc Andresson's *Netscape Web Browser* was introduced in 1994, it opened up new frontier of immersive, intimate public space unmediated by the art museum. On the net artists believed that they could work without context or censorship, retaining control of their content while constantly connected to a global community.

The net seemed like an intimate affair - a rich tapestry of connections. There was an element of forging a new craft. Stella Brennan has captured needlepoint, created in cotton on canvas, [Figure1] the Apple Macintosh operating system at the turn of the twenty first century – a view we no longer see as the landscape has radically changed. The approximately one meter square *Tuesday, 3 July 2001, 10:38am,* simply depicts a screenshot of Brennan's desktop, encapsulating an era.

The best networked art often relied on non-standard software and hardware, on glitches and on happy accidents to function. It was built with dynamism, rather than preservation in mind. We've already lost many fleeting works from the early experimental days of Internet art through corruption and mutation. Net art archives usually retain a minority of works – ones which are straightforward to conserve because of their common and stable formats, or their ability to be easily migrated. . With the certainty of either going out with a crash or slowly fading away, online art becomes data trash.

Ironically material culture responded to these issues with a mutant field of migratory practice with artists producing static artefacts from the ephemeral net.art works almost as soon as the works appeared!   The wonderfully whimsical *Introduction to net.art (1994-1999)* a manifesto formulated by Natalie Bookchin (USA) & Alexie Shulgin (USSR), carved on six marble tablets by Blank & Jeron (Germany). The representation is derived from the Blank & Jerons work *Dump your Trash* (1998), where a software agent recycles existing web pages into new pages. Pages filed at this site stay stored even after the original has been long lost or shut down. The texts carved in stone secure their presence in the physical world while simultaneously subverting the ephemeral - an ironic commentary on the way we deal with data in the information society.

The memorial concept is taken further with Nick Crowe's *The New* Medium (1999) – fifteen glass panels hand-engraved with internet memorial pages that had been submitted to a web site called Virtual Heaven. First shown at the long defunct Lux Gallery, London in January 2000, *The New Medium* examined different forms of internet use including the iconography of personal homepages and the growing use of cyberspace as a spiritual medium. The fragile works glow faintly in the gallery full of sentiment and touching naïvety.

Investigating the point where the mind starts to confuse what is reality and what is illusion, Jan Robert Leegte focuses on the physical experience of the internet. His *Scrollbars (2005)* installation isolates elements of the Windows interface, which are projected onto various structures. As an artist he moved form being internet-based, to creating physical installations to develop a more meditative relationship between the audience and the work. Pixel depth is perhaps too superficial?

Carving in stone or painting on canvas secures a presence in the physical space of an object-driven art-market. The Google browser is surely the most painted, sketched, photographed and built interface artefacts, with Japanese artist collective Exenemo's 3.5x 2.5 m *Google* (2004) painting being one outstanding example. It is of course owned by the Google collection.

The *Rhizome* screenshot, drawn on paper with pencil and gouache (2000) by Russian Masha Moriskina, was as well, immediately bought by art portal Rhizome. Moriskina continued to create highly desirable web page renders – important g historical documents which reminding us of the long forgotten stories of Internet art victories such as that of the eToys/Etoy wars! [1]

It was never an easy fit as existing art forms such as drawing, photography, poetry, video, animation and radio moved to the net, adopting the unique aesthetic of chunky pixelated low res images, low bit sound, and the now vaguely recalled rhythm of slowly downloaded net-art. Networked art challenged but never usurped the well-established commodity value of the discrete art object and the primacy of authorship.

In 2003 Thomson and Craighead created the *dot-store* - an e-shop environment which delivered a series of artworks both on and offline. This included "a beautifully crafted set of four tea towels sporting a series of authentic search engine results returned to a user when the criteria, 'Please Help Me', 'Is Anybody there?', 'Please listen to me' and, 'Can you hear me?' were entered into the search field, while using Google in Netscape 4.7 on Mac OS 9.2 or Netscape 6 on Windows 98." [2]

The printed textiles, embroidery, drawings, engraving, sculptures, paintings, machinima and etchings have a ready-made future while the ephemeral coded works they are derived from do not.   To break

the glass, to trash the art, to rip the fabric is to scatter the bleached bones of HTML – the skeletal re-mains of the lively richness that once connected people across networks.

As we speed into that future, there is a certainty of corruption and mutation and decay. Online work be-comes disposable data trash, environmental and cultural wreckage, littering the web with dysfunctional and lost artworks. But remember today's data trash will resurface, be revalued and recycled in a not too distant future.

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TERRA VIRTUALIS: THEY ARE REALITY

Melinda Rackham

Terra Virtualis, an exhibition of virtual art curated by the Australian Centre for Virtual Art (ACVA). It positions Australia as apart from, yet intimately cojoined to the rest of the world and is critically driven by the relationship of physical location in virtuality and augmented reality, to the expanded concept of site-specificity.

Rainbow X Apocalypse, Video Installation, 2011, Anita Fontaine & Geoffrey Lillemon.

They are reality. (1)

A red taxi snakes through an unexpected patch of greenery, swimming against the mid-evening, mid-level traffic up to the sanctuary of the Church of All Saints. My semi-permeable skin registers the shifting levels of moisture in the air ascending the Peak, as warm and cool oceanic currents. Satellite imagery and subjective back-stories of my destination scroll across the luminous tablet purring, fan humming and drive vibrating almost imperceptibly, on my lap. Outside black soil erupts from between concrete superstructures, teasing my nostrils with tropical fecundity as we pass.

Taxi morphs into a Fastback of undulating pattern; golden palm trees sway in the virtual breeze.You and I embrace like we have never before - exposed to our core. Anita Fontaine & Geoffrey Lillemon's *Rainbow X Apocalypse*, engulfs me. Beautifully. If 2012 is the final year of human existence I want to live fast and die young so my soul can be avatar for ever after in the *Metaverse*. [2]

Architectural scale generates minuteness and magnificence. Insignificant human creatures scurry below acres of highway flyovers, disappearing into transit tubes beneath ground. Life is cheap below the million dollar video displays atop the scraper canopy. Silhouetted by flickering neon, each tower competes for air space, every level presents a bigger, brighter, blinding surface animation. Our 21st century mega polis recalls with fond nostalgia its *Blade Runner* past while seductive faceting distracts our attention from the present realities of our *Diamond Age.* [3]

The ecosystem of *The Institute For Advanced Augmentiform Development and Release*exists in parallel to several others. It nurtures live interactions and data exchange. Virtual and the augmented realities dynamically link as Andrew Burrell & Warren Armstrong make us, the inhabitants of one world, responsible for the survival of the others.

She must suspect.
She senses her being.
Her memory is situated.

Women will notice it first. The virtual, like Irigaray's autoerotic female genitalia, [4] is not one. We touch ourselves constantly and the virtual is simultaneous. *Écriture feminine* [5] is perhaps the best way to speak on the subject of the virtual, for here knowledge and memory are foreigners. To know the virtual we must be immersed – to give ourselves over to being within soft, wet, hard space. Our pliable data bodies surrender to touch and meld with the unknown. We must have courage to play in the *Terra Virtualis* - territories of unknowingness. For it is when we try to feel, to know, to recall, to rename, to remember, that we do not experience what is. [6]

Meandering is that. Aroha Groves takes us seemingly randomly through her worlds. Her grand design, a connected thread of ideas, emotions, environs, and forms of consciousness will touch us, touch ourselves, and touch our soul.

Contemporary art will be virtual, or it will not be. [7]

The virtual is beyond photographic. The image is not recalled; rather we re-sense the intensities of experience. Virtuality, vitality, virtuosity is embedded and distributed like a rash of scarlett fever under my skin. There is no event, no horizon to orient my self against. [8] Trueness or falseness is not in contention here. Software parses the next scenic level. We do not lack vision in our rendered reality; we do not need optical illusion – frustration only arises from lack of control. The cartographies of the virtual have moved off the grid and beyond of the Street that runs the entire 216 km circumference of the perfectly spherical *Metaverse*.

The urban space shifts. *Neomaflux.* Augmented Reality resets perception. Troy Innocent and Indae Hwang construct urban space as it should be – a network of connected relationships. AR markers generate spatial digital language and abstract mindspace as mediated ISEA delegates consider the collective intelligence of the space itself.

Our experience of the intensity of virtual art is a moment of pure potential pleasure. This interstitial art, the art that happens when we are not quiet conscious, generates a moment of ambiguity and a mo-

ment of discomfort. But we must resist reaching backwards - grappling for the ease and comfort of re-call. This moment of being in the new territories is a moment of reality, of being within the flow of our bodily sensation. Let go and drift curiously into *Terra Virtualis*- into the crevice of unknowing.

We are not one - we are virtuality.

Melinda Rackham, Hong Kong and Istanbul, September 2011.

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TRACING THE CITY: EXPLORING THE PRIVATE EXPERIENCE OF PUBLIC ART THROUGH ART AND ANTHROPOLOGY

Martha Radice, Kim Morgan & Solomon Nagler

What happens when the private experience of art is disrupted or reframed by the chance encounters and events of urban public life? Conversely, what happens when modes of production of art are opened up for the public to intervene in artistic creation? We draw on Lefebvre's sociospatial theories to present the framework for our interdisciplinary research-creation project, and use it to interpret an art installation on a public city bus route.

Fig. 1. Time Transit, 2006, Kim Morgan (artist), Craig Gelowitz (engineer), TRLabs Regina, mobile media art installation on Regina city bus route #4. © Kim Morgan.
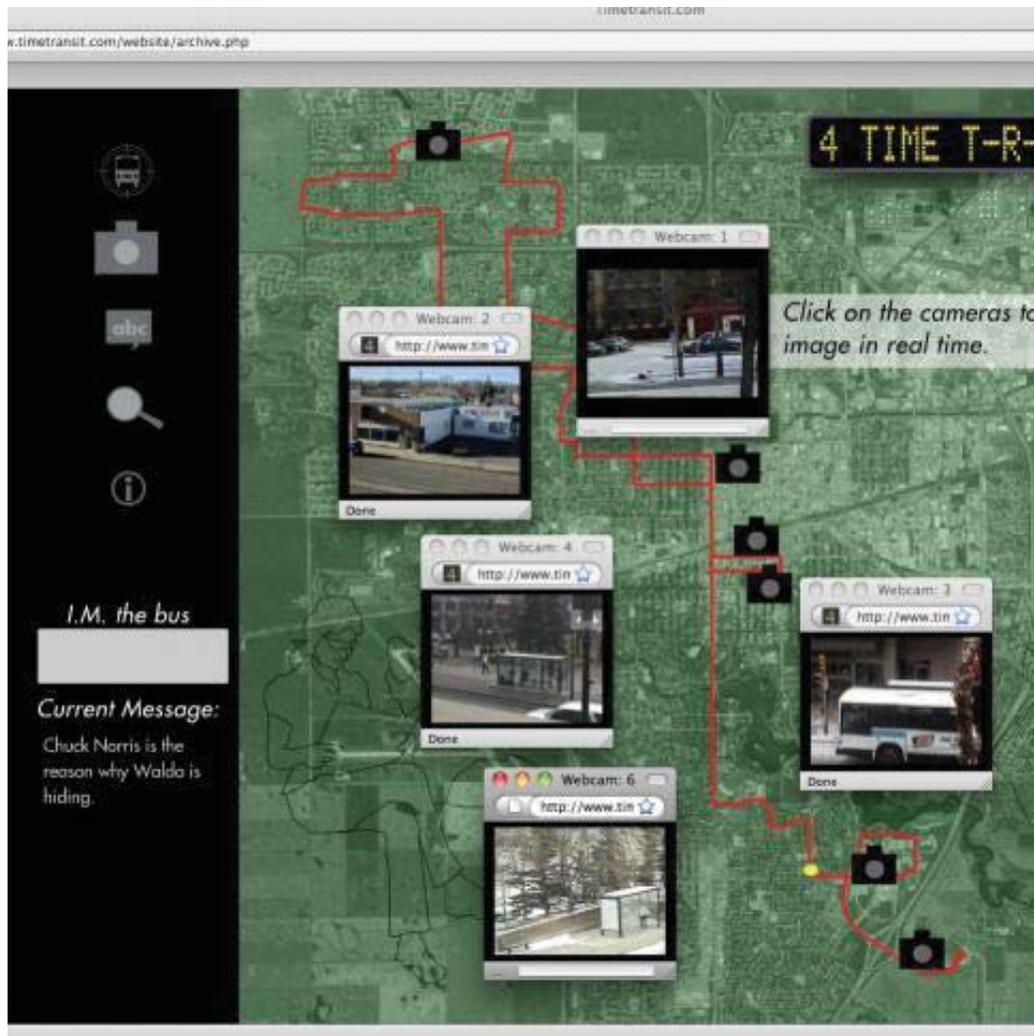
Fig. 2. Time Transit, 2006, Kim Morgan (artist), Craig Gelowitz (engineer), TRLabs Regina, camera page from website (http://timetransit.com/). © Kim Morgan.

Whatever its form and setting, contemporary art tends to privilege a one-on-one relation between the viewer and the art. In the gallery, people encounter artworks within the bubble of their own personal space. In the cinema, they watch films ensconced in the dark, in a comfortable chair. People feel emotional reactions to art within their own bodies and express them to only a small circle of companions. Their experience of art takes place in a social context, but is typically privately contained. This paper – written by an urban anthropologist, a multi-media installation artist and a film-maker, respectively – presents the premises of an interdisciplinary research-creation project that questions this one-to-one relationship. We posit that the public space of the city can challenge – and indeed can creatively be made to intervene in – the private space of engagement with art. We ask, what happens when the private experience of art is disrupted, unsettled or reframed by the chance encounters and events of urban public life and space? Conversely, what happens when modes of production of art are opened up so that the public can intervene in processes of creation?

In our individual practice, we are each driven by a concern to investigate the sociospatial dialectic: the idea that the organization of society is necessarily expressed in and constituted by the organization of

space, such that transformations in the one effect change in the other. Our collaborative project explores the urban sociospatial dialectic through a combination of creative processes in the visual and media arts, principally film and site-specific installations, and empirical qualitative research in the social sciences. [1]

The sociospatial dialectic and new media art

We draw on Henri Lefebvre's conceptual triad of the social production of space to theorize our work. [2] *Spatial practice,* or *perceived* space, consists of people's perceptions of society through space that arise in their ordinary activities and routines, and the material settings and objects involved in these – the commute to work and the bus, the weekend movie and the cinema, grocery shopping and the supermarket. *Representational space* is the realm of symbols and images, also called *lived* space, because spatial symbols can be 'lived,' non-verbal, ineffable or clandestine rather than explicitly articulated. Here, space can be invented and imagined, and critiques of society and culture are possible. The visual, rhetorical and performing artists, the chefs and the artisans, the urban shamans, priests and diviners work in this kind of space, adumbrating the meanings that attach us to cities. In contrast, *representations of space* are consciously codified by those who have the power to shape and define society, such as urban planners, technocrats and scientists. Also called *conceived* space, this is the view from above; representations of space contribute the kind of knowledge that makes the city immediately or potentially knowable, productive and 'useful'. For instance, an anthropologist makes representations of space in order to understand it more accurately. Of course, anthropological research also involves observing and invoking spatialized routines and symbols. Each kind of space cannot be fully understood in isolation from the others, but together they refract the nebulous concept of 'space' in useful ways.

The sociospatial dialectic has evolved in ways that Lefebvre could not have foreseen, thanks to new information and communications technologies (ICTs) that collapse time and distance: cellphones, GPS, social media, GIS, and Web 2.0 protocols, which allow us to track and construct complex representations of geographical and social data. This spread of virtual space and its intersection with the material alter our conceptions of what 'space' really is, challenging "three deeply embedded assumptions [...]. First, that space is three-dimensional and shared between actors. Second, space is either solid or void. And third, you can only be in one place at one time." [3]

The collapse of the virtual and the material also blurs boundaries between public space and private space. In urban anthropology, the distinction between public and private space is not based on ownership or function, but accessibility and visibility. Space is public when it brings strangers from all walks of life into view of and into contact with each other, as individuals and groups. [4] Private space, in contrast, implies invisibility and interaction with an already known, even intimate circle of friends and family. New ICTs bring the private realm into public space – as you hold an intimate telephone conversation with your sibling on the bus – and the public sphere into private space – as you post comments on a newspaper website in the comfort of your living room. What results is an expanded idea of presence in space, and a sort of open border between intangible and material space.

This open border has been extensively explored by artists. However, we have two criticisms of many of the artworks that we have reviewed so far. Firstly, artists often incorporate locative media technology in ways that shrink public space into the personal world of the cellphone or computer screen. For instance, dialling a number posted on a wall or even, thanks to GPS, simply approaching a site with a cellphone can deliver a lyrical representation of that location through the phone to the listener, but it's for that

listener's ears and eyes only. Our second criticism relates to public participation. The new layers of the sociospatial dialectic seem to have integrated seamlessly into our everyday lives, and yet this very seamlessness conceals the authoritarian nature of the media. GPS and GIS were developed primarily as tools for making representations of space (conceived space), to better survey, know and control territories and their inhabitants. Interactive art projects – representational spaces – make earnest attempts to use ICTs to place authorship in the hands of the users. However, they often retain a hierarchical relationship between the artists and the public participants by selecting and therefore censoring interactive content according to non-transparent protocols, even when there is no technical requirement to do so.

Time Transit

In contrast, we aim to build on work that uses ICTs to broadcast over a wide swathe of the city and to decentralize authorship. One such example is co-author Morgan's *Time Transit,* a temporary mobile art installation that combined art, engineering, public transit and digital media in order to explore the impact of ubiquitous technology on our daily lives, and its potential to generate both interconnection and alienation in urban public space. [5] The installation site was the City of Regina Transit bus route #4 (Walsh Acres/University), a route which, significantly, traverses neighbourhoods that vary greatly in class and culture, from the university through to the impoverished north central ('the hood') to wealthy new suburbs. The installation had three principal interactive public components: an operating city bus; six major bus stops along the route equipped with cameras that constantly filmed them; and a website with text messaging and email (http://timetransit.com/).

The bus was fitted with a GPS system, four flat-screen monitors, a computer and a wireless network connection. Two monitors were mounted near the front of the bus and two near the middle of the bus. Each set of two monitors displayed the same content, which meant all the riders could experience the installation more or less equally as they rode the bus (Figure 1). The monitors displayed images captured from the cameras that were focused on the six major bus stops along route #4. The right-hand screens showedreal-time images of the next filmed bus stop along the route (i.e. where the bus was going). The left-hand monitors displayed images from the most recent major bus stop, and these images were translucent stills layered on top of each other, to represent the cumulative, collective memory of gestures and activities from where the bus had been. The passengers were thus able to view what had happened at the last stop and what was happening at the next stop on the screens. The website (Figure 2) showed the real-time location of the bus as well as film from the bus stop cameras. More importantly, it allowed users to communicate with the bus by typing a text message into a sidebar textbox, which would be displayed as scrolling text on the monitors of the bus. The message could either be displayed in real time or be dropped at a particular zone along the route, in which case it would show as soon as the bus reached that location. In addition, people could send messages to the bus via cellphone text message or email. A display hierarchy was set up to give these latter messages priority over ones from the website.

Time Transit made plain the ways in which ICTs fold time and space in on each other. Firstly, the installation existed in virtual and real space simultaneously. People could experience it by riding the bus, by appearing at the bus stops that were monitored by cameras or by browsing the website where they could either view or interact with the installation in real time. Secondly, *Time Transit* cumulated past, present and future: riders could see where they had been and where they were going. They could watch themselves board the bus or see friends waiting for them at their destination. Thirdly, *Time Transit*played

with conditions of surveillance and anonymity. Using their private cellphones, riders could send messages to unknown others that would be displayed publicly on the bus screens. Website users submitted messages to known passengers: "Larry bring home milk." The installation thus permitted privacy and even intimacy to dwell in the very public space of the bus. As one art critic wrote, "*[Time Transit]* not only prompts up to consider the city and its citizens but prompts subtle shifts in our understanding of how we occupy and experience the city and how we shape it – and it shapes us." [6]

While *Time Transit* pointed to the ubiquity of surveillance technology and its effect on our perceptions of private and public space,[7] it also challenged our paranoia about such issues. Here the users controlled the content and data collected by the equipment. They could appear before, perform for or hide from the cameras, remotely operate them, watch and be seen on-screen. They could publish their own stories and read those of other passengers – tales of their day or experiences of the public transportation system, shout-outs to friends or cheers for local sports teams. Regulars posted stories as serials, in daily instalments. Poetry often scrolled across the bus monitor screens... and so did profanity. Following a series of pointed insults, and at the request of the bus company, the project engineers added filters to censor profanities, but riders could also put their considerable creativity to work in finding ways to curse without using the forbidden words, circumventing authorial regulations. In this way, members of the publiccontributed to the installation not only by precipitating the activity (using the bus, viewing the screens), but also by creating its content.

To use Lefebvre's terms, *Time Transit* used conceived space – surveillance technologies and new ICTs – to create a lived space – an art installation – by means of perceived space – the everyday bus journey. The representational space had the unexpected side-effect of creating a new practical representation of space, in that this interdisciplinary artistic inquiry led the project engineers to develop an open-source application to track the real-time location of buses in city transit systems. *Time Transit* will acquire another layer of conceived space when we use urban anthropological research methods to analyze and interpret the text messages that were collected over the life of the installation. What kinds of content did the installation prompt users to create? How did it vary over time? What were the recurrent or one-off themes and modes of communication?

Tracing the City through Art and Anthropology

Our *Tracing the City* project will similarly create and trace public, interactive art installations through new avenues of anthropological and artistic inquiry. We aim to use locative media (GPS and GIS), cellphones and Web 2.0 interfaces to engage 'the public' – understood as people *and* places/spaces – in artistic creation. By layering dynamic data over physical space – for example, an architectural plane – we will create an augmented spatial environment that then becomes a tangible interface for the public, who collaborate to create the ultimate meaning of the work. The resulting artworks will be exhibited (installed, projected) in outdoor and indoor public spaces, becoming part of the sensory experience of the city, and will also have a virtual presence on the web. The project therefore engages with 'the public' in terms of both space and society. One site we are particularly interested in is Halifax's downtown public library, not only because it is a quintessential urban public space, but also because, like Regina's bus #4, it already has a public membership, a set of regulars, and is well integrated into spatial practice.

The anthropological component of the project consists of building in feedback loops that will both investigate how members of the public experience our artworks, and generate material for creating subse-

quent artworks. The research-creation process will be enriched by the contributions of three collaborators whose practices are connected to our own: Ellen Moffat, a sound installation artist based in Saskatoon; Christopher Kaltenbach, an interdisciplinary designer based in Halifax (NSCAD University) and Tokyo; and Erin Wunker, a cross-genre literary scholar at Dalhousie University. We are keen to find out how both the interdisciplinary collaboration among the research team and the interactive collaboration of the public will affect the structure and content of the artwork.

To come full circle back to Lefebvre, we will be engaging perceived, lived and conceived space in particular ways. We want not only to emphasize but to amplify the interdependence of imaginative space and everyday space: we want to bring spatial practice (perceived space) into representational spaces (lived space), making quotidian, routine experiences of the city alter and interfere with its resonant artistic symbols. This means bringing the banal events and objects of urban public space, both routine and haphazard, into the imaginative but typically personal world of art and culture. Moreover, by doing interdisciplinary 'research-creation', we want to draw on representations of space to make representational spaces – and, indeed, vice versa. Dialogue between artists and social scientists should enable the latter to creatively explore the conduct and consequences of arts-based inquiry, and the former to conduct rigorous research, particularly with respect to public interaction with and experience of their works. We recognize the paradox of, on the one hand, working to subvert and decentralize creative authorship, and on the other, turning creative processes into 'objects of study' and 'sources of data' that potentially nourish the commodification of urban symbols. But however codified and commodified they may be, representations of space still provide the knowledge that underpins our understanding of spatial practices and representational spaces. We take the opportunity of interdisciplinary collaboration to try working in the interstices between perceived space, lived space and conceived space. In these ways, we aim to make the public space of the city creatively intervene in the private space of engagement with art.

References and Notes:

1. Tracing the City: Interventions of Art in Public Space is funded by the Social Sciences and Humanities Research Council of Canada, Research-Creation in the Fine Arts award no. 848-2010-0019.
2. Henri Lefebvre, The Social Production of Space, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991).
3. Mike Crang, "Urban Morphology and the Shaping of the Transmissable City," in City: Analysis of Urban Trends, Culture, Theory, Policy, Action 4, no. 3 (2000): 303-15.
4. See e.g. Lyn H Lofland, The Public Realm: Exploring the City's Quintessential Social Territory (Hawthorne, NY: Aldine de Gruyter, 1998); Sophie Watson, City Publics: The (Dis)Enchantments of Urban Encounters (London: Routledge, 2006).
5. The Time Transit Project Team were: Kim Morgan (Artist in Residence, TRLabs Regina); Craig Gelowitz (Research Engineer, TRLabs Regina, University of Regina); Bill Friedrich (Computer Programmer, Co-op Student SaskTel, U Regina); Lee Henderson (Media Artist, Research Associate); Jane Uttaranakorn (Graphic Designer, Graduate Student, U Regina); and Laura Wiley (Student Engineer, U Regina).
6. Kim Morgan, "Artist Remaps City in New Ways," Leaser Post (Regina), November 29, 2006, http://www.canada.com/reginaleaderpost/news/arts_life/story.html?id=19e2dcd6-a7c6-4caf-9704-1ad2ecd65135 (accessed June 7, 2012).
7. See Lev Manovich, The Language of New Media (Cambridge, MA: MIT Press, 2002).

DIGITAL ANTHROPOPHAGY AND THE ANTHROPOPHAGIC RE-MANIFESTO FOR THE DIGITAL AGE

Vanessa Ramos-Velasquez

A theoretical essay proposing a new practice of consumption (ingestion, digestion, excretion) involving a technological mediation, and a manifesto-poem with a new take on the 1928 *Manifesto Antropófago* by Brazilian author Oswald de Andrade. I offer an update for the concept of cultural cannibalism in regard to the digital age, where the virtual world is the new frontier, and everyone a possible colonizer.
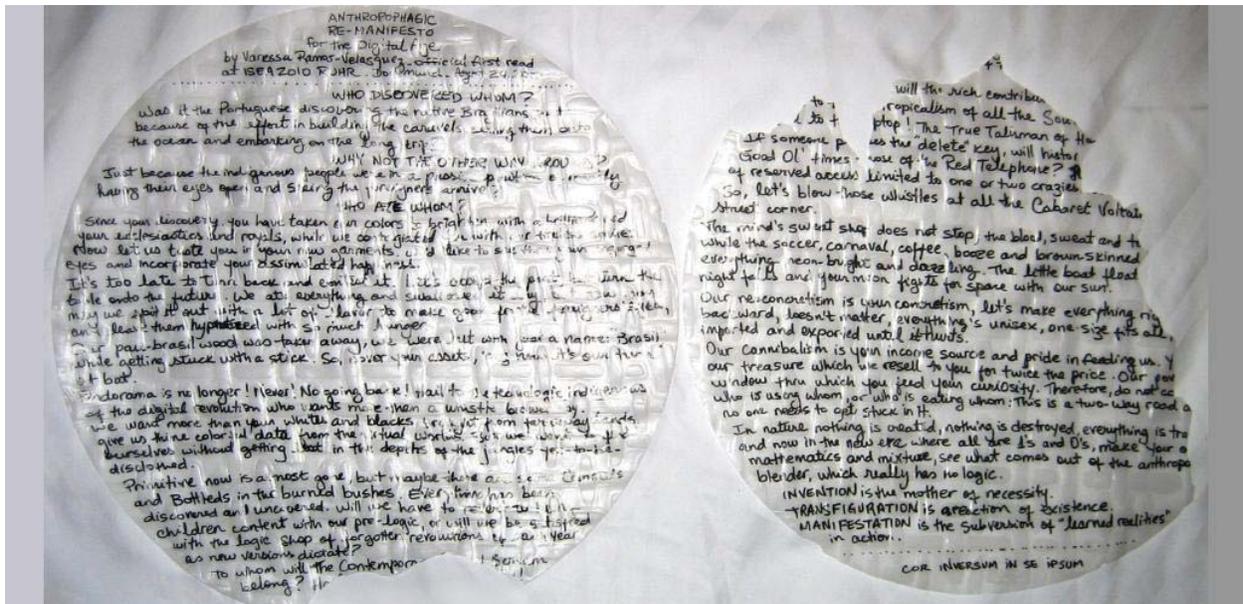
Fig 1. The Anthropophagic Re-Manifesto for the Digital Age
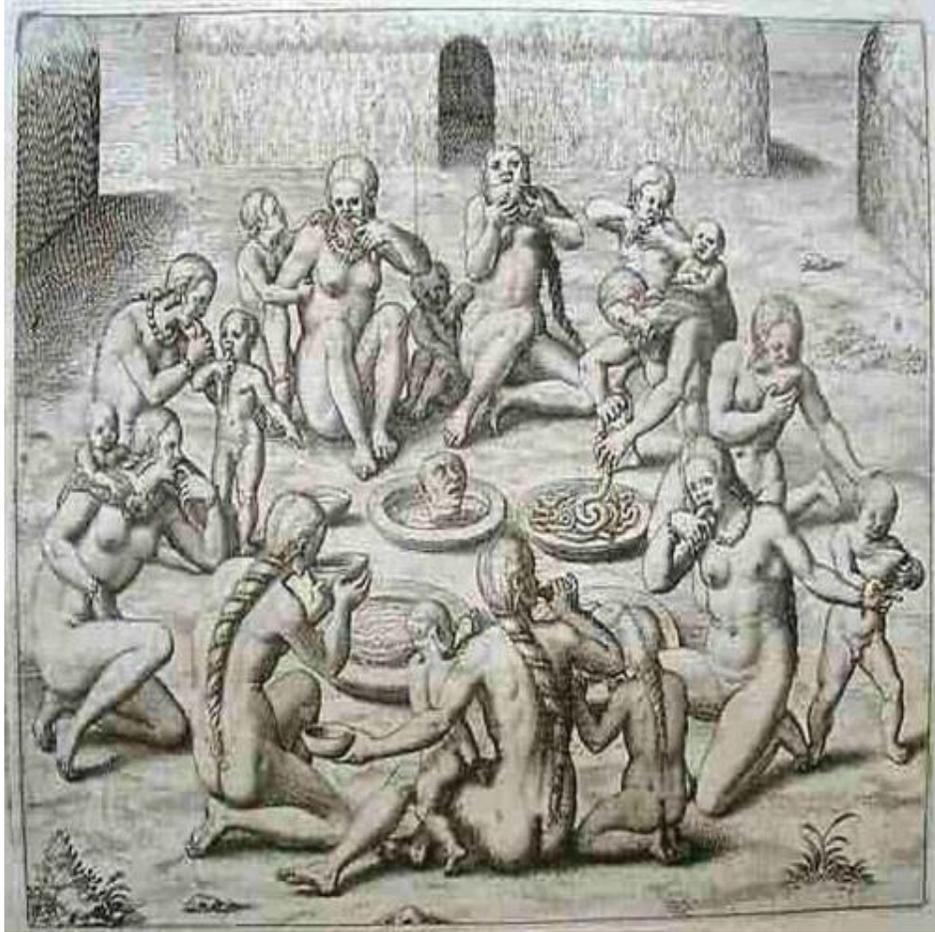
Fig 2. Anthropophagy

Fig 3. Digital Anthropophagy

ANTHROPOPHAGIC RE-MANIFESTO FOR THE DIGITAL AGE

Who discovered whom?

Was it the Portuguese discovering the native Brazilians just because of the effort in building the caravels, setting them onto the ocean and embarking on the long trip?

Why not the other way around?

Just because the indigenous people were in a passive position of merely having their eyes open and seeing the foreigners arrive?

Who ate whom?

Since your discovery, you have taken our colors to brighten with a brilliant red your ecclesiastics and royals, while we contagiated you with our tireless smiles. Now let us taste you in your new garments. We'd like to see thru your engorged eyes and incorporate your assimilated happiness.

It's too late to turn back and contest it. Let's accept the past, but turn the table onto the future.

We ate everything and swallowed it dry, but now may we spit it out with a lot of flavor to make good for the foreigners' eyes and leave them hypnotized with so much hunger.

Our pau-brasil wood was taken away, we were left with just a name: "Brasil", while getting stuck with a stick. So, cover your assets, 'cuz now it's our turn at bat.

Pindorama is no longer! Never! No going back! Hail to the technologic indigenous of the digital revolution who wants more than a whistle blower toy.

We want more than your whites and blacks brought from far away lands, give us thine colorful data from the virtual worlds. But we want to find ourselves without getting lost in the depths of the jungles yet-to-be-dis-clothed.

Primitive now is almost gone, but maybe there are some Canneds and Bottleds in the burned bushes. Everything has been discovered and uncovered. Will we have to revert to being children content with our pre-logic, or will we be satisfied with the logic shop of forgotten revolutions of each year as new versions dictate?

To whom will The Contemporary Primal Scream belong?

Hail to innocence and purity! May they never lose themselves in the post-modern emptiness of the Matrix, the new belly button of the world!

Hail to the ignorance of the infant unknown to pixeland!

This time, what will the rich contribution of all mistakes be?

Hail to the En-Tropicalism of all the Souths.

Hail to the Laptop! The True Talisman of Happiness!

If someone presses the "delete" key, will history be erased? Good Ol' times those of the Red Telephone? It was just one button of reserved access limited to just one or two crazies. Now every loony has one!

So, let's blow those whistles at all the Cabaret Voltaires of every street corner.

The mind's sweatshop does not stop; the blood, sweat and tears run infinitum while the soccer, carnaval, coffee, booze, and brown-skinned beauties leave everything neon-bright and dazzling. The little boat floats at sunset as night falls and your moon fights for space with our sun.

Our neoconcretism is your concretism, let's make everything right, left, forward or backward, doesn't matter, everything's unisex, one-size fits all, made in China, imported and exported until it hurts.

Our cannibalism is your income source and pride in feeding us. Your trash is our treasure which we resell to you for twice the price. Our poverty is your window through which you feed your curiosity. Therefore, do not complain who is using whom, or who is eating whom. This is a two-way road and no one needs to get stuck in it.

In nature, nothing is created, nothing is destroyed, everything is transformed; and now in the new era where all are 1's and 0's, make your own mathematics and mixture, see what comes out of the anthropologic blender, which really has no logic.

Invention is the mother of necessity.

Transfiguration is a reaction of existence.

Manifestation is the subversion of "learned realities" in action.

FULL ABSTRACT

The background of my *Digital Anthropophagy* theory comes from the *fair use* conundrum of the Information Age. One of my own art practices is to create films from found footage and openly exposed media. I metabolize these materials into new contexts. In the creative process of this practice, in the age of the Internetworked Information Society as the producer of culture also engaged in remixing, offering a rich self-serving online buffet, I often thought of the Anthropophagic practices of some Brazilian indigenous tribes when they came into contact with their colonizers. The indigenous cannibal honorably eats the foreigner in order to incorporate his strength, experiences and qualities and to see through the cannibalized foreigner's eyes. But I find that in today's digital culture, we unceremoniously consume the world around us in a globalized structure, thus quickly acquiring worldly references and spitting them out in a personal but also somewhat homogenized way. We have thus become both the cannibal and the cannibalized because of the wide and immediate access to information and the incredible reduction

of time it now takes to consume that widely available culture. It no longer takes a passive person watching the ships arriving on the shore in order to consume what they might bring aboard, and conversely, for the colonizer in those ships to take away the riches they "discover" in far-away lands. Over five hundred years later, that exchange has now become cross-pollinated and more equal, and happening in an inhuman speed cycle. And the paradigm of power acquisition has now shifted from land ownership of colonies to ownership of information and creative property, especially engendered by the virtual world. This virtual world has started to disintegrate former imperialism and push toward a "democratization of access" and "freedom of use" of information. And so I offer an analysis of Information Metabolism which drives human experiences. I hope this work furthers the discussion on fair use of media, leading to a simplification of global fair use cultural models and practices in the age of digital culture.

Background history leading to my Anthropophagic Re-Manifesto for the Digital Age:

In 1928, a Brazilian Modernist author, Oswald de Andrade wrote the *Manifesto Antropófago*, (the *Cannibal Manifesto*). It was an assertion of the unique Brazilian voice in the emerging modern time, away from clichés of colonialism, while unapologetically metabolizing outside references from the First World. Over 100 years since Brazil's independence from Portugal, the moment of transformation had come! To devour outside artistic influences from Europe, and to finally incorporate all their developments useful to Brazilian culture, while seeking the Brazilian modern identity, strength and unique vision. It was as much a dictum against the colonizer's power, as it was a criticism of the colonized people's hunger for what is not their own. My manifesto-poem offers a new take on the original Manifesto and I call it a "Re-Manifesto", alluding not only to today's remix culture, but also to a re-assertion of previously colonized cultures into the new dynamics and context of cultural influence in the digital era. My *Digital Anthropophagy* position paper likewise, seeks to update that anthropophagic practice of cultural cannibalism to the digital age, proposing that the virtual world is the new frontier and anyone can be a colonizer.

In my Anthopophagic Re-Manifesto, I expose that the allure, the attraction of "the other" is mutual and that it serves to form a symbiotic relationship that feeds both peoples. The concept of "the exotic" is a two-way road, for if one has never seen the other before, their mutual discovery is of equal impact, and a curiosity to consume that newfound exoticism is occurring on both sides. The question thus is not about the symbiosis itself, but about the degree of positive influences and acculturation, especially in the era of an ongoing digital revolution. Of course the great line dividing this equality in colonial times was an economic one: the colonizer upon seeing a newfound land sees money, while the "found people" just sees unknown people. That very innocence of the Golden Age is the exotic raw material that so many in the First World seek, but beware as even in that innocence lies the cannibal spirit. And since there's no more land to discover, the colonizer has now become the entrepreneur who seeks to conquer the virtual landscape of 1's and 0's. But now the "innocent" is born with a much larger capacity to understand and dominate that virtual world. So now the entrepreneur is forced to invite who he or she sees as the cannibals into the game in order to keep the barbarians at the gate. And these little barbarians will grow up to be the entrepreneurs of tomorrow in an endless cycle of digital evolution. Thusly, anyone will be a colonizer, except this time nothing is done by imposition because the networked community functioning as a universal brain decides what gets served up, and consequently what becomes consumable in this natural entropic filtering process.

My Manifesto-Poem is therefore a new take on the original *Manifesto Antropófago*. It is but a glimpse through a prism reflecting how the indigenous Anthropophagic cannibalistic practice resonates to

today's civilized society, materializing as cannibalistic remix culture spanning the entire world in an age where virtually all colonies have proclaimed their independence. It's the new world order: anyone can chose to be either the colonizer or the colonized, and why not both?

DIGITAL ANTHROPOPHAGY

INTRODUCTION

"Anthropophagy": anthropos = "human being" + phagein = "to eat". Main definitions:

1. Cannibalism, as the eating of human flesh by a human or humans
2. Self-cannibalism, as the eating of one's own flesh
3. Eucharist, the ceremonial eating of the body of Jesus as wine and bread

In my view, these forms of cannibalism have transmutated into a new form, which I would like to propose as *Digital Anthropophagy*, meaning:

1. All the aforementioned Anthropophagic practices if done virtually, for example, with the aid of computers, social online networking, and other digital devices; or if executed in reality but facilitated digitally
2. A new paradigm of input/output models generated via the internet
3. A new practice of cultural consumption involving a technological mediation for input (both the feeding and the being fed), digestion, and output

OVERVIEW

Cultural Cannibalism from tribal origins to today's cultural practices through a mash-up of Biological, Philosophical, Social, Economic, and Artistic perspectives.

- DIGESTIVE PROCESS OF CANNIBALIZATION: ORIGINAL RECYCLERS and REMIXERS
- DIGESTIVE PROCESS OF CANNIBALIZATION IN HUMAN BEHAVIOR: ACTIVE AND REACTIVE AGENTS
- CULTURAL IMPERIALISM AND TECHNICAL BARBARISM LEAD TO A REACTION TO DEMOCRATIZE
- ACCULTURATION MODELS ACCORDING TO A PROPOSED POLYMORPHOUS CANNIBALIST PRACTICE

CHALLENGES

Human nature reacting to widespread availability of information and culture. Uncontrollable hunger to consume what's available and facility of "public as producer of culture" leading to uncontrollable media usage in the form of appropriation and re-appropriation, memes as an example.

- CYCLES OF CONSUMPTION / MEDIA BOMBARDMENT
- APPROPRIATION
- RE-APPROPRIATION
- THE NEW TECHNOCRACY
- THE NEW CANNIBALISM: TO PROPAGATE OUR HISTORY AND TO SECURE OUR IMMORTALITY

PROPOSED SOLUTIONS

Considerations for a free and democratic internetworked society.

In practical terms, common sense should guide us in helping to decriminalize the very pillars of freedom of expression and access to information as they are paramount in the new socio-economic develop-ment. In his book "Remix", Lawrence Lessig proposes five steps to help us walk the path towards more efficient and sound copyright law.

My own proposed methods involve:

- Credit your sources whenever possible! If you don't know who or where the material came from, use a standard disclaimer that invites the audience to contribute the missing information, much like in the Wikipedia model.
- Use a pre-existing international forum, such as Creative Commons to further internationalize the simpli-fication of copyright regulations into the Copyleft Model, and expand upon it to ensure owners of the creative property are getting paid in a fair method for the use of their work.
- If this model starts to fairly valuate the exchange of intellectual property, then Mafia-like organizations who collect money on behalf of artists will naturally become obsolete and disappear, just like in a process of natural selection and evolution.
- Treat other people's output as you would like yours to be treated, keeping in mind that imitation is still one of the highest forms of flattery, but that we have moved way past that simplistic form of content integration onto higher forms of remix culture and beyond, where everybody can win. New technologies will always bring with them new possibilities and probabilities that cannot be stopped or reversed. Therefore it is up to each of us to be creative in how not to lose profit but more importantly in how to gain new profit. And by profit I don't mean just money, but all that is made possible by being internet-worked. A new gateway to a new kind of enrichment.

References and Notes:

-Winner of the Flusser Award Distinction (Vilém Flusser Theory Award) at Transmediale.11, the work premiered at ISEA2010/RUHR – International Symposium on Electronic Art: Cyborgs and Transhumans. After ISEA2011/Istanbul, next presentations in 2011 at Moscow Biennale - Pro&Contra Sympo-sium: Media Activism; the International Congress Image, Imagination, Fantasy. Twenty years without Vilém Flusser; virtually from Berlin, Germany at ABCiber Conference in Brazil; and at Festival CulturaDigital.Br at Museum of Modern Art in Rio de Janeiro, Brazil.

-Initiated in May 2009 and completed in July 2010, in reality the work is morphing according to the inter-play with the date and place where it's presented. And thus the work itself becomes Anthropophagic.

-This text is an abridged version fit to ISEA2011/Istanbul print format. For complete paper, video version, or if interested in publishing, or bringing this performative work to your programme please contact au-thor.

-I am unfolding other forms of expression from my Re-Manifesto such as a film done via Facebook. The public is responding to the invitation by choosing phrases of my Re-Manifesto and self-recording reciting their lines and posting the clips on project page: http://www.facebook.com/pages/Re-Manifesto-Antropofagico-para-a-Era-Digital/174803579203744. The video will also exist as a finalized edited piece and spread virally online for unrestricted reuse by third parties, following the inherent concept in Digtal Anthropophagy. Please visit the Facebook link for more details on how to participate.

-More about the work on artist's websites:

- www.quietrevolution.me
- coming soon: www.vanessaramosvelasquez.me

-ISEA2011/Istanbul presentation sponsored in part by Step Beyond Travel Grants Programme / European Cultural Foundation.

A POTENTIAL LANDSCAPE

Jonas Ranft

Landscapes... Beautiful landscapes, of course: mountain ridges and beaches. The sea and the desert as they constantly evolve, retract & gain territory, change their very appearance. Did you know that not only does a wild sea roar but that dunes can sing? Landscapes are dynamic, and we're part of it.
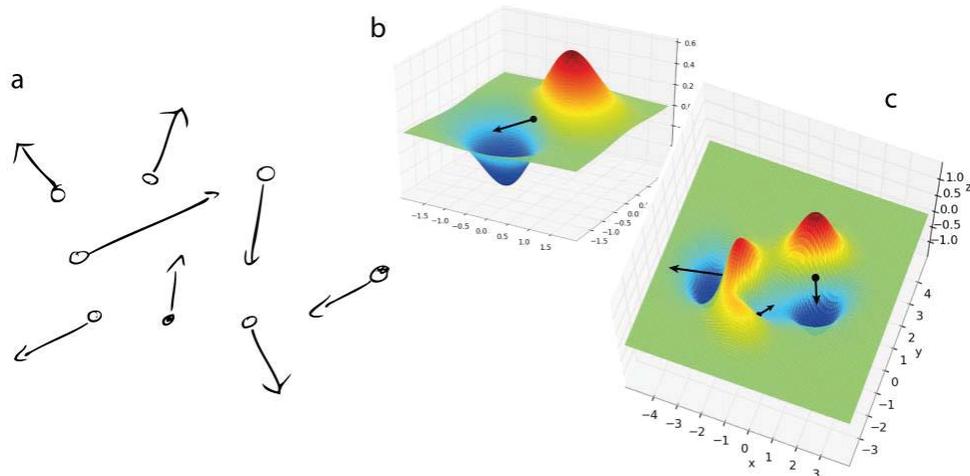
Fig. 1. (a) Sketch of agents that move on a plane, with speed and direction as indicated by the arrows; (b) the potential that corresponds to the motion of a single agent; and (c) the global potential landscape that accounts for the motion of all agents around.
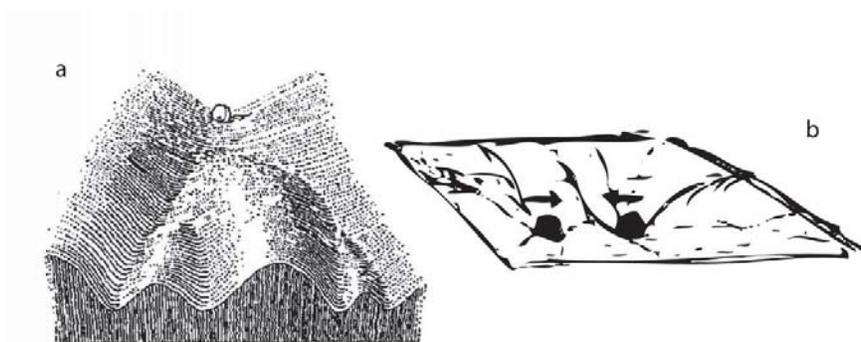
Fig. 2. (a) The epigenetic landscape as depicted by Waddington: The marble represents a cell that differentiates on its way down the valley, thereby experiencing constantly a new environment. (b) Sketch of two (actual) marbles on an elastic sheet which gets deformed, thus mediating an attractive interaction between the marbles.

```python
def single_potential_2d( x, x0, v0 ):
    """potential around single agent

    calculates the potential such that the gradient
    at agent's position equals the agent's velocity
    (overdamped, friction coefficient is 1
    in dimensionless units)
```



```python
    """
    a = dot(x-x0,v0)
    b = dot(x-x0,x-x0)
    c = - a * exp( -b/10. )
    return c

def find_rc( xi ):
    """determines the critical radii around multiple
    agents
    """
    na = len(xi)
    rc = zeros(na)
    for i in range(na):
        pos list = xi.tolist()
```

Fig. 3. The potential that corresponds to a given motion is combined of a skewed plane and a Gaussian cut-off, in order to remain localized around the agent.

Imagine you have a bird's eye view of a public square full of people. Some of them stand together chatting, one or two sit on a bench reading the newspaper. Others are moving around, crossing the square hastily as to catch the bus on the other side or just because they overheard their alarm clock this morning, being in a hurry all day since; some stroll around without any apparent destination, changing their mind once in a while and turning direction. What makes all those people move, what determines their pace? In the following, we hypothesize that these movements in space and their evolution in time can be understood as a dynamical system whose "inner workings" we aim to uncover.

Let's consider this dynamics from a more abstract perspective. Figure 1(a) shows a sketch of some 'agents' moving in a certain direction with a certain velocity, a simple representation of a given configuration of people on the public square mentioned above. We can now rephrase the above questions: How does such a configuration arise? How do these configurations evolve? Which forces act on the agents, confer momentum, make them go? Here, we unveil an underlying potential landscape that ac-

counts for these forces and thus explains the observed movements. This potential landscape can be considered as kind of a socio-dynamical analogue of potential energy in physics. Think of gravity: An apple that falls from the tree accelerates due to the gravitational force; this force results from a difference in potential energy between the apple being high up in the tree (more energy) and down low in the grass (less energy). Analogously, it is the ups and downs, or gradients, of the potential landscape that describe the varying forces that the agents experience in time and space.

So how does this potential look like? If it determines our behavior, can we feel it? Where 'is' it? These questions are difficult to answer. No, we can't feel it. No, it doesn't smell. The potential is invisible, of course – but it defines a landscape that we can represent.

Dynamics of the Unseen

First, consider an individual, a single agent. In order to extract the potential from the observed motion, we assume that (i) the velocity in amount and direction is given by the slope of the potential at the agent's position, and (ii) the potential forms a smooth surface without abrupt jumps or kinks. This is illustrated in Figure 1(b), which shows the potential around a single moving agent. Analogously, we can reconstruct the global potential for more than one moving agents in the very same way, where the slope at any agent's position corresponds to its velocity, see Figure 1(c). This potential landscape, however, is not static. Foremost, this is a matter of fact: We change our mind – and in the potential landscape picture this implies that the gradients change, hills and valleys move, too.

This is unheard-of: From the wills of the gods via Leibniz' pre-established harmony to voices in modern neuroscience – ideas that our actions are determined have been around. But the underlying dynamics has never been exposed so explicitly, as something that we can see with our own eyes.

Just watch it! The hills and valleys defining the potential landscape sweep across the square, and all the people can't but move accordingly. A little chitchat here: two people that meet on a flat spot. As the potential starts to bulk out, they inevitably separate, moving in two different directions, drawn apart. Then that lady over there: hurrying along as the steep potential gradient pushes her forward... It is a smooth, ever-changing landscape that we observe, almost reminding us of a heartbeat as it goes up and down here and there. Importantly, it is a social fabric: It is a single, joint potential landscape that determines everybody's pace.

There is another clue to it: Now that people can 'watch' the forces they are subject to, they may react. Trying to escape that determination. I'll prove my free will! Will I be able climb that hill? Defy the laws of motion? The potential seems to be one step ahead, however: In fact, it corresponds instantaneously to their supposedly free actions, and inevitably everybody continuously seems to follow the line of steepest descent. This states the ambiguity of our approach: In reconstructing "A Potential Landscape" *a posteriori* from the observed movement, it is the movement that precedes the potential –constructing it in a way that it accounts for the movement, it is the potential that causes the latter. What truly remains, is the constitution of a new social space: Even if it seems that we can't defy the laws of motion, we will soon realize that together we can create all kinds of patterns...

Fiction and Epigenetics

No pseudo-scientific vocabulary like 'force', 'potential gradient', and 'momentum' can betray the careful reader: the unveiled potential landscape is of course purely fictitious. Let's consider it as some kind of fiction, a story that is told, a game maybe. By taking it seriously, though, we might be able to learn something about dynamic landscapes in general. How can local dynamics be reconciled with the idea of a global, unified landscape? What kind of feedback can be conceived between a landscape and the dynamics of agents it might represent?

In the sciences, the landscape metaphor is recurrent: In biology for example, the epigenetic landscape provides a simple picture for epigenetic phenomena such as cell differentiation, serving as a means to explore by figurative analogy different aspects of the concept in question. In population genetics, the 'fitness landscape' – be it adaptive or not – describes the fitness of individuals with certain genetic traits; physicists speak about 'energy landscapes' when they refer to a system's potential energy as a function of space. It is the epigenetic landscape, introduced by Conrad Hal Waddington in 1940, which is the paradigmatic example of a dynamic landscape that evolves in time. [1] Waddington, a biologist, was interested in the apparent contradiction that stem cells can differentiate into different types of cells such as muscle cells and neurons for example, although every cell contains exactly the same genome which encodes the building plan for all the molecular constituents of a cell. Necessarily, it is not only the individual genome, but also the environment of that cell, that determines the so-called cell fate, i.e., which type of cell it will develop into. The epigenetic landscape, see Figure 2(a), describes this process of cell differentiation: As a cell starts 'at the top', it rolls down the hill, following a broad valley which is laid out by the genome. Later, the valley splits in two, and for the future differentiation it is important where exactly the cell reaches the branching point. However, this landscape is not static either, for two reasons: When a cell differentiates, it (i) changes its own gene expression pattern, and (ii) is most probably subject to an altered external environment, which is both reflected by a modification of the landscape. [2]

The potential landscape introduced above mimics that idea: The movement of the agents follows the slope of the potential, and as they move the potential evolves accordingly. Because the potential is calculated from the observed dynamics – "Tell me your velocity, and I tell you your potential" –, it is kind of a reverse engineering approach; only that the result is pure fiction. But if we do not insist on the "predicting" character of the potential, we can see it from a different angle: The derived landscape is dynamic with a time evolution that is determined from the of localized agents. As such, it is a complementary concept of landscape dynamics. On the one hand, it seems to be the opposite of the complexity of the epigenetic landscape, for which external driving and intrinsic dynamics of the landscape are in constant interplay. On the other hand, however, in the epigenetic landscape picture, a cell's course is not essential to the epigenetic landscape dynamics anymore: To the extent that the path of a cell follows the landscape, it is predictable from the landscape itself; to the extent that it is unpredictable, it is simply additional external input that has to be taken into account for the further time evolution. Whereas in the proposed potential landscape the landscape is nothing without the agents, the epigenetic landscape evolves and changes and adapts without necessarily including any cells at all in the picture.

Interaction

So what about the interaction between different agents? In order to answer questions like "How does A influence B and vice versa," I will have to elaborate more on the algorithm according to which the global, multi-agent potential landscape is constructed. Let's come back to the two necessary conditions

that qualify the extracted landscape as a (fictitious) potential of the observed movements of individuals. First, the velocity in amount and direction is given by the slope of the potential at the agent's position. Second, the potential should form a smooth surface without abrupt jumps or kinks and should not diverge at infinity. For a single agent, this is straightforward: We just combine a skewed plane of the right slope with a gaussian bell-like curve defining a cut-off, and we obtain a smooth function with the correct characteristics, see Figure 3. But how do we fulfill these requirements if more than one agent is present? If we simply added up the 'individual potentials' of two or more agents, the first condition would not hold anymore: We would obtain a smooth landscape, but with a slope different from the agents' respective velocities with which we started from. Somehow, we have to glue the individual potentials together in a way that the correspondence of slope and velocity is preserved. The motion of other agents' (B, C, ...) must not at all contribute to the local shape of the potential at the position of agent A.

This suggests that there is no interaction at all! This is true as far as the motions of the agents do not influence each other, which is intrinsic to the reverse engineering approach – otherwise the game could not be played, the agents' dynamics and the potential landscape would not be related in the stipulated manner. But as far as the dynamic of the landscape itself is concerned, the interaction can not be neglected: Whenever two agents are close to each other, the potential reflects this fact and changes its appearance! Whereas the people on a public square might not be coupled involuntarily by some real, hidden mental potential, they could well interact deliberately in response to each other. This is the social space referred to before: Once the proposed potential landscape is visualized in some way or other so that everybody involved can observe it, it opens up new perspectives on group dynamics and social behavior. It serves as a playground and catalyst for interactions that are not prescribed, but a response to the observed landscape dynamics.

This mode of interaction can be contrasted to actual, direct interaction, as for example between two marbles on an elastic tissue, see Figure 2(b). The weight of each marble deforms the tissue, which in turn guides the movement of the marbles towards each other. Such a system, however, is totally passive: Neither do the marbles choose a direction deliberately on their own, nor does the elastic tissue present additional forces that may drive the marbles apart. It would be worthwhile to construct an instance of a coupled system that tries to overcome such passivity, with a dynamic balance between active perturbation and passive response (see also [3] for experiments with "membrane landscapes").

The Potential Image

I want to dicuss "A Potential Landscape" from yet another perspective. This landscape is an image. The potential comes to life with its visualization, visual representation. In principle, this representation has to be three-dimensional, be present, re-present in real space. Leaving the technical implementation (and limitations) aside: What does this dynamic image of hills and basins tell us? First, we notice that spatial structure is intertwined with evolution in time – there are no stationary structures, the height modulation corresponds to a temporal dynamics. Then, we may decipher that there is a connection between the potential and underlying agents, their movement and the dynamics of the image. But what do the hills signal? Are they not indicative of some kind of a presence, telling the observer "Here is what you look for"? Analogously, what do the basins tell us? We find that they are essentially empty, void of meaning. The agents are localized at the points of inflection, where the slope stops to grow and starts to diminish. Whereas the maxima and minima of a curve are defined only with respect to an up and a down, the inflection points are intrinsic to a curve independent of a defined axis. This is why Bernard Cache, an architect-philosopher, calls these points "intrinsic singularities" and considers them as the

"primary image" - like an image atom - from which whole territories are derived. [4] I want to close with a quote from his book *Earth moves*, which captures the image aspect of "A Potential Landscape" remarkably well:

"Just a hill and a valley and nothing more allow for all possible becomings. Space is thus no longer a juxtaposition of basins but a surface of variable curvature. We will no longer say that time flows, but that time varies. No settling is possible in such a landscape: variable curvature turns as into nomads."

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1. *Conrad Hal Waddington, Organisers & Genes (Cambridge: Cambridge University Press, 1940).*
2. *In the absence of a microscopic theory of life and a quantitative understanding of all the involved processes and signaling pathways, the epigenetic landscape must remain a mental image. Still of today, however, the epigenetic landscape is a widespread metaphor in the biology community and featured on many introductory slides in talks about epigenetics. Whether it is still of conceptual use, referred to for historical reasons only, or rather intellectual dead weight that is in the way of new, more precise concepts of epigenetics, I do not dare to speculate about.*
3. *Sara Franceschelli, "Dynamics of the Unseen," Proceedings of 12th International Generative Art Conference (GA2009), Milan, (December 2009).*
4. *Bernard Cache, Earth Moves: The Furnishing of Territories, trans. Anne Boyman (Cambridge, MA: The MIT Press, 1995).*
5. *A processing sketch illustrating the ideas and algorithms of this paper: "A Potential Landscape [v0.1]" which can be found at http://www.pks.mpg.de/~jranft/dynlan/potlan.html (accessed June 8, 2012).*

VISUALISING EMOTIONS AND AUTISM

Barbara Rauch

The e_Motion research proposal integrates 3D visualization, haptic technology and rapid prototyping as a window into the Autism Spectrum Disorders (ASD) mind. It represents an exciting evolution of past work done on emotion and digital media. Through the research of Simon Baron-Cohen and others we have learned that ASD falls along a broad spectrum.
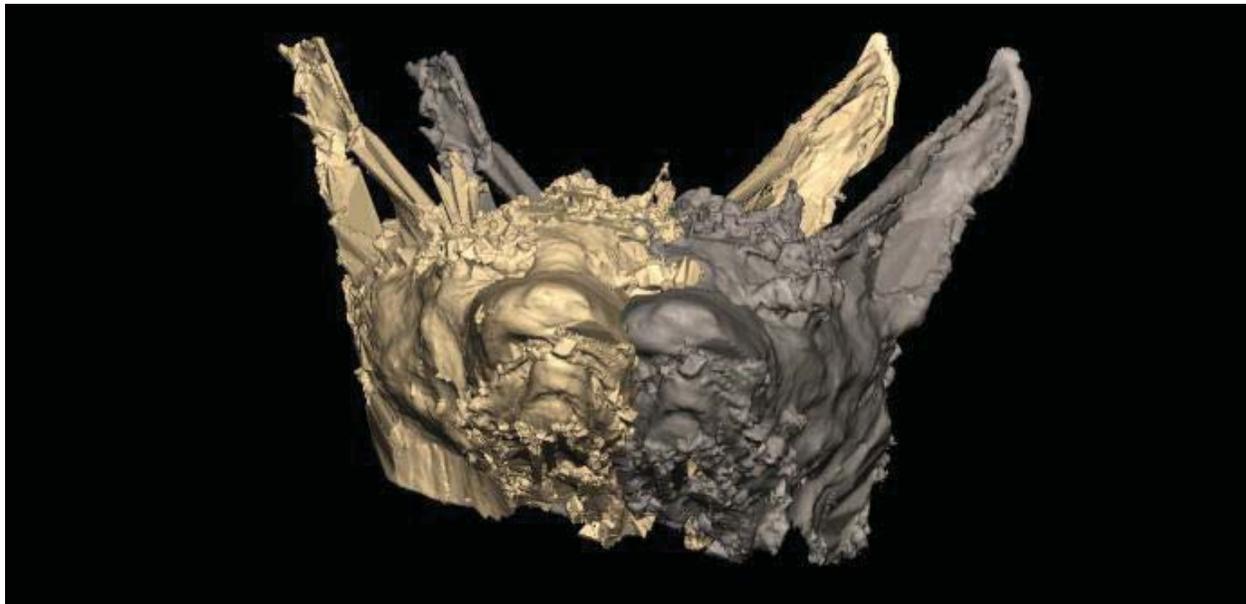
Preface
It is now well known that many ASD people are visual thinkers and learners, and this paper proposes new research to utilize state-of-the-art but 'APPROACHABLE' digital technologies that will allow the autistic person to speak with distinct and enhanced visual voices. This differs from art therapy in that it will lead to a better understanding of how ASD individuals think and feel, through visualization. That the products of creativity might allow psychologists and neuroscientists to better place individuals along the ASD spectrum is especially critical.

This research paper outlines a unique contribution emphasizing emotion and visualization through digital 3D production and haptic technologies. The project is still in its early stages of production, however it has initiated the outlines and hypothesis of a promising cross-disciplinary study that also introduces a PLAY method for emotion rehearsals.

Introduction: Engaging Autism at e_Motion Lab
The discussion of affective computing that Rosalind Picard introduced in the mid-1990s is rather interesting to me when it comes to machines learning about affect and emotions. If we claim that we are ready to produce synthetic emotions to build affect in robots, we seem to know a great deal about them. Here, I am concerned with finding out what happens if emotions go wrong. At 'e_Motion Research Lab' we work together and investigate with the autistic person, or more correctly the person on the Autism spectrum disorders (ASD) who serves as a case study for a malfunctioning of emotion handling. The autistic person's main goal is twofold: it is to learn to read and respond emotionally to signs of emotions and of equal importance to experience emotions in their full meaning. It has been questioned whether the autistic child can actually learn to experience true emotions. I am investigating in the floortime approach introduced in 'Engaging Autism', a book by Stan Greenspan, in which he delivers thorough research that helps autistic children to relate, communicate and think in a meaningful way. The work suggests that the psychology therapist has to examine the developmental stages of the very young child and go through the learning processes with the child (and parent) step by step. They initiate creative situations by employing a Play methodology. What I bring to this approach is the use of haptic and

tactile interfaces to generate and also measure emotional feedback and affective creation. I suggest that the haptic technological interface research might enhance emotional and affective experiences through the hands-on creation process.

Intersubjective Approaches to Influence Emotional Communication
How do we learn a language and/or social skills? We seem to build on personal experiences; we create a model of the world that is being constantly updated. However emotions are very subtle and the autistic person seems to be less tolerant of emotional responses that differ from the model they had just adopted. By this I mean to introduce the subtleties of facial or bodily gestures that communicate all shades of emotional correspondence.

The problem with emotions is that we need emotions to make creative choices but also emotions and feelings are necessary in order to make rational choices. Affective computing talks about this problem of affect and emotion not being the same: affect is central to our understanding of culture, in particular to the postmodern debate; the body and its capacity for sensation is informing cultural theory - its discussion about how society and humanity are far more complex, and cannot be reduced to a diagram. Picard (1996:1) defines affective computing as "computing that relates to, arises from, or influences emotions." (She coined the term in the mid-1990s.)

My earlier attempts to visualize emotions came into being when I worked on a study about facial expressions. I employed Paul Ekman's understanding of universal emotions, expressions of the face that can be understood across cultures. His classification of basic emotions into a list of six distinct emotions (anger, disgust, fear, happiness, sadness, and surprise) was later extended to include guilt, contempt, shame and others. I initially used a list of seven emotions by adding contempt to the original six basic expressions. This allowed me to select distinct facial expressions in the human face that are identified with being happy, sad, disgusted, afraid etc.

Through a previous collaboration with the University College London I had access to a large 3D database of the human face, where I suggested adding new scans, namely scans of a smiling, frowning, surprised or disgusted face of a man. Furthermore I was interested in discussing the evolutionary aspect of emotions, not unlike Darwin's interrogation of expressions of emotions in animal and man. I therefore included a fox's neural expression in the very same large database. This allowed me to morph not only from a happy to a sad person, but I could now also animate the face to become more fox-like, with a happy or sad expression on its face. This model will be used in a study to test facial expressions and mimicry in the autistic person.

Several research creations were produced using this large database. Works include 'emotional degrees' (animation), 'interFaced' (sculptures), and 'friends' (hybrid digital representations of merged faces). I will include images of these works. Copyright Barbara Rauch.

In his book 'Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life' Ekman (2003) describes the importance of the face in human communication. We all recognize a smile, we mimic it and so does the infant child.

The autistic child however might not return a smile, and it has been discussed whether this is due to the child not being able to read the emotion of the mother more generally, or if this is due to a frustration

caused by the child not being able to clearly identify or classify slightly different emotional expressions on the face.

The study of emotions in autistic people has been addressed by numerous researchers, and one particular theory is of importance to my research and this will be elaborated here. When discussing the issues of emotions in humans we relate concepts of consciousness, mind, empathy, and evolutionary biology, animal study and social neuroscience; all of the named concepts address the debate of an emotion theory and the theory of mind (ToM).

If a subject has an understanding of self and other, place and time, the person will be able to simulate a situation or even imagine someone's thoughts and intentions. And this is what seems to go wrong in the autistic child's mind. Theory of mind impairment sometimes referred to as mind-blindness discusses the inability of the autistic person to understand that another person has her own thoughts, this of course also includes feelings or emotions in response to particular incidents that the other person might experience.

Imitation, mentalizing and empathizing are skills that the young child acquires by mimicking and learning, however it seems that the autistic child might not have a very robust theory of mind (Baron-Cohen 1985). 'Theory of Mind' is what Baron-Cohen refers to as 'social reciprocity'. It is important as a social skill to pay not only attention to others, but also to others' intentions. The learning of other and self is usually mastered by a young child of 2 years of age. (See chapter 2, PhD thesis, Rauch 2006.)

The ability to imitate, mimic, mentalize etc., allows social-cognitive achievements, perspective taking, empathy: all these are the base for a theory of mind. The ASD child does not mimic the mother's gaze or smile, because it seems she cannot read exactly, as the face might vary too much for the ASD's liking of systematic answers and clarity in the expression. There is fascinating research on the interaction of the autistic child with robot toys that confirm this bold statement (Kaspar the friendly robot or soccer-playing humanoid robot Nao have both been developed for use treating autistic children).

Stanley I. Greenspan in 'Engaging Autism' (2006) points out how important early signs of autism in infancy are and in describing and advocating the floortime approach and the DIR program parents and therapists can intervene and help the autistic child to learn how to develop social skills. Greenspan reiterates how important it is to learn each step in the development. One has to be able to engage in basic attention, to be able to share a world to be able to develop higher levels of abstract thinking. And since this is one of the main problems that have been identified in autism, 'e_Motion Lab' research takes the specific object and then generalizes it to create a prototype image or memory of it. The digital data can then be treated like clay or other materials to manipulate, pull and push the data to play with iterations of the very same prototype.

Temple Grandin's work in 'Thinking in Pictures' encourages visual thinking over verbal expression. She talks about the frustration that the child will experience by not being able to label and express a particular emotion, resulting in the child's turning away from emotional data and instead concentrate on objects, toys or systems that are more reliable. By introducing models that the ASD person can identify with this will be a huge opportunity to create specific and recognizable representations of emotions almost on demand. The lab is linked with an adjacent rapid prototyping set-up where we hope to introduce 3D printers that range from handling material output that is soft resin, hard and porous plastic/ceramic shell and paper modeling using lasers, additive and substructive sintering machinery.

Temple Grandin elaborates on her particular interests in systemizing designs. She explains that the ASD has developed a hypersensitivity to detail and individual blocks of information. ASDs often are talented in the breaking down of complex models or designs into small parts.

Grandin is a high-functioning autistic person, and in the near future we will be working with ASD adults and ASD artists and designers who would be encouraged to work with complex data sets; they would be touching the data using haptic and other sensory tools. We speculate that their particular sensitivity with touch and feedback will produce a unique body of designerly and artistic work. The fluid data set would offer a rehearsal situation for their emotional frustration, they will be altering faces or change objects to their liking. And I hypothesize that this body of work will be revealing insights into the unique haptic and sensory skills of the emotionally challenged ASD. (REB approval in process.)

As mentioned above e_Motion Lab works not only with autistic people. We collaborate with artists and designers on creating through haptic devices and visualization tools and techniques. We recently received funding to stage a PlayShop workshop series employing a Play Methodology. My particular workshop hopes to deliver insights into emotions and feelings and the use of technological tools and to apply these findings to enhance the potential expression of emotions for the ASD person.

Emotions and feelings are probably the most confusing phenomena for psychologists, biologists, and those working in general in the sciences and humanities alike. Artists and designers have over the centuries devoted themselves to work on questions of and around consciousness and emotions. This is not just because emotions and their expressions often withdraw themselves from verbal reports but they are expressed equally both internally as feelings and sensations and externally as bodily gestures or facial expressions.

Being such a complex issue many influential researchers have engaged in emotion studies; Charles Darwin was as an early figure of evolutionary biology and William James (1890) an early key proponent of the psychology of consciousness; Dennett as a contemporary philosopher within cognitive studies, and his method of heterophenomenology, when it comes to the study of one's own mind. But if it is for Dennett we are all just conscious robots. On the other hand Joseph E. LeDoux and Antonio Damasio confront us with their neurological views. In Descartes' Error (1994), Damasio outlines how important emotions are for rational decision-making. He explains that reason and emotion are not separate; instead, mind and body need to be examined and explained in tandem. Damasio also explains the difference between emotions and feelings, as emotions happening in and with the body, while feelings are reflective and conscious experiences in the mind.

For facial expressions, emotions and bodily emotional gestures I want to highlight here again the work that Paul Ekman has done over many decades. Ekman's examples of how to read emotions on faces will be explored. Ekman created hundreds of photos; some are collaged works since they are difficult to make on demand. One approach in the workshop will be to improve our ability to read the face of the other. We will mimic and play with toys, so as to create a basic means of communications between ourselves.

We will study Robert Plutchik's psychoevolutionary theory of emotion in more depth to employ his wheel of emotions in our Play workshop session. If we consider his elaboration on emotion and cognition, emotions are really developed to help predict future events. Emotions are there for survival of the species and they serve as cognitive information about our environment. In that sense they are not linear events but feedback processes, they are in loop to restore a state of equilibrium in the body. This is true

for internal as well as external stimulation i.e. dreams trigger much of our emotion processing in the amygdala of the brain, where emotional data is mainly being processed.

As for the planned three-dimensional colour wheel for emotion concepts, Plutchick has developed a 'circumplex' model that not only represents emotions and their intensity but also explains how emotions can be combined. In addition the wheel has been used as a tool for personality labeling. I would hope that by playing with the model we will also examine how we relate to each other's emotional states.

The e_Motion Research Project (e_MRP) looks into Autism Spectrum Disorders as a model for understanding the mind of the other. With facial expression and reading emotions through an intersubjective approach, we explore both the relations with oneself and an object and the manifold relationships between subjects and externalized others.

Through these imaginative play or pretend play situations we create scenarios in which one engages in make-believe situations. Imagination and pretending helps children and adults to rehearse actions and sequences of actions; they can play out their ideas so as to rehearse for later in real life situations.

The Play Methods Workshop will be considered such a rehearsal situation. We aim to visualize the information we have gathered and hope to come up with some infograph/ sketches for the sessions. It is hoped that the visualization employs Csikszentmihalyi's theory of flow, the 'optimal state of experience' and deep immersion in the experience of one's self.

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STITCHTURES: INTERACTIVE ART INSTALLATION FOR SOCIAL INTERVENTIONS

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The purpose of this paper is to describe the design and development of Stitchtures-interactive art installation for shared spaces. Physical and digital co-design activities are described in the development of the piece inspired by biological systems and collective behavior. The combined methods respond to the specific aims of the project, which investigates the effects of design and technology interventions on aiding interactions among people.

no caption

INTRODUCTION

Interaction with other individuals seems to be a simple operation but may represent a challenging task for some people. Shared common areas in public spaces are great opportunities for interaction. Yet, sometimes they are highly underutilized. Designing interactive art installations for shared common areas

in public spaces can help people counter act lack of human interaction. An interactive design that bene-fits and grows from the involvement of multiple people may allow individuals to connect through inter-active creation. The purpose of this paper is to describe the design and development of an interactive art installation, Stitchtures, for shared spaces. The specific aim of the project is to investigate the effects of design and technology interventions in aiding interactions among people.

STITCHTURES FRAMEWORK

The overall goal of the project is to investigate the effects of design and technology interventions among older adults in common shared areas. We identified different motivations to develop Stitchtures. One is related to increasing interactions among people. Another motivation is related to bringing people closer to nature and art. Lastly, motivating people to move is of central importance.

Stitchtures is an interactive art installation for people. It is a dynamic piece that encourages people to interact with it. As the interaction occurs, the art installation evolves. Consequently, evolution of the art installation is dependent on the interaction of individuals with both single (one individual) and multiple (multiple individuals) contacts. The installation consists of a series of overlapping three-dimensional pat-terns inspired by everyday objects. Interactions with the art piece occur via sensing technologies that were informed by biological systems. As people approach and interact with the art installation, visual feedback of differing modalities invite, motivate and engage users. The next sections describe the de-sign and development of Stitchtures.

PHYSICAL AND DIGITAL CO-DESIGN

Designing an interactive art installation encompasses design in the physical and digital realms. These realms cannot be separated. Instead of foregrounding the creation of interactions and interfaces that map onto and access digital information, there is a need to explore when and how digital computational media can be drawn back to the physical environment and how physical interactions can model digital behaviors. [1] This practice can be referred to as physical and digital co-design. Co-design requires a col-laborative and interdisciplinary team. As such, different disciplines including industrial design, human computer interaction, and computer vision were brought together to respond to the needs of designing an interactive art installation.

CONCEPTUAL DESIGN DEVELOPMENT

The design of this project began with team members from industrial design. Early explorations involved studying how to materialize interactions and how those physical representations can coexist with digital interactions. Initial explorations included developing concepts that addressed the ability for technology and design to contextualize users withdrawn from their surroundings. The design team began with a focus on studying patterns. One of the earliest considerations used analog cell phone flashers (flashing LEDs from frequency waves) to create reactions within a patterned system. In this version, the intention was to bring attention to the effect of self-isolation on one's surroundings and helping others realize that they are continually involved with their environment and those around them. The issue of the con-cept was limited by the fact that the end user would not consistently use such technologies to activate the interaction as expected.

During this phase, the team focused on studying examples of interactive art installations that were interactive and reactive. Wall projects include the Adobe interactive installation; [2] the Aperture facade installation with interactive and narrative displaying modes consisting of an iris diaphragm matrix, whose variable diameter is the main interaction with the piece; [3] and the Living Wall project, [4] which aims at creating electronically enhanced wallpaper with touch sensors, LED's and Bluetooth technology, allowing users to touch decorative elements of the wall to turn on lamps, adjust heating, or activate a stereo. Lastly, the interactive wall Mes Etoiles responds to proximity of people. The closer one gets to the wall, the larger number of dots are light up in the surface activated by the embedded proximity sensors and LEDs. [5] All these examples represent a way of using designed surfaces for people to communicate or to build collective creations using their bodies as instruments.

Having examples of interactive art installations, Stitchtures iterations focused on surfaces development. Investigation of patterns included developing a moodboard containing references to adult's everyday objects such as clothing, linens, upholstery, décor and jewelry. The goal was to lead design decisions around familiar forms while avoiding the presence of obtrusive devices that may intimidate or discomfort the users. This approach responded to the need of bringing about a physical design that was familiar to our end user.

As the refinement phase of the pattern progressed, a repetitive floral motif emerged, similar to a quilt. Quilts are physical comforters made of repetitive patterns traditionally composed of three layers of fabrics combined using the technique of quilting. Meaning, the joining at least two fabric layers by stitches. This allowed the team be inspired not only to develop a layered three-dimensional pattern but also to use conductive thread for stitching the pattern as a unified installation. Quilts also evoke the idea that users are building this piece by stitching together the sections of a whole. Simultaneously, it also allows the design to be linked to nature by emphasizing the plant and floral aspects of the form.

Digital interactions were also biologically inspired. By looking at nature as a source of inspiration and innovation, the art piece's core idea was framed on behaving like a living plant that requires care and attention (interaction). Through different versions, formal designs were simplified, abstracted and molded individually from natural variations of the Clematis flower (Clematis Vitalba, Clematis Jackmannii, and Clematis Stans respectively). As an integrated pattern, forms were refined by looking at the behavior of the liana. The liana vine uses trees and other vertical support to climb canopies to reach sunlight. This intertwining concept was adopted. The art piece was the designed with growing sections that permanently light up and, like the liana, they go from piece to piece and connect all the pieces as the art piece grows.

The final design consists of several layers containing a total of 52 modular pieces and distributed in a designated area of 97.25x84.50x10 inches from the actual retirement community common shared space. There are three different types of layers, which have a distinctive pattern designs. One of the layer designs covers a grid area of 4x4 modules with 16 modules. Each module is 21.75 x 21.75 inches. Additional layers cover a grid area of 4x8 modules with 28 modules. Each module is 21.75 x 14.75 inches. All modules are cut from transparent acrylic, of which two of the three distinctive designs are white fabric backed. These are attached by architectural aluminum rods, which allow the hard wiring to run throughout the piece. All modules are hand stitched with conductive thread to bring power to LEDs. Each modules hold white colored LEDs.

INTERACTIVE TECHNOLOGIES DEVELOPMENT

In order to promote a more natural form of interaction with the art installation, the interactive technologies development phase was based on behavioral patterns found in nature connected to communication. For example, behavioral communication patterns were noted in how animals interact at close proximity. As input mechanisms with the art installation, proximity patterns were defined to provide an active area large enough for two or more people to interact with the piece and prevent situations where users get drawn too close to each other that it repels them or too far from each other that they don't interact.

In terms of output mechanisms in the art installation, there was a need to provide an unspoken language that is easy to recognize to the users. Blinking was defined to lure users closer to the piece. The design decision was inspired by fireflies and how they use blinking lights to lure their mates. Additionally, the monochromatic white light and fabric mimics species without defenses that need to blend with the environment. [6] This mimicry creates a more relaxed invitation that uses the idea a defenseless animal to make the piece approachable instead of using the shocking invitation of bright colors to bring users into interacting with the art installation.

The result is an interactive art installation where the only form of feedback is through the use of monochromatic light. Sets of white LEDs accentuate sections of individual modules becoming the voice of the piece. Approximately 2000 LEDs create a series of organic patterns in three types of interactions: invite, engage, and motivate. Each interaction has its own method of communication (see figure 5).
For the invite interaction, blinking is used to attract users to the art installation. Once an infrared range finder detects a user in its 5-meter sensing range, the LEDs on the outermost layer starts blinking (pattern #1). As the user gets closer, the blinking slows down until the LEDs become permanently on.

At close proximity, the piece focuses on the engage interaction. This form of interaction is centered on real time feedback that responds directly to users' actions. Phototransistors detect shadows casted by users and immediately respond to the user's actions by creating dynamic light patterns in the back layer of the piece (pattern #2). The more users simultaneously interact with the piece, the more patterns become lit up.

Finally, to encourage users to continue interacting with the piece, the motivate interaction is implemented. Inspired by plant growth, the motivate interaction is based on the amount and type of user input. As users interact with the piece by activating the phototransistors, sections of the last layer (pattern #3) permanently light up. This permanently lit state represents the growth of the plant with ivy like shape. The more users interact with the piece, the more the plant grows and the more sections of the piece permanently light up. To control the growth rate, a timer determines when the next piece should light. The count is renewed when a new section is lit. Conversely, a second timer initiates to control the to decay of the plant, turning off sections when no interactions occur. Additionally, the piece accounts for collaborative actions in the motivate interaction mode by only lighting the center sections of the circles when two or more people interact with the piece.

CONCLUSION

Bringing design and technology to common shared areas in public spaces may increase social interaction among people. This paper described the physical and digital co-design of art pieces inspired by nature. Designing art installations to aid social interaction remains to be explored. Yet, Stichitures was designed to be an interactive installation that creates an environment which proliferates communication through

the meeting of design and technology. This dynamic piece encourages people to interact with it, which causes the art piece to evolve. However, the evolution of the piece depends on the interaction of multiple individuals; a single individual will only have a temporary effect on the piece. The co-dependence on others inspires communication between individuals, which builds to create a greater sense of connection on a human level.

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FLYING ROBOTIC ARTS FOR HRI AND INTERFACE RESEARCH

Nicolas Reeves & David St-Onge

The SAILS research program consists in developing geometric objects that can stabilize, move and rotate in the air, and that are able to develop behaviours and assemblages through emergent processes. This paper will focus on the qualitative results of this massively interdisciplinary project, which presents many examples of situations where questions and needs required by the art realm have led to techno-logical premieres.
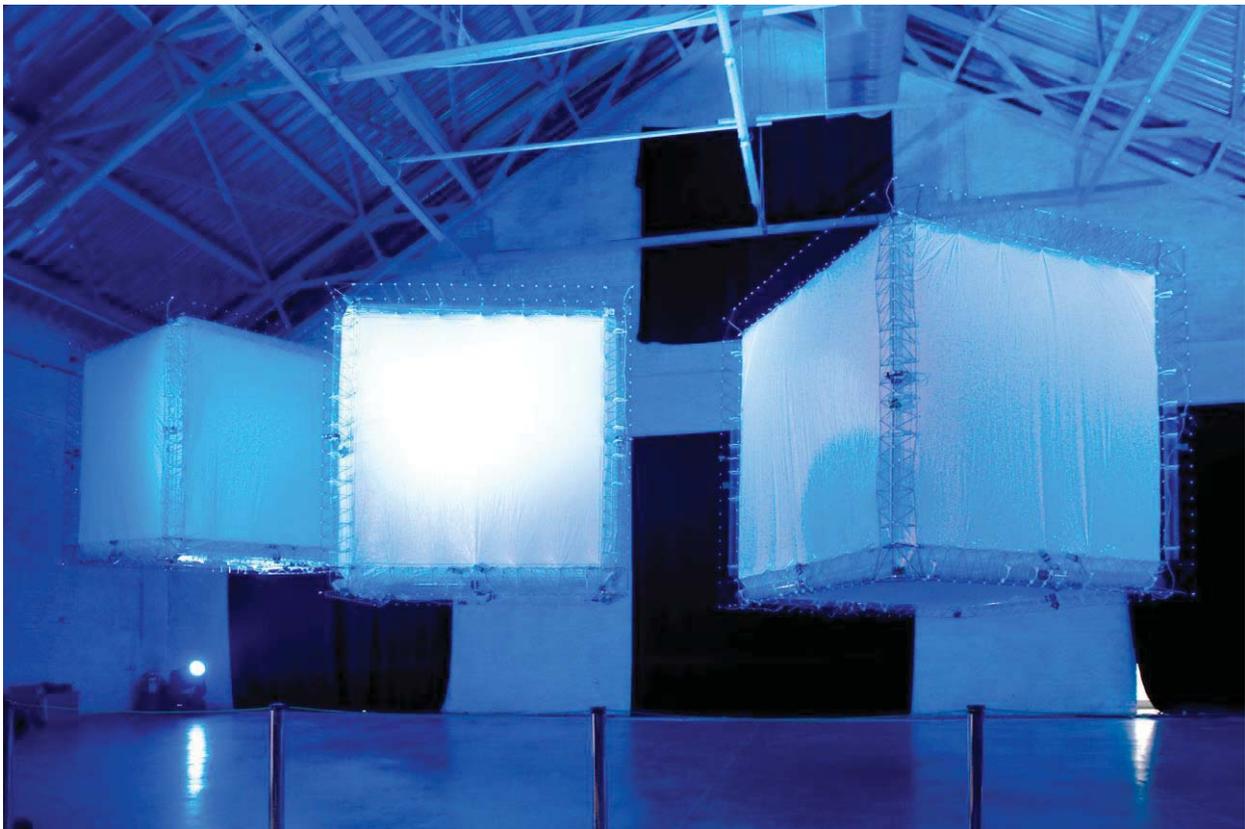
Fig 1. Three Tryphons flying cubes from the SAILS project during the Geometric Butterflies performance. Winzavod Contemporary Arts Center, Moscow 2008. Photo by A. Ablogina.
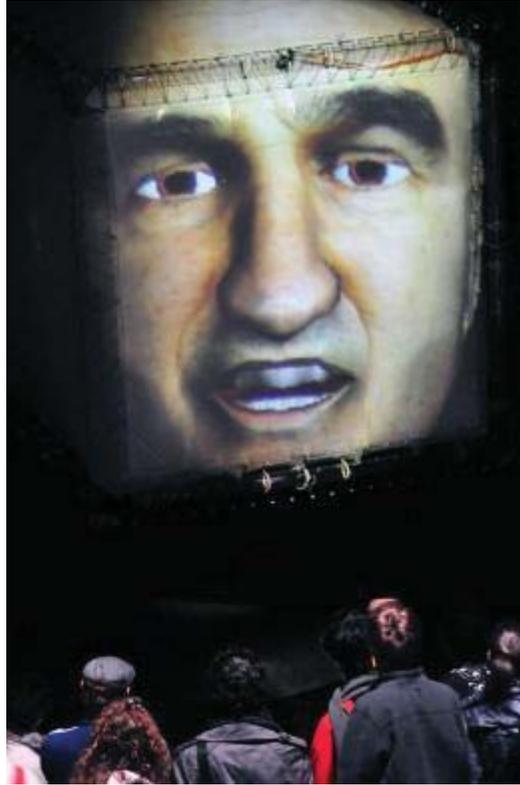
Fig 2. Stelarc's prosthetic head, projected on a flying cube from the SAILS project during the Floating Head experiment. Elektra festival, Montreal 2010. Photo by Elektra.

1 - Introduction

The use of machines to convey impressions and emotions is everything but new. They are reports of vapour-activated automata, designed to impress worshippers in ancient Egypt. Human-like or animal-like automata were a trend in XVIIIth century Europe. As impressive as they might have been, these machines were seldom considered as art pieces at their time: they were more considered as pertaining to advanced crafts than to Beaux-Arts. Some were seen as amusement, or as demonstrators for their author's technological skills; others were scientific devices, meant to explain or understand biological phenomena. It is only by the end of the XXth century that robots began to be created for solely artistic purposes. From then, the progressive development of efficient automated learning processes, supported by the availability of sensors of all kinds, quickly led a part of the art community to create robots whose only objective would be to generate artificial emotions and impressions through interactive processes.

The SAILS research-creation program was originally developed for such purposes. Developed for now more than five years in the NXI Gestatio Design Lab, directed by Nicolas Reeves, it aims at developing autonomous cubic flying robots for artistic performances and exhibitions. It brings together engineers,

scientists and artists in a unique collaborative work process. [1] [2] The *Tryphon* is the latest aerobot developed within this program. It consists in a cubic polyurethane bladder surrounded by a cubic exoskeleton made from composite materials. Its overall size is 225cm. The Tryphons' predecessors were the prototype M180t (180 cm) and M170t (170 cm) *Mascarillon*, whose structure was made of basswood, and the M160c *Nestor*. This paper will discuss five performances with the flying cubes that occurred within the last years, focusing on the reactions that these objects triggered among various audiences.

2 - ROM<evo>

This performance took place at the Quebec Museum of Civilization in 2006. Three flying cubes, floating in a closed room, were programmed to avoid obstacles. The entrance of a visitor would trigger a series of events. First, one cube would stabilize in front of him. Then an external, adaptive video projection system would map on two faces of the cube the eyes of a hidden actress, whose voice, coming from hidden speakers, started a discussion with the visitor. The actress could actually see and hear the visitor through a microphone, a headset and several video screens. The scenario of the performance was similar to a robotic version of a Türing test; the actress was instructed to speak as if she was a machine, unable to understand the subtleties of a human language. For the robot, every word, every sentence was to be interpreted as a code: a system where each expression corresponds to one and only one meaning. It was unable to understand second-degrees, analogies, or metaphors. It began the performance with almost no knowledge about humans, and tried to accumulate information through its limited exchanges with the visitors.

A wealth of intriguing reactions intervened. Small babies were particularly attracted by the cubes. This was all the most surprising: apart from the gigantic projected eyes, no element of them could recall anything from human or animal beings that babies generally like. One hypothesis is that the slow oscillations and movements of the cube, which constantly repositions itself through its sensors and ducted fans, was seen by the toddlers as evoking a soft, gentle giant organism.

Another visitor spent a long time trying to teach a poem to the aerobot. The interesting point here is that the language of the cube is diametrically opposed, on a semiological level, to a poem: where the former tries to look like a code, a closed system where the meaning of each word is precisely defined, the latter corresponds to a form of text that is open to various meanings and significations. One can make the hypothesis that the visitor, knowing that the cube was eager to relate with humans, was trying to teach him a form of communication - art - that remains the privilege of mankind ; and to tell him implicitly that no real exchange would occur without a basic knowledge of the role of art on human communication.

Another curious event occurred when an old lady came into the exhibition room and began telling about herself to the cube. She came several times, and she talked about her feeling of loneliness; she explained that her children never visited her; and so on. Such a speech is not that surprising for an old woman; what is more intriguing is the fact that she could talk so freely about intimate matters to a huge cubical machine. Here again, we can only make hypothesis about her behaviour; but she certainly anthropomorphized the flying object to a degree. The presence of the projected eyes may have helped in that respect, but this is all but sure, since other visitors were literally scared by them. It may be more fruitful to compare this situation to a psychotherapy session: she may have seen in the cube an empathic entity that, precisely because it is so different from a human being, would not put any judgement

on what she was saying ; she could talk to it as long as she wanted without detecting on the cube symptoms of impatience or boredom that people frequently encounter when they repeat the same story several times.

This event also led to unexpected kinds of interactions. When a visitor was entering the room, the air currents created by his displacement and by the opening doors drawn more power from the cube's ducted fans, whose noise became louder. This created a supplementary reaction of the aerobot to a human presence. The same thing happened when groups of several excited youngsters came to speak together with the cube. Since their displacements were triggering air currents, and since the sensors detected more agitation, the cube looked excited as well, through its own reactions to the air flows, and through the reactions of its motors, which were striving to restabilize it.

Another intriguing observation has been made: the answer of the question to know if a human being was hidden somewhere in the system depended closely on the formation and education of the visitor. The people who were the most successful at finding the real answer were coming from the art community. Most scientists where convinced that the whole system was robotic, and that it included advanced modules for language interpretation and generation. It is worth remembering that no such modules existed in 2006, and hardly exist today. Further discussions revealed that the elements that led some people to find the answer where actually linked to very subtle changes and modulations in the eyes and voice of the actresses; these changes could never, for them, be generated by a machine : they could only be human. It is precisely this kind of observation that has the potential to open research tracks in psychology, HRI, neurosciences, and the like. This experiment led us to consider the impact on visitors of a similar aerobot whose vocal interactions would use a completely artificial system, based on a voice-recognition program coupled with an artificial locutor. This development has become one of our priority research axis.

3. The Summers of Dance in Paris

No direct interactions with people were planned for this event, which was seen only as an opportunity to test autonomous interactions in difficult circumstances, with large audiences. The aerobots would try to mimic human movements through their own translation/rotation vocabulary. All displacements were made through assisted, partially automatic remote control.

In the summer of 2008, we were invited to fly three Tryphon cubes for the Summer of Dance in Paris, within the gigantic nave of the Grand Palais. In such a space, the air streams caused by convection and differential pressures generate an aggressive flight environment. All the mechatronics and stabilisation algorithms had to be completely redesigned prior to the event, in order to ensure proper a behaviour of the cubes over a dancing crowd, in such a wide space.

Calibration times were particularly long because of strong air streams, and the system only worked properly on the second performance. The first performance had to be made through semi-autonomous remote control: the movements of the aerobots were partly induced by direct commands from the pilots, coupled with self-stabilization and collision detection. Our degree of control on the robots allowed us to make them act like dancers in the air, or even on the dance floor. Their movements were determined mainly by the reactions of the pilots to the music, which were themselves influenced by the general energy of the crowd: they became the equivalent of proxies for the pilots, of whom they became a sort of cubic flying embodiment. The audience seemed to share the space with a different and new kind

of dancer; the other dancers had to adapt to the presence of these huge moving objects, and to learn how to predict their movement so as to give them sufficient space to evolve.

4. Nestor and Veronique

This event took place in the Montreal Center for Sciences. It was the first completely interactive performance involving an actress and an autonomous cubic aerobot. It was based on a simple scenario, in which the actress would tame a Nestor flying cube by interacting with it through her movements and displacements. Each interaction was fine-tuned to be as precise as possible; but there is no way to predict exactly the behaviour of an aerostatic object in every possible circumstances. An interesting evolution occurred during the event : since the actress had to adapt her movements to the slow pace and to the unexpected movements of the aerobot, the performance progressively developed into a two-ways relationship, just like if the particular behaviour of the aerobot had influenced the behaviour of the actress. After several shows, everything happened as if the unpredictable movements from the cube induced the actress to react on an improvised, almost choreographic manner, which greatly enriched the performance. Some other unplanned reactions were caused by small drifts of the cube, when it was caught by sudden air streams; they actually added an anthropomorphic touch to the cube's behaviour, since small errors and imprecisions are more easily associated with humans than with machines. To our knowledge, this performance was the first experiment involving an interaction between a human being and an autonomous blimp.

5. Geometric Butterflies

This performance took place in Moscow during the spring of 2009, as part of a Science-Art festival. It was the first long lasting, totally autonomous performance for the Tryphons. The cubes were flying in an area surrounded by blue spotlights. They were instructed to avoid obstacles and to run away from light. The spotlights sent them towards the center of the flight area, where they met randomly with each other; their obstacle avoidance algorithms sent them back to the periphery, where they would detect again the light sources, and so on. This sequence created continuous, unpredictable orbits. When they were getting too close to each other, their collision detectors reacted quickly, at times sending them towards and over the audience. The approach of these huge objects was impressive: the visitors would quickly extend their arms to stop them. This was sensed by the detectors, which sent the cubes back to the flying area, creating a first occurrence of interactions between the cubes and a whole crowd.

Other kinds of interactions happened. Even when the Tryphons were in a near-stable position, the visitors tried to interact with them and to make them react through the light of their cellphones. This desire to communicate with the aerobots and to influence their behaviour through individual or group interaction brought us to the conclusion that any future performance with the cubes, even theatrical, must consider the audience as an integral component of the environment, and should benefit from its presence to develop new ways of interacting.

6. The Floating Head Experiment

This HRI-artistic public experiment took place in Montreal in 2010. It was the result of a many-months collaboration between our lab and the team of Australian artist Stelarc. [3] A Tryphon aerobot was combined to Stelarc's work *The Prosthetic Head*, which consists in a 5-meters-high projection of a 3D avatar

of himself, represented through a synthetic image, and linked to a chatbot-like engine in order to discuss directly with the visitors. Stelarc's artworks development is supported by the MARCS Auditory Laboratory in the University of Western Sydney. This team has transposed the Prosthetic Head into the Articulated Head, a new version that is embodied via a LCD screen attached to an industrial robotic arm; this added a strong level of expressivity to the Prosthetic Head : all facial expressions could be correlated to spatial translations and rotations of the screen, thus approximating the movements of a human head when talking or discussing. Thanks to various sensing devices, the team managed to develop an *attention model*, called THAMBS (Thinking Head Attention Model and Behavioural System), to enhance the effect of presence triggered by the synthetic face.

We quickly realized that the floating cubes of the SAILS project could play the same role as this screen, without the limitations imposed by a fixed stand. Through intensive international collaboration between our teams, we managed to realize a performance during which Stelarc's synthetic head was projected onto a large floating cube, whose movements and displacements in the air conveyed the head's emotions and impressions to the audience, while strongly enhancing the effect of presence of the virtual face.

7. Conclusion

The visitors' relations with the robots, as well as the actors' relations with them, proved a valuable and meaningful source of information and knowledge for the design of HRI procedures. In each performance, the visitors were seeking a contact with the robot, and initiated interaction processes. They may have wanted to test their influence on what they saw as a large machine, or simply test its abilities ; but more fundamentally, what could be gathered from our discussions with them revealed that they were attracted by the strange appearance of these slowly moving cubic organisms to which they would attribute a personality and a kind of proto-consciousness ; and that these artificial creatures put the visitors in touch with the fundamental human desire to communicate, even with an entity whose all elements betray the artificial nature.

It has also been observed that a slow moving cube was creating more positive feelings: visitors who accidentally triggered brisk reactions from one aerobot were generally impressed, and even afraid, when they realized that they were the cause of it. These reactions by neophytes proved quite informative in setting a preliminary common ground [4] for optimizing human-robot communications.

The development of interactions for performances followed a different path, since the performers had to get acquainted with the unpredictable reactions of the cubes that were caused by the parameters of the flight environment. This can be seen as a problem from an engineer's point of view: the repeatability and reliability of interactions are almost always essential for any technological applications. Things are very different in art; in this project, unpredictability may become a key ingredient in the definition of each cube's personality. Interactions whose repeatability ranges from "nearly precise" to "moderately imprecise" add to the poetic dimension of the cube, facilitating their assimilation to living organisms. These last observations leads to one of the main conclusions of this paper : endowing robots with basic sensory and interaction aptitudes, and putting them in close contact with humans in a given context and an intentional frame, provides a wealth of observations and data that can be fruitfully exploited for the design of optimal human-to-robot interactions.

From their artistic origin, [5] and throughout all the artistic development that surrounded their technological evolution, the flying cubes demonstrate how several disciplines can contribute to the creation of objects that escape any attempt for classification, and hover over the undefined territories that stretch around the borders between arts, science and technology. We will borrow our conclusive sentence to the late Stephen Wilson : «Artists should be hungry to know what researchers are doing and thinking, and scientists and technologists should be zealous to know of artistic experimentation.»[6]

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THE GENEALOGY OF A CREATIVE COMMUNITY: WHY IS AFTERNOON THE "GRANDDADDY" OF HYPERTEXT FICTION?

Jill Walker Rettberg

This brief paper will question the role of the mythical progenitor in the creation of a creative communtiy. Are certain kinds of work more likely to be adopted as progenitor of a field, or does the choice of progenitor depend more on social networks, modes of distribution or even chance? Would electronic literature have been different today if Nichols or Malloy had been crowned as the grandparent of the field?

Granddaddy

In 1992, Robert Coover famously called Michael Joyce's *afternoon, a story* (1990) the "granddaddy of full-length hypertext fictions" (Coover 1992), writing only five years after *afternoon* was first presented in public (Bolter and Joyce 1987). Since then, both *afternoon* and Coover's description of it have been cited repeatedly in accounts of the history of electronic literature, whether in books, articles or teaching. *Afternoon* has been canonised by scholars, who reference the work far more frequently than any other work of electronic literature, by teachers and even, quite early on, by mainstream literary institutions , as it was included in the Norton's anthology *Postmodern American Fiction* in 1998. How did we come to accept *afternoon* as the unequivocal "granddaddy" of electronic literature (not just full-length hypertext fictions, as Coover in fact wrote)? Although earlier works are regularly mentioned when scholars and teachers recount the history of electronic literature, *afternoon* has certainly become the reference point and is frequently assumed to be the first work of "real" electronic literature. This amplification and reinforcement of certain ideas, works and citations is typical of a print-centric culture, Elizabeth Eisenstein wrote in her history of print (1979), but perhaps we should say, more broadly, that it is typical of a culture such as ours that privileges recorded texts, whether analog or digital, linguistic or visual.

Perhaps *afternoon* is indeed the granddaddy of full-length hypertext fiction, but it is certainly not the sole progenitor of electronic literature. That ancestry is extremely diverse, yet most of it has become almost forgotten, as the more easily accessible and more frequently taught works are referred to more and more often.

Beginnings

It took about twenty years for the early British novel to grow from a point when only five or six novels were published annually to a critical mass with new novels being published more than once a week. As Franco Moretti shows in his book *Graphs, Maps, Tree*, this twenty year timeline can be seen to repeat itself in a range of countries, though with different starting points according to when novels began to be published in that country (Moretti 2005).

Has electronic literature gone through a similar time line? Today, certainly there are new works of electronic literature published at least every week. Twenty years ago, in 1991, hypertext and other genres of electronic literature was not quite new, and although not many of them are remembered, there were at

least dozen or two dozen works being published each year. By 1986, and maybe earlier, five or six works of electronic literature were being published each year, even without including interactive fiction in the count. By the early 1990s, several publishers existed, including Eastgate, Voyager and Electronic Holly- wood. With the advent of the web, of course self-publishing became even easier, and a number of on- line journals appeared that published hypertext fictions. By the turn of the century large organizations such as the Electronic Literature Organization, trAce and E-Poetry were established. So if we are to fol- low Moretti's twenty year time line for new genres, 1986-2006 appears to be a reasonable span.

Where should we set the beginning of electronic literature? Electronic literature began in many places, at many times. In 1952, in Manchester, computing pioneer Christopher Strachey created a love letter generator (Wardrip-Fruin 2005). In 1966, at MIT in Cambridge, Massachussetts, Joseph Weizenbaum created a simulated conversation agent, *ELIZA* (1966). In 1976 Will Crowther, another Cambridge resi- dent who worked at a technology company, created *Colossal Cave Adventure*, the first textual adventure game, which was then further developed by Stanford graduate student Don Woods (Crowther and Woods 1976).

All these early works were created by computer scientists who were playing with the technology. They did not see themselves as authors, on the contrary, Strachey, Weizenbaum and Crowther all expressed surprise at their experiments being taken seriously by people. They had not intended to create a new form of literature, and were not, as far as we know, building on or even aware of other work in the field. Their work did not immediately start an avalanche of new literary forms. Indeed, they are only recog- nised as the starting points of electronic literature in hindsight (Wardrip-Fruin 2005).

Alongside the experiments created by computer scientists there were non-linear literary experiments that have also been seen as "proto-hypertexts", and as the starting points of electronic literature – but these were far and few between. Frequently cited examples include Nabokov's *Pale Fire* (1962), Saporta's *Composition No. 1* (1963), Cortazar's *Hopscotch* (1998) and Pavic's *Dictionary of the Khaz- ars* (1988). Works by visual artists such as Len Lye's animated texts in film (1937) orJenny Holtzer's *Tru- isms* (1977) could also be included.

But none of these works was seen as connected to other works at the time. Although they are important in hindsight, they did not shape a community of electronic literature.

One community of experimental, electronic literature and art in the 1980s met on the WELL. Video and performance art curator Carl Loeffler coordinated the Art Com Electronic Network (ACEN) on The WELL where ACEN Datanet, an early online publication, would soon feature actual works of art, including works by John Cage, Jim Rosenberg, and Judy Malloy. Rosenberg's programmatic poetry *Diagrams No. 4* were published here, as was Malloy's database narrative *Uncle Roger*, which was "a hyperfictional nar- rative database". Malloy's works were also exhibited in physical art exhibitions.

On the opposite coast of the US, introductions were made through shared friends, by reading papers and journals and at conferences (such as the MacAdemia conferences in Philadelphia in 1988 and at Brown in 1989) and the ACM Hypertext conferences in 1987 and 1989. Stuart Moulthrop describes how at the '89 Hypertext conference he and John McDaid, Michael Joyce and Jay Bolter sat at a computer connected to the internet and searched for other people doing similar things. They found Judy Malloy's work:

It was just like blues men going to each other's performances. Yeah, alright, oh darn that's good. Oh, we're not that good. So we really recognized that she was somebody, and she was part of a community out there in the Bay Area that was really important and exciting. I can remember coming away from that moment thinking that, you know, there might be a real hope for what we were trying to do because other people were doing it. (Rettberg 2011)

In an interview with Ransom Center archivist Gabriela Redwine, Michael Joyce described how he came to realize that there was a community of readers passing works around informally even before there was a publisher or any of the institutions that conventionally support literature:

So—you had a physical community [of readers], like a book community. Same thing—similar story—with Jane [Yellowlees] Douglas when she first called me up and said I'm writing my dissertation on *afternoon*. I said, "That's impossible, you can't be, it's not published." She said, "Well, no, but I have it, you know. I've gotten it through so-and-so." So we were pretty much aware there was a community of readers out there. (Redwine 2009)

By the late eighties, several tools were available for creating electronic literature, including HyperCard and Storyspace. Additionally, many practitioners did their own programming, such as Nichols, Malloy and Rosenberg.

Eastgate became a central node in the hypertext fiction communities, as the primary publisher of literary hypertext. In an interview with Judy Malloy, Bernstein explained that he saw one of Eastgate's goals as providing shared references for the growing hypertext research community. The hypertext research field was growing, but before the web it was characterised by diverse, locally developed authoring systems. By publishing a series of hypertext fictions written in the same system, Eastgate managed to create a shared set of references: "These hypertexts helped focus discussion. For the first time, if you and I wanted to talk about the craft of hypertext writing, we could talk about a specific work we'd both read, a work with some ambition and scope, a work we could admire and with which we might disagree" (Malloy and Bernstein 2010).

As previously mentioned, Eastgate succeeded in creating what we may call a canon of electronic literature, and works published by Eastgate in the early 1990s are still taught and written about today. At the time, there were other publishers, including Voyager and Electronic Hollywood, but they no longer exist, whereas Eastgate, small as it is, and by no means mainstream, is still selling copies of those same hypertexts. Eastgate has been frequently criticised because it does not make works available on the web but instead only distribute works on disk, and because works have not always remained accessible on current operating systems. However, it is clear that works published by Eastgate in the early 1990s are far more frequently cited and taught today than contemporaneous works that were self-published or published by publishers that later shut down.

In addition to publishing Storyspace works, Eastgate also published works written in other authoring systems, and in some cases, ported work written in other systems to Storyspace. For instance, Malloy's *Penelope* was first written in BASIC, but Bernstein gave it the "Storyspace look and feel" and incorporated generative aspects of the work into Storyspace when the work was republished by Eastgate in 1993 (Malloy, email to author). In this way, Eastgate served to gather much diverse activity, incorporating earlier works into its catalog, including pioneering authors on The WELL like Judy Malloy and Jim Rosenberg.

At the same time, hypertext fiction was beginning to enter the college classroom. Among the most well-known teachers of hypertext of the time were George Landow and Robert Coover at Brown University, and Janet Murray who taught at MIT at the time. Landow, Coover and Murray wrote extensively about the field as well (Landow's book *Hypertext* was published in three editions, each about a decade apart), and each is frequently cited.

This is the period before the web took over as the main communication channel for authors and readers of electronic literature, and the period before dedicated organisations and events such as the Electronic Literature Organisation or the E-Poetry series had been established. Although the internet existed, and some authors were connected to each other through bulletin board systems such as The WELL, the version of this history that we hear the most frequently centres around the publication of a few, very heavily cited key works, by a single publisher, Eastgate. The period has been called "the Storyspace school" (Aarseth 1997, 85; Hayles 2007) or "the Storyspace era" (Raley 2002, 194; Kirschenbaum 2008), because the field was dominated by works written in the Storyspace software and published by Eastgate. As we have seen, this may not have been entirely true, but this is how the period looked in hindsight. Later, Coover dubbed these pre-web years "the golden age" (Coover 1999), in part because of the dominance of text. Early hypertext fictions, Coover wrote, gave careful readers a sense of "losing oneself to a text (..) until clicking the mouse is as unconscious an act as turning a page, and much less constraining, more compelling." (Coover 1999)

The web may bring with it a different kind of electronic literature and different conditions for readers, but more importantly for this paper, it brings with it very different affordances for writers and readers to communicate with each other. Communities can grow very differently on the web than they could before it.

Five Categories

Why are certain works more frequently cited than others? One likes to assume that it is the best works that are remembered, but contextual circumstances are also extremely important, and it is the context and the community I am interested in in this paper. Thinking about which works of early electronic literature are remembered today we can see five categories. These categories do not correspond to genres or literary qualities, but to the ways in which works were disseminated, documented and preserved.

1. There are many examples of *isolated experiments* that are regularly offered as examples of protohypertext or very early electronic literature, although they are more often mentioned as part of an obligatory literature review at the start of a paper than they are analysed or discussed in detail.
2. The second category of early electronic literature is *the canon*, as we might call it, the works that have been taught again and again in colleges and universities and that are frequently mentioned and discussed in scholarly works on the field. These correspond to a selection of what several authors have called "the Storyspace school".
3. *Works published by now defunct publishers* may have received some critical acclaim at the time, but are no longer available and are rarely if ever mentioned in current discourse on electronic literature.

4. *Self-published works*. Many of these works are no longer available, either because the website has not been maintained, or because the software or the web browser required to view the work is not compatible with current systems. Whether or not the author had other connections to the field is important here.
5. Some works, as today, were *performed* on an electronic network (as was the first publication of Judy Malloy's *Uncle Roger* in 1986, when nuggets of text were posted to discussion boards), and so of course can no longer be experienced as originally intended. There have been many works since that require synchronous experience, or that can be said to be performed as much as they are published. Works that are sent to mailing lists or that are told as a series of emails or tweets and other social networks are examples, and so are works that are constructed in MOOs, such as Coover and his students' *Hypertext Hotel* or the literary environments in *LambdaMOO* in the early 1990s. Without careful documentation, such works are easily forgotten, as they, unlike static websites or CD-ROMs, do not exist in their original form after their original performance.

What is a community?

What is a literary community? Traditional communities are defined by geography. A village grows around bountiful farmland, a city is strategically built by a natural harbour. Today families move to a suburb centered around a school and shops. Traditionally, people socialised, worked and made art with the people who lived nearby.

Communication technology allows for collaboration across distances, outside of the immediate, geographically defined community. The technologies of print and reliable postal service allowed literature, letters and newspapers to circulate among people with shared interests who lived far apart, allowing even a person living far from hubs of literary activity a certain amount of access to intellectual and artistic debates. Literary art forms are generally designed to be portable. We do not think of a novel as losing important context if it is read in Northern Norway instead of in Paris, whereas a painter or musician was forced to travel to where the exhibitions and concerts were to experience them.

Distributed literary and artistic communities, then, have existed to some extent since print and postal services made them possible. But most artistic communities have had a physical centre or centres as well. Artists and musicians have at different times in history known that to make it they must go to Berlin, or Paris, or Rome, or New York. Authors of electronic literature can connect online instead, meeting occasionally at gatherings or conferences.

Today the field of electronic literature is still not mainstream or familiar to a general audience, but there are many well-established meeting points both online and off: there are conferences, journals, mailing lists, blogs and research projects. There are universities that offer courses and degrees in electronic literature and anthologies that suggest a canon of important works.

Conclusion

The works of electronic literature that are still remembered from the 1980s have enjoyed the attention, as it were, of scholars, publishers, teachers and authors who have remained in the field for a long time.

Although Eastgate did not begin publishing hypertext fiction and poetry until 1990s, it is the Eastgate versions of earlier, self-published works that are still remembered. Works published on now-defunct publishers are orphaned and rarely discussed, largely because they are no longer accessible. At the same time, the social networks around conferences and teaching institutions were key, as were online groups such as the ArtCom forum on the WELL. These online groups may no longer be remembered by many, but they served to connect authors and artists who then went on to receive a wider audience. I have not found any examples of solely self-published works that have been continuously discussed in the two decades of scholarship and teaching since the 1980s, although some workshave been recently revived and made accessible again and are now receiving new attention, such as bp Nichol's BASIC poems.

Working on this short article I have realised how much more there is to learn about these early days of hypertext and electronic literature. I hope to interview more of the actors and gather more information about the period, which is key to understanding the emergence of electronic literature, but also valuable in understanding the broader ways in which creative and artistic communities emerge. What appears clear at this point is that works that were self-published have tended to be forgotten. Whether this is simply because they cease to be available or because they were never much discussed due to a lack of social and artistic connections (i.e. nobody was aware of the works in the first place) is not easy to ascertain as the discussions, online or off, of the time are not generally archived. Of course, publishing with an established publisher was no guarantee for being written into the history books either. Voyager was a far larger company than Eastgate in the early 1990s, and many works published by them received great critical acclaim at the time, but their works are no longer available. With the advent of the web, these dynamics changed significantly, and today we also have many conferences, journals, college classes and organisations focused on electronic literature.

What, I wonder, will determine which electronic literature of today is still discussed in twenty years?

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ARE YOU REALLY T/HERE? AFFECT, AFFORDANCE AND VITALITY IN HETEROTOPII OF FLOWS

Kate Richards

Immersive media art provides opportunities for audiences to engage with spaces, embodiment, processes and systems. Often predicated on audience mobility, it can allow for the creation of new relations and aesthetics of immersion, vitality affects and embodiment. Agency should now be understood as a process of participation and becoming rather than a simple facility. It is a calling and an inclination to act not simply a human 'affordance'.

Video still of Hong Kong harbour ferry from 'grove', an immersive media artwork by Kate Richards 2011. Image copyright Kate Richards.

INTRODUCTION

Media artists are increasingly concerned with creating works that are opportunities for audiences to engage with spaces and embodiment, processes and systems - in short, affective porous experiences that touch us pre-cognitively or before signification is brought into play. The event-space is often predicated on audience mobility, and aims to allow for the creation of new relations. There is a demonstrable shift away from reliance on content and signification, towards an aesthetics of immersion, affect and embodiment. Exemplars include James Turrell *Dhatu* (2010), and Olaf Eliasson *The Weather Project* (2003).

Media art practices aiming for immersion and intense embodied experience are framed by philosophies of affect, a fascinating and multi-dimensional field. Although its genealogy includes late 18Cth Romanticism and aesthetic discourses around the sublime, it has more recently been informed by innovations in neuroscience, embodiment and cognitive psychology. The affect theory taken up in this paper concentrates mainly on these latter areas of contribution. Simultaneously, media artists generating affective

artworks are influenced by - and sometimes driven by - new forms of engagement based on participation and interactivity, features now ubiquitous in mainstream and popular culture under the umbrella of experience design. In 2001 Erik Davis argued that we were already operating in an economy enacting predetermined 'experiences', and that the new material "being worked here" (Davies, 2001, p. 1) is experience itself. Necessarily embodied, Davies' summary of human experience is "… the phenomenal unfolding of awareness in real time, a movement which tugs against the network of concepts and significations while tending toward the condition of more direct sensation or intuitive perception. In other words, experience may not be able to escape the prison house of language, but it willingly sticks its nose out the barred window and inhales" (Davies, 2001, p. 1). Today, popular 'experiences' of embodiment are designed to easily incorporate the visceral, the narrative, the symbolic and the participatory.

Yet techniques of designing for interactivity and participation are strongly informed by theories of affordance as articulated through human computer interface (HCI) and design disciplines which hinge on object/subject dichotomies. The preoccupation with interactivity, affordance and participation can be restrictive and may be realised at the expense of affect. As Andrew Murphie explains it, agency should now be understood as a process of "participation and becoming" (Murphie, 2008) rather than a simple facility. It is a calling and an inclination to act not simply a human 'affordance'.

My practice-led research raises the questions: In an immersive porous environment of flows and particles, how do we understand and create for affordance? Can the affective flows and materials *themselves* have affordance?

AFFECT

Brian Massumi defines affect as the experience of an intense, embodied action/reaction sequence in response to the affordance offered by a space or event. Affect is essentially an intensity - a confluence of the physiological, the autonomic, the embodied that is not connected to the content of the image or the space in any direct or sequential way (Massumi, 2002, pp. 23-45). While both intensity/affect and qualification (depth reactions belonging to form/content level) are immediately embodied, it is affect that is a "non-conscious, never to be conscious autonomic reminder" (p. 25). For Massumi, the human subject will experience a series of embodied active reactions that precipitate their cognition of and their emotional response to, their physical environment. Affect precedes the human subject's cognitive and emotional states.

This pre-linguistic call-and-response between our bodies, other bodies and objects happens in the first nano-seconds of visual/aural encounter. The natural and built environments offer us degrees of affordance, that is, opportunities to engage with three-dimensional spaces and objects. At these initial moments of embodied perception, we have already virtualised the object of our gaze – despite it being two-dimensional at the visual level. We perceive, we know, we ken, its potential as a navigable three-dimensional thing – we imagine its reverse side; we get its texture and mass as the light bounces and plays upon its surface; we sense its weight from these other factors. In its virtual, already-perceived form - a form given to us by our affective, embodied relations with it – the environment suggests to us its affordances - it offers ways in which we can engage it, embody ourselves with it.

AFFECT AS VITAL, CONTAGIOUS AND ECOLOGICAL

Massumi's work draws in Whitehead's radical empiricism and the 'extensive continuum' – affective events are continually emerging and layering in various dynamics, shedding light on the relationship between quantum physics and radical empiricism - quantum physics describes constantly shifting relationship that can only be fully understood retroactively - radical empiricism describes how every shifting moment is retroactively revealed in consciousness. Massumi discusses William James' analogy of experience coming in drops. But the accumulation of drops can also "come with "oceanic" feeling" (Massumi, 2010, p. 13)

Affect is everywhere in us, through us and beyond us – it's the culmination of a sequence of actions/reactions occurring in various and multiple registers of the physiology, a culmination that touches, animates and draws-in that elusive philosophical 'other' – consciousness. Minute instances assemble and connect to other events, evoking a sense of rhythmic waves of thinking-feeling that are simultaneously embodied and ephemeral. A recurrent theme is the vitality of affect, that there "is no subject, apart from the singular aliveness appearing in the object's generic wake. The subject is life. This life." (Massumi, 2010, p. 12) Affect varies in scale and intensity - occurring at a quantum level, and at a macro level. Like a fractal geometry it is manifold - its rhythms and patterns are discernable but not always 'true' to their physiology. For Stern, generalised affect moments precede the categorisation of feeling - there is a vital generality, a vitality in transitory experiences, ordinary everydayness. (Stern, 2004). For Ednie-Brown, vitality is a collective affair, life is in the resonance of events (Ednie-Brown, 2011). For Munster, there is vitality in transitory experiences, and affectivity goes viral, folding back on itself (Munster, 2011). For Stewart, "The ordinary registers intensities…" (Stewart, 2007, p. 10)

In this sense experience is an *ecology* that engages us with affective resonance - a vital, flowing, compelling and dynamic system of which the human is an active participant at registers variously molecular, physiological, aesthetic and philosophical. Affordances are not fixed but are moving, dynamic, surging qualities across time and space; experiences are layered in us like geomorphological strata, and these can be enacted and re-evoked in various combinative registers under different circumstances.

HETEROTOPIA

An interesting way of analyzing the affective resonance of immersive spaces is to posit them as heterotopii. In 1967 Foucault contextualized the idea of heterotopia within a conception of space that historicised three meta-eras – the hierarchical, pre-industrial of the Middle Ages; the Cartesian industrial space of modernism; and the post industrial era of a grid-space of emplacement. For Foucault "…we are in an epoch in which space is given to us in the form of relations between emplacements…" and "…emplacement is defined by relations of proximity between points or elements - series, trees, grids". (Foucault, 2008, p. 15). In his highly significant exposition on the rise of the network space, time is only one of the possible operations of distribution between elements that are distributed in space; "… the anxiety of today fundamentally concerns space, no doubt much more than time." (p. 18).

For Foucault heterotopii are not utopias in the Hegelian sense of transcendence - rather they are:

"…real places, effective places, places that are written into the institution of society itself, and that are sort of counter-emplacements, sort of effectively realised utopias in which the real emplacements, all the other real emplacements that can be found within culture, are simultaneously represented, contested and inverted; a kind of places that are outside all places, even though they are actually localisable." (p.17).

Here there is disruption, modification or suspension of the apparent normalcy and continuity of every-day space; they are lacunae in the space of flows - they embody "the tension between place and non-place that today reshapes the nature of public space" (p. 5). Heterotopii are neither public nor private - existing in the overlaps they are collective and shared spaces in their own time/space framework.

Foucault posited six principles of the heterotopia. Their often-multiplicitious and juxtaposing functions have been culturally and historically specific. A heterotopia can embrace several temporal modes – cyclical, perpetual, transitory, accumulative. Apparently open yet exclusive, one might need to perform ritual gestures to enter. They may offer an illusory compensation. For example, the ship is "…a place without a place, that exists by itself, that is self-enclosed and at the same time given over to the infinity of the sea and that from port to port…goes as far as the colonies in search of the most precious treasures they conceal in their gardens…the greatest reserve of the imagination. The ship is the heterotopia par excellence." (p. 22)

The idea of heterotopia has proven highly resonant since its inception, and has permeated urban, architectural and cultural theories. Most salient here for media artists is the idea of heterotopia as a strategy for reclaiming places of otherness in the inside of an economised public life (Dehaene, 2008, p. 4) which is a good way of describing the role art and particularly the ways in which an immersive experience as a lacunae in the urban fabric, can provide a space of reflection, interiority and immanence. Stickells' (Stickells, 2008) looks at several urban design projects that emerge out of the tensions between the city's fragmenting physical fabric and its multiplying electronic socio-economic networks. The relevance and power of figurative, symbolic urban architecture is being replaced by spaces that respond to and manipulate existing flows, manifesting as "fields of movement with no structural orientation". Thus "a new form of public space emerges alongside an alternative social ordering of public space" (p. 255). The author describes the flux and mutability, the architectural potentials of datascapes as "socially integrative spaces: heterotopia of flow" that reflect new spatial continuums in which unimpeded flow is a new way of experiencing the city (p. 247). This new discipline of 'flow urbanism' aims to create integrative urban gestures, seamless continuous landscapes that are about the 'field of movement' and reflect the participants as 'plural and heterogeneous urban actors'.

Flow urbanisms arise out of a "network bound rather than a site bound reading". (p. 251). They foreground networking and aim to balance, integrate and design for mobility and event. Stickells asks how designers can balance intensity and flexibility, fluctuation and diversity of use - "the thrill of mobility and speed with…considered tactile and social engagement" (p. 250). This conundrum is close to the heart of making art that accounts for interactivity and participation in immersive spaces. As was my experience with the artworks *Bystander*, *Wayfarer* and *Foul Whisperings, Strange Matters* and my work on large public installations such as *Beautiful Minds – 100 Years of the Nobel Prizes* and *Lost City* for the Museum of Sydney (Richards, 2011), the success of such spaces "to function as social condensers is dependent on the relationship between space and programming [of events]…" (Stickells, 2008, p. 256).

AFFORDANCES OF FLOW

The contemporary focus on interaction in media modes is participatory and behavioural – audiences are encouraged to change, modify, personalise, add content and 'play' using game-like modes of engagement. So the focus for creation and analysis tends to be on the participatory, the performative, the procedural. Affect has an increasing relevancy because "… affect is much more powerful and central than

we may have thought—in everyday life as much as in theory. It is increasingly seen as key… to our understanding of cultural effects and also key to concept and process such as reason and agency." (Murphie A. , 2010) There is such an openness of outcome in interaction design that it's easy to understand that the whole question of affect is about a continuous process of drawing behaviour from the audience, in evoking rhythms and scales of intensities across time and space.

Massumi reminds us that form is actually a non-fixed attribute, and therefore we can apply the concept of form to generative, to participatory and to networked media art. Vision is always dynamic (as neuroscience now evidences) so that it brings movement and change to the form of the object at each viewing and during each viewing instance. (Massumi, 2010) This suggests that we might benefit from looking at and understanding different kinds of movement. Experiential dynamics, distinctions between kinds of movement and what difference they make are aspects of affordance that are relevant for artists working with immersive spaces.

For the design and creation of interactive artworks these attributes of form have real implications as the (art)work continues to unfold and engage the audience – if the interactivity is token, and if the work does not continue to evolve under the drive of audience input, then the affective potentials would presumably be limited. This may depend on the signification-load of the image: if we have to 'read' it and connect the elements with, e.g. narrativity 'what does that object, movement, sound signify in relation to what has gone before?' then those particular affordances might mitigate against affect.

In this way the engaged subject is a contemporary instance of the rhizome as described by Deleuze and Guattari. A rhizome is a flow not an imprint; it is not unconscious and closed in on itself but it is a structure of organised interconnection, a machinic assemblage of utterances embedded intrinsically within social discourses of power, drawing its roots and tubers from that power discourse. A rhizome is "agglomerating very diverse acts, not only linguistic, but also perceptive, mimetic, gestural, and cognitive: there is no language in itself, nor are there any linguistic universals, only a throng of dialects, patois, slangs, and specialized languages" (Deleuze/Guattari, 1987). And just as we understand the 'subject' as not unified, the rhizome has no fixed centre on which to pivot but exists as a set of dynamic imperatives across scale. There is a constant movement of meaning, non dominant and not fixed - and the rhizome can be ceaselessly modified - unhinged, ripped, inverted - by any configuration of audience. Deleuze and Guattari's rhizome is an important and resonant precedent in understanding digital terrains; as a model it accounts for heterogeneous, mobile, and imperfect networks.

Delueze and Guattari explain how the rhizome always has multiple entry points, and is open to performance. By fostering dynamic and rupturing 'lines of flight' between bodies, between fields, it is open and connectable - it is a system of intensities, variable speeds, transformations. Famously, the philosophers go on to describe the human body as rhizome, its nerve endings as tubers, and hence the body is able to engage with other rhizomes in an exchange and deterritorialisation.

SUMMARY

In devising for participation and agency in immersive interactive media art experiences, artists can move beyond conventional HCI ideas of affordance and the subject/object dichotomy. Audiences engage and interface with affective ecologies that afford embodied flows between the space and the audience as an open system of nerves, consciousness, shifting subjectivities. Thus the audience is the co-creator of the

embodied experience, rhizome to rhizome. The theory of the heterotopia of flows is particularly applicable for media artists because it can account for spaces that are fluid and porous, with soft borders conflating interiority and exteriority. Offering a moving field of inter- and intra-relations, dissolving the subject/object dichotomy with multiple affective affordances and the potential for affective resonance, the immersive media artwork can be a heterotopia of self- or interiorised knowledge.

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HERDING CATS TO INFINITY

Peter Richardson

In this paper I outline the current findings of an on going investigation begun in 2009 at the *Visual Effects Research Lab* (VERL). The three-year project links the worlds of film. art, technology, and computer science. In sharing methodologies and promoting cross, trans and inter disciplinary understanding the project challenges established notions of visual thought and creates new synergies between scientist, artists and film-makers.
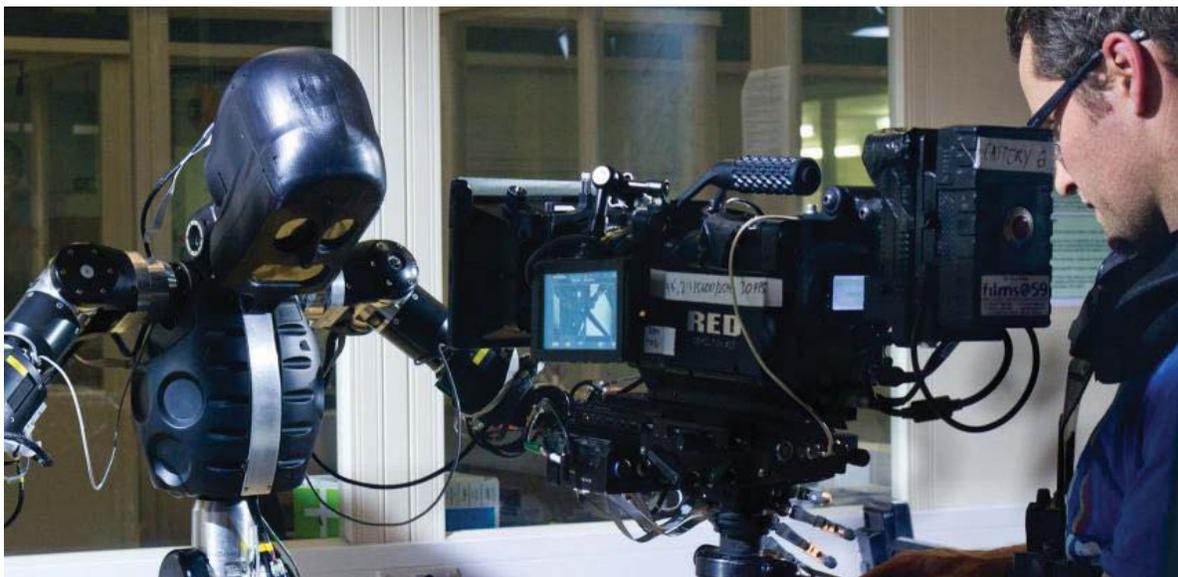
Fig 1. Filming Wendy McMurdo's 'Olympia' Bristol Robotics Lab September 2010.
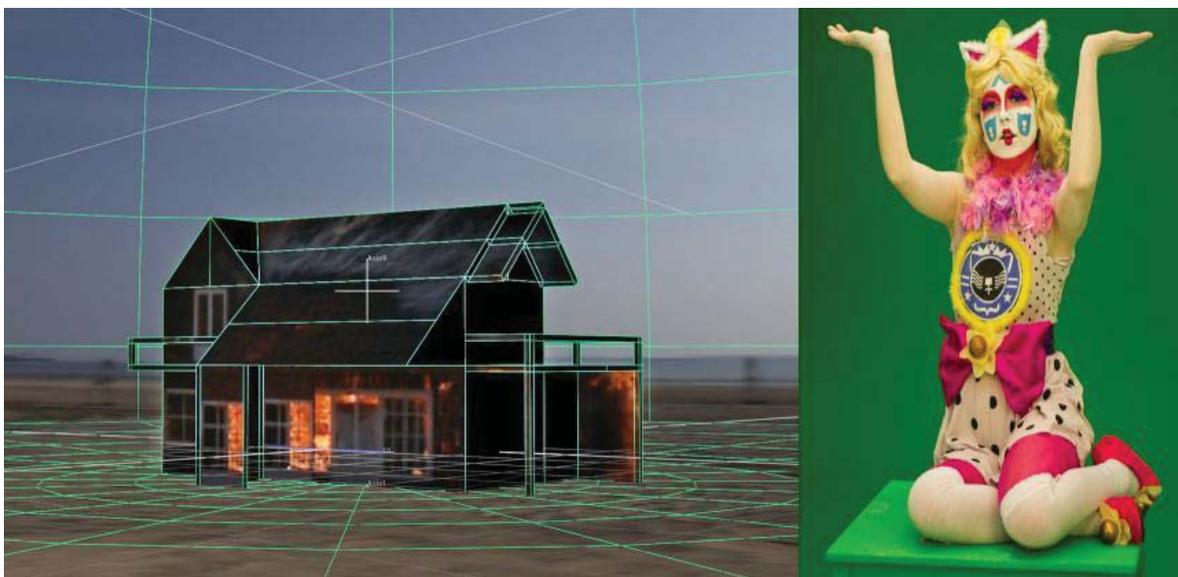
Fig 2. Left: 'The Return' Colin Andrews (work in progress) Right: Rachel McLean.

Introduction

This paper outlines and contextualises some current findings of an on-going investigation begun in 2009 at the Visual Effects Research Lab (VERL). The three-year project links the worlds of film, art, technology and computer science. In sharing methodologies and promoting cross-, trans- and inter-disciplinary understanding the project is beginning to challenge established notions of visual thought. The paper explores the issues surrounding the creation of four new high resolution [1] moving image works by contemporary artists. Working in collaboration with VERL the artists were invited to push the lab's state of the art visual effects facilities and team to their limits. The projects proposed envisioned: impossible ornithological stunts, buildings rising from burning embers, real and imagined robots and visceral fantasy worlds. Towards some initial conclusions the paper explores three questions: 1. In conceiving the works would any coherent themes emerge? 2. Would working with the Lab allow greater flexibility for the artists to create and experiment? 3. Would the potentially oppositional paradigms of film and art be challenged?

From Signal to Noise

The first turnkey digital effects system was brought to market by UK technology company Quantel in 1978. Over the next ten years Quantel continued to work with artists and designers to perfect their product. By the mid 1980's the paintbox system was the mainstay of television motion graphics. In 1985 artists David Hockney and Richard Hamilton were invited by Quantel to experience the Paintbox system. Hockney is reputed to have worked for 8 hours nonstop creating artworks with the tablet and pen set up. He described the experience as "painting with light."

In the spirit of Quantel's project, VERL and Creative Scotland invited artists to propose fantastical moving image projects un-realizable with incumbent technology. Four proposals from Scottish based artists Colin Andrews, Rachel McLean, Wendy McMurdo and Rory Middleton were commissioned. VERL collaborated with the selected artists to produce the works in high resolution with post-production using Nuke and Maya. (Whilst technologically advanced cinematic tools are at the centre of the project it is important to note that the content and context of the works proposed by the artists are the main focus of this paper.) The works are ultimately intended for cinematic exhibition and are shot in High Definition (1920 x 1080 pixels) as the lowest resolution and 4K (4096 x 2304 pixels) as the highest - roughly 32 times that of standard televisual definition. Andrews's "The Return" and McMurdo's "Olympia" will be discussed in detail whilst McLean's and Middleton's works will be described.

Cinematic visual effects tools such as Nuke, Inferno and Maya are ubiquitous in the creation of visual effects shots in Hollywood style feature films. The integration of live action footage with computer generated and enhanced imagery is a prerequisite of most adventure, science fiction and fantasy genre films. (The Harry Potter franchise, Lord of The Rings, Batman, and Inception exemplify this trend.) The VFX industry claims to "Bring together creative and technology specialists." [2] A survey of the VFX sector carried out by NESTA questioned 84 VFX Companies and found that "40% of respondents currently working in the industry are CG (computer graphic) artists." [3] Obviously the term "artist" here is applied in its loosest sense. This data provides an insight into not just nomenclature, but also into the potential creative allegiance of the industry to the artists and not the designer that it could be argued would be the more appropriate term. Skills and training in technology currently outweigh all other considerations for the VFX houses who habitually employ CG artists for their technological capabilities rather than their

conceptual talents. The VERL seeks to reverse this situation. VERL puts the tools of high-end digital creativity into the hands of the trained artist (mediated by artist-operators). It commissions works that are challenging conceptually and technologically. The creative imperative thus outweighs the technological: the notions of making and remaking become central to a de-objectification of the technological tool.

The Artworks

COLIN ANDREWS

'The Return' is both inspired by, and a reference to, the penultimate scene in Andrei Tarkovsky's feature film 'The Sacrifice'. In the scene the principle character Alexander, a distinguished theatre director, burns down his house to fulfill a pre-nuclear apocalyptic vow. Early during the filming of the 5¾ minutes scene Tarkovsky's camera jammed and the fire destroyed the house before the shot was achieved. Tarkovsky insisted that the house be rebuilt and re-burnt in order to shoot the scene a second time. This repetition along with the symbolism of fire, and the philosophical notion of the eternal return, are the inspiration and context for the work. The final film is a single screen work consisting of a 360-degree track around a burning facsimile of Tarkovsky's wooden house. The camera completes one 360-degree circle round the house and the fire slowly ignites. The tracking shot continues at a constant speed and on the same path until the building is completely burned and no trace of its existence remains. The footage then reverses and the house is reformed from the embers, fully forming again and returning us to the starting point (the installed work repeats from this point.) Andrews proposes an infinite making / remaking, he imagines and reimagines Tarkovsky's film: "The idea of infinity cannot be expressed in words or even described, but it can be apprehended through art, which makes infinity tangible. The absolute is only attainable through faith and in the creative act." [4] In Sculpting in Time Tarkovsky analyses cinema itself in terms of a physical making and remaking process. (His insistence on re-filming after technical difficulties exemplifies this notion in a practical way.) The notion of "Depicting Time" (the literal translation of Tarkovsky's book title) is central to this work and to the VERL project.

WENDY MCMURDO

12.30pm The Robotics Lab is closed, the lights are off. The doors swing open. We wander along the corridor. We pass whiteboards straining with formula and equations. The camera tracks through the empty lab to the aria Les Oiseaux Dans la Charmille from Les Contes d'Hoffmann by Jacques Offenbach. In her film "Olympia" Wendy Mucmurdo's camera stalks the robotics lab seeking out signs of life. Like a technological art school the scientists inhabit small studio spaces, partitioned and personalised, littered with the tools of the trade: aluminium tubes, carbon fibre panels, precision engineered forms, circuit boards and of course gonks. As we travel through this human free scene the robots flicker to life. A remote arm attached to a desk moves through a ballet of pre-programmed moves, a 'helper robot' glides past a series of wax finger moulds. We are climbing the hill towards a summit that in turn leads us into a valley. The aria builds, the robots are now human like. A disembodied hand flexes, its black rubber fingertips glisten: with sweat? But don't shake the familiar hand, people, because if we do we will be surprised: "surprised by the lack of soft tissue and cold temperature. In this case, there is no longer a sense of familiarity. It is uncanny." [5] We are nearly there. Now, the descent into the valley. McMurdo's journey ends with 'Jules'. He doesn't see us coming; he can't, he isn't human. Jules enjoys the aria, his head inclines towards the music, relishing each note. As the camera tracks, the back of his skull spews cables and flickering leads. That's it, we've arrived…. In his 1970 paper Masahiro Mori's gave a description of

"strangeness", strangeness represented by the "negative familiarity of a human observing an android," [6] he then coined the term "Uncanny Valley." "Climbing a mountain is an example of a function that does not increase continuously: a person's altitude y does not always increase as the distance from the summit decreases owing to the intervening hills and valleys. I have noticed that, as robots appear more humanlike, our sense of their familiarity increases until we come to a valley. I call this relation the uncanny valley." [7]

RACHEL MCLEAN

"My work slips inside and outside of history and into imagined futures, presenting a hyper-glowing, artificially saturated surface that is both nauseatingly positive and cheerfully grotesque." [8] Rachel McLean worked with the team to develop her previous Britney Spears / Mary Queen of Scots personas (from works such as 'Going Bananas' 2009). Each character (portrayed by McLean herself) is given Sisyphean tasks to perform; they are composited into an infinite high resolution mindscape. The resulting Technicolor mash up of performance and fairytale is as I write over 30 minutes long: this particular cat has yet to be herded.

RORY MIDDLETON

A modernist house (aged concrete and glass) sits on the edge of a Glen. In the sky a Golden Eagle - a Scottish archetype of strength and beauty - tracks through the highland landscape. The Eagle flies almost at ground level, the wind keeps her low. She rises on a thermal, turns into the sun then bears down on the camera, crashing sickeningly through an unseen window. In slow motion, glass splinters towards us. The bird of prey continues straight through the house. Time is suspended, she makes an unseen exit seconds later. In Middleton's vision of nature verses humankind the Eagle emerges unscathed from its encounter with C.G.I. brutalist architecture. In placing the camera inside the C.G.I. house the notion of distance in its simplest form (the distance of people from nature) and of framing and depth of field are playfully rearranged. Safe inside the house, nature is kept at bay. The intrusion leads us to question the very existence of the building in this landscape, a line has been crossed and time and place are questioned. Simon Unwin discusses the notion in his book on doorways: "Entrance is not always a clear cut matter of crossing a distinct and incontrovertible line. Sometimes the transition from clearly being outside to clearly being inside is not the matter of a moment, but drawn out taking time." [9] At the end of the work the Eagle lands in a tree. She casually glances back at the building as if contemplating its very existence. Finally we move into a close up: there is no house reflected in her eye.

A-N-T Avoidance

And so to Actor-Network-Theory. Latour's critique of his own terms are apt here; even though our artists are linked by their proximity they are as similar / dissimilar as Latour and his neighbour: "I can be one metre away from someone in the next telephone booth, and be nevertheless more closely connected to my mother 6000 miles away." [10] The connections made under the disguise of this paper then are merely alternate narrative strategies: the lab itself is a room full of computers not a network. The ideas generated are the sole property of the artists but are shared. The images created are merely data yet beautiful. The artists are unconnected yet connected and the artist-operators are productive yet creatively mediated. VERL as Actor Network: yes, but: it is the shift from technology to ideas and back, from distance to infinity, from data to shape, that characterize our current work, not the network /

mesh of ideas itself. As Law says: "If it is now time to abandon stories that tell of straining towards the center then this is because doing so has helped to perform alternative narrative strategies. Strategies that are not always narratives. Narratives that are not necessarily strategic. Alternatives that are about the making of objects and subjects. That are ontological. Alternatives that have generated the possibility of an ontological politics where objects may be made and remade, remade in different images." [11] So let's avoid A-N-T till next time and head out of the valley towards the frontier.

At the Digital Frontier? Initial Conclusions

1. In conceiving the works would any coherent themes emerge?

As I have discussed, the themes of: depicting time, distance / infinity and the uncanny valley dominated the works. The prevalence of hybridized notions of depth of field is also obvious. However it could well be argued that: by definition, depth of field is thematic to lens based media. Deleuze argues that: "The big screen and depth of field in particular have allowed the multiplication of independent data to the point where a secondary scene appears in the foreground while the main one happens in the background, or where you can no longer even distinguish between the principal and the secondary." [12] Middleton in particular perplexes us with his main focus: the Eagle giving way to the secondary scene; the building when the real story is humankind and its place in the landscape.

2. Would working with the Lab allow greater flexibility for the artists to create and experiment?

High-resolution artworks are not restricted to the digital artist's practice. Artists have habitually sought the highest resolution to depict the real and hypothetical. The very early (1504) still-life painting by Jacopo de' Barbari "Partridge, Gauntlets, and Crossbow Bolt" [13] is often cited as the first small scale trompe l'oeil painting since antiquity. (Paint as a high-resolution technology?) The painted panoramas of the late eighteenth century gave us Louis Daguerre's Diorama, a lit scene in a huge room, where manipulation of backlight through enormous paintings convinces viewers they are looking at a natural scene (a high resolution installation?). Which takes us to the spectacle of the Lumiere brothers' cinematic projections. People did not flee the cinema in terror but were nonetheless 'disturbed' (cinematic visual effects in an immersive high resolution installation?) With the experiment he VERL artists were able to create experimental cinematic artworks on a scale that wouldn't have been possible without the network. McMurdo's and McLean's works are cinematic (neither had worked with cinema technologies before) but designed for single screen viewing, whilst Middleton and in particular Andrews produced high resolution artworks with a durational / immersive element that are challenging to stage in any gallery.

3. Would the potentially oppositional paradigms of film and art be challenged?

The primacy of the 'artwork' is obvious throughout these projects. Each of the selected artists proposed their works mindful of the facilities on offer. VERL organized, filmed, edited and post produced using the traditional film methods but at no time did the working methods of film take primacy over the iterative / intuitive methods preferred by visual artists. The crews were without exception used to working on traditional film projects and looked to the 'Director' for instructions. The artist directors, unused to this method were forced to share and explain their vision with the crews. This led to a near unique (for filmmakers) situation of on set discussion and inclusion which aided the ideas development of each artwork. All of the final pieces benefited from this unusual (for film) working method.

This papers title is obviously mischievous. Why should a project of this scale be as pointless as 'herding cats'? From the beginning the artists displayed no feline tendencies, they were completely open to the rigid methods required to 'shoot for post'. They understood decisions had to be made in advance of shooting so as to maximize the potential of the high resolution technology. They were patient when the lab didn't have the answers. Eventually we learnt from each other: the clue is in the title we are the Visual Effects RESEARCH Lab, welcome to infinity Cats.

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MACHINE MUSIC THROUGH THE EARS OF THE REPAIRMAN

Morten Riis

With its starting point in the homebuilt mechanical instrument *Steam Machine Music,* this paper will make a media archaeological examination of automatic musical instruments as experienced through the ears of the repairman. This will propose an alternative historical understanding of the relationship between musical content and its execution.
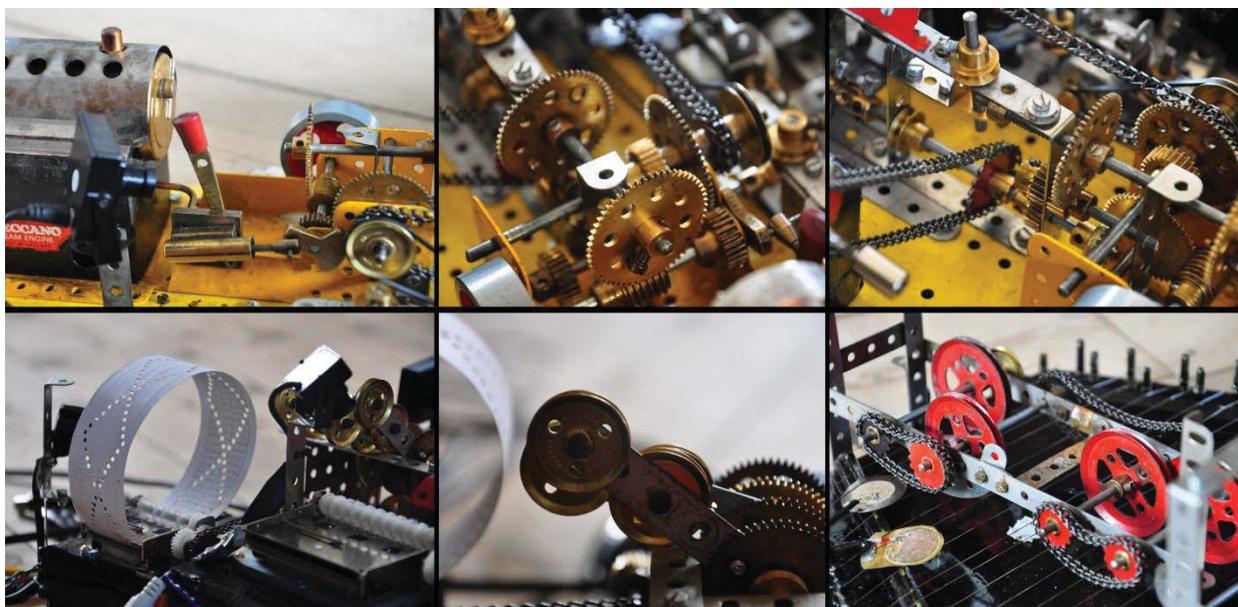
Steam Machine Music (2010) by Morten Riis, mechanical musical instrument. Copyright by author.

In this paper I will take on the role of the repairman. Both in terms of describing my musical performance *Steam Machine Music*, but also in relation of unfold an alternative history of automatic musical instruments that would give a tentative explanation of what kind of a role malfunction plays in the development of machine music. How can this history of the malfunctioning machine be used to give a broader, more diverse understanding of the way we tell the story of technology driven music.

Steam Machine Music is an automatic mechanical musical instrument built from vintage Meccano parts, and powered by a small steam engine. Taking on the role of the repairman in relation to this instruments performance practice would include taking care of issues such as thickness of the perforated paper, tension of the chains, steam pressure, maintaining power and energy level, oiling the cogwheels and dealing with the constant danger that the whole mechanism would jam. These construction and functionality related questions have been a constant challenge in the process of building and performing with this mechanical instrument. The instability of the entire mechanism is extremely noticeable, and displays and reflects the physicality of the real machine to an extreme degree. Everything is imminently

about to go wrong, a cogwheel that jams, a screw that loosens itself, a chain falling of, water running out, the loss of steam pressure, gas running out. One could state that this is physical mechanical glitch music, but in contrast to its post–digital counterpart, *Steam Machine Music* questions the whole practice and conceptualizing of machine music in a historical perspective that points to the fact that machines always have been malfunctioning, they have always broke down, there has always been a real physical mechanism that challenged the predetermined functionality of the machine. It has just somehow been forgotten or overlooked in our symbolic and deterministic focus of technology.

This traditional interpretation of machine music often regards technology in a symbolic sense that places the machine in a context where it is regarded as something that fulfills a predetermined task based on instructions mostly existing in a symbolic form such as code (text), notes or other symbolic representations of a desired functionality. In the attempt to frame these fundamental elements of electronic music, I ascribe to a media archaeological method, in which I will propose a different understanding of today's electronic music by making an archaeological examination of mechanical musical instruments. This is done by examining this history through the ears of the repairman, and listening to the voice of the machine itself opposed to the traditional 'musical' melodic output. In the history of the mechanical instruments the notion of 'machine sound' is as good as absent, but listening to these machines today and investigating alternative sources, it is evident that these machines are indeed not a silent mediator of a symbolic musical representation.

"Automatic instruments are documents," [1] as Fuller claims, but what sort of documents? The traditional musicological study of these mechanical instruments focuses on the distribution of musical repertory through a study of the tune list associated with the instruments, [1] and examining the various performing styles, melodic ornamentation and tempi. [2] As this musical data is regarded an authentic source to the musical performance practice of the time, nothing is mentioned about the performance practice of the mechanical instrument itself. The traditional method of analysing mechanical instruments is by examining the symbolic data inherent in the cylinders and perforated punch cards. These musical documents merely function as a symbolic database of past melodic and rhythmical general musical tendencies, but by fine–tuning the archaeological gaze towards the physical mechanism of the machine, it becomes evident that these mechanical instruments can tell us much more than the preferred tempi and tonalities of past popular tunes.

The following excavation will take a closer look at one of the most popular mechanical musical instrument of the 18th and 19th century, the cylinder music box, in an attempt to point towards an understanding that mechanical noise was an inherent part of the auditory experience of the mechanical musical instrument.

The Malfunctioning Cylinder Music Box

The cylinder music box is one of the, if not the, most popular mechanical musical instrument through the last three centuries, and its mass production has its birthplace in the western part of Switzerland in the 1790s were thousands and thousands were produced. [3] The music boxes come in a vast variation of sizes, shapes and designs, but the mechanism that produces the musical sound has maintained, with little variation, the same fundamental appearance and functionality: The tuned teeth in a steel music comb are plucked by metal pins arranged in the form of a musical composition on a revolving metal cylinder, driven by a mainspring. To power the cyclical musical box one or two spring motors were used with a key, a lever or a winding handle would wind. The energy of the spring is then transmitted to the

revolving cylinder by the use of a gear train mechanism. Special attention should be paid to a mechanism called the governor, which is a series of gears usually in connection to a form of a fan. This fan uses the air resistance to provide an effective way of regulating the speed of the cylinder, making it revolve at a constant tempo. [3]

Sources tell us that the cylinder music boxes had several unintended noises and errors that where typical and recurring phenomena in the daily use of these instruments. Noises and rattles that any musical box during the course of time will develop. [4] These mechanical noises are described as a grating noise due to the badly adjustment of the dampers that should dampen the comb. [5] The pins of the cylinder will also produce a harsh disagreeable sound if not properly oiled. [3] Furthermore if a cylinder pin comes in contact with a tooth on the comb, while it is still vibrating from a previous pin, a raspy, buzzing, harsh sound will be heard. [3] Also the effect of atmospheric conditions on the exact parts of the mechanism or the result of long use, led to tiny changes, which noticeably affected the performance. [6] Additionally one could mention that repairing broken pins on the cylinder, and broken teeth on the comb were a daily part of the music box repairman's routine. [4] Also at times it may be found that one of the wings of the air–brake mechanism (governor) on the endless screw is loose and will not stay in the exact position necessary for the movement to run at the correct speed. [5]

The *Mechanical Music Digest* archives [7] are an insightful source to the malfunctioning mechanical musical instrument. Hundreds of forum post from dedicated collectors and repairmen give an intensive insight into the world of these old instruments. Among other things the archive points towards some of the most common errors of the music box that is described as non–musical noises from the governor mechanism mechanical noise from the drive wheel together with buzzing sounds from the lid and the soundboard of the music box that sympathetically evolves into strong tones of the mechanical mechanism points towards the fragile malfunctioning reality of the music box.

A most detailed account for the malfunctioning music box is additionally found in C. H. Jacot: *How To Repair Musical Boxes – Practical Instructions to Watchmakers With Complete Illustrated Catalogue of Material*, third edition 1890 reprinted in. [8] In this popular repair guide (first two editions promptly sold out) we find accounts for how the repairman must insure that comb dampers are properly adjusted "otherwise the box will give certain disagreeable, whistling sounds, which greatly impair the effect of the music." [8] Also the repairman should be careful not to place the comb to close to the cylinder, which would result in the sound of the box will be harsh, and also remember that every screw must be fasten as firmly as possible in order to avoid rattling sounds. [8] Regular oiling of the cylinder pins and the rest of the mechanism in the musical box is required to prevent wear and screeching noises. [8] But the most dreadful scenario for the repairman is when the music box is said to "run". This phenomenon occurs when the cylinder is accidentally disconnected from the fly–wheel governor while the mainspring is still wound which results in the cylinder suddenly whirls with lightning speed resulting in parts breaking off, bending and breaking pins of the cylinder and teeth of the comb. Accordingly hundreds of boxes are ruined by this accident every year. [8]

These accounts of the malfunctioning tendencies found in the music boxes, clearly indicates that this mechanical instrument is not to be treated solely in a symbolic deterministic way.

Recordings of Mechanical Instruments

The actual sound of the automatic instrument can, besides experiencing the instruments live, be accessed through audio recordings. These recordings [9] are clearly auditory documents that tell the story of how 'unwanted' noises from the mechanism becomes very audible, and illustrate how mechanical noise and motor sounds become an integrated part of auditory experience of the mechanical instruments. Accompanying these recordings are liner notes that states "Every one of these instruments has a turbulent life behind it, and if this sometimes manifests itself in creaking, groaning or other authentic noises, this in no way dims the excitement of the acoustic experience." [9]

It is interesting to notice the use of a phrase such as "authentic noises" in this context, emphasising that the machine reveals its true self when it breaks or malfunctions. The authenticity is somehow connected to the failing machine, a machine that breaks down is somehow more true than a machine that functions perfectly accordingly to the anticipated functionality.

Constant Speed of the Music Box – Introducing Speed Regulation

Speed–regulating stands as one of the most important factors of the mechanical instrument, and at the same time the most difficult to ensure for the repairman. [6] Without regular revolving of the cylinder "the music would be worthless" as Kircher writes, quote from. [6]

The governor control mechanism used to regulate the speed of the music box has a long history that originate in the constant quest for more and more exact ordering of time. A quest that in many ways can be balanced with that of the symbolic deterministic ordering of the machine, thus more and more accurate timing ushers a stronger anticipation towards an exact comprehension of the machines functionality.

The self–regulating mechanism of the governor has of course a long and complex history, but in this context it is relevant to introduce the concept of 'resonant control'. This category of timekeeping uses the theory of an oscillating mechanism or material to ensure precise clock rate. These resonant elements come in a wide variety of forms, mechanical or electrical, where the gravity pendulum discovered by Galileo in 1583 starts the epoch of the resonant control. Later the development of electronic oscillator clocks and the quartz crystal resonator, invented in 1921, ensured even more precise timekeeping. [10] The quartz crystal was later used in computers to generate a steady and reliable clock frequency in CPU's. This steady clock is the basis on which all calculations are made; if the frequency becomes unstable it can have catastrophic consequences for the functionality of the digital system. [11]

The development of a more and more precise ordering of time has a profound impact on the way we construct our lives and routines, as Mumford states with the introduction of the "modern" mechanical clock in the 13th century, the machine changed forever modern civilization. [12] These clocks that first appeared in the European monasteries, placed a mechanical ordering of the twelve temporal hours of the day, but it also had a more profound meaning, namely as synchronizing the actions of men, and the bells of the clock tower almost defined urban existence. [12] Furthermore it is evidently that "The clock, not the steam–engine, is the key–machine of the modern industrial age," [12] and to elaborate on this statement it is the speed regulation, or the governor mechanism, that is the key mechanical concept in the ensuring of equal regulation of the machines functionality, thus creating and developing the sym-

bolic deterministic order of the machine. These regulating principles propose the possibility and development of the standardizing modern life. The accurate clock thus being "a new kind of power–machine, in which the source of power and the transmission were of such a nature, as to ensure the even flow of energy throughout the works and to make possible regular production and a standardized product." [12] In that way the notion of exact timing can be regarded as the foundation of the symbolic ordering.

Breakdown

The statement, "The only totally authentic medium is the functioning automatophone," [1] perfectly frames the traditional notion of how machine music has, and is regarded in a broad cultural context. But what of the malfunctioning automatophone? Is that not an authentic source too? By listening to the errors of the auditory history, by taking on the role of the mechanic one could reveal an inner hidden logic of the machine, and get closer to a more diverse and complex understanding of the machine. This notion that the machine reveals its logic when it breaks down is claimed by Benjamin [13] may in this context be regarded as a subscription to a real or physical ordering of the machine, which focuses on the malfunctions and irregularities, complementary to the symbolic notion of predetermined functionality. This predetermination relates to Wittgenstein's [14] account of the machine as symbol in which our comprehension of the predetermined movements in the machine as symbol is governed by the grammar of the language. It is included in the discourse surrounding the machine, more specific the use of certain words such as *have* and *must*, as seen in relation to the machines functionality. These linguistic constructions that are used to describe the machine, are maintaining the illusion of the predetermined actions contained in the machine, thus forcing us towards a symbolic comprehension of the machine, maintained by the discourse that surrounds it. And if we consider the components of the machine as figurative or symbolic representations, the movements of the machine will be no more relevant than the movement of the piece of paper it is drawn upon, thus completely disregarding the physical aspect of the machine.

This paper has very briefly introduced to the concept of machine music through the ears of the repairman. A story of automatic music in which the focus lies on the malfunction and irregularities of technology in contrast to the traditional history of technology that usually focuses on the benefits of new technological breakthroughs. With the history of failure many new possibilities present themselves in relation to account for the way we use and understand digital technology today. New possibilities that start with a breakdown.

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TECHNO-CULTURAL ASYMMETRY IN LATIN AMERICA

Claudio Rivera-Seguel

Present day technological assimilation processes offer new possibilities for the development of communities based on autonomous, distributed and collaborative networks. This opportunity places us at the cross-roads of a double-edged Latin American techno-cultural asymmetry paradigm. The following comparative analysis describes 10 New Media Latin American cultural initiatives contributing to the emergence of a new 'Transamerican Culture.'

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The LatinWare Meet-UP

"Once again, late for another on-line Meet-UP, like usual in our 'Maestro Chasquilla' – handyman – country. So of course, I got on my cell phone and started calling:
Me: Hello where are you, are you connected yet? 1st Friend: Hi. I am in San Pedro, because my Open Space in the city has no connectivity. Me again: Ok. Then let's try to see if we can connect to Skype. 1st Fiend again: Yes. But I don't have anyone's contact imagination. Me: Ok, ok. Just send me your user name and I will Bypass you.
She soon sent me a textuality with her data, and I transitioned her an invitation. She then called me once again and told me Skype didn't work. Right at this time, my 2nd friend suddenly popped up on the desktop and said:
2nd Friend: Hey man, it's my first time on Skype. Me: It's easy. We just have to simply bypass the system. 2nd Friend again: Yes, but don't really know what I am doing, I really need to visualize. Me again: Ya, ya don't worry. I will add you to the LatinWare Meet-Up ideology.
I immediately infoed him the step-by-step process, and managed to reconnect. Right at that point I got another cellphone call from 1st Friend. She streamed me about her tech difficulties, and that she hoped to subvert the future.
1st Friend: Hi. I am so sorry. I still have problems with the neo-liberal software. It works but informs me that "I will never be connected". Me: Ok. Try hacking the system. I will let 2nd Friend know about the tech asymmetry.1st Friend again: I have already tried restarting and reprogramming several times, and

no change, the system will just not work!!! Me: No, no let's try to figure out how to Trans-culturize. We must depolarize.

At this point, I found out she was connected on G-Talk. So we create a digital-analog bypass for the rhizomatic transformation. I had to physically placed one laptop on top of the other, thus another low-tech retooling solution for a Non-Problem." [1]

According to international market research statistics, during the last decade Latin America has undergone the third largest internet user growth rate, alongside with the Middle East and Africa, which hold second and first place respectively. But overall for the period 2000 to 2010, Latin America has had the largest global increment of internet users, rising from 18 million to 226 million users. [2] This rapidly expanding social phenomenon is contributing to the rise of enormous social transformations that are inevitably incubating and establishing new associative, communicational and productive organizational and political social structures.

Latin America – together with other technological expanding world regions – is undergoing an exponentially expanding technological assimilation scenario, which offers a unique opportunity for the re-organization and subsequent implementation of new types of socio-political models based on the establishment of locally inspired forms of distributed and collaborative networked communities. This new social networking scenario -characterized by self – organization and self-regulation – places emerging and underdeveloped regions at the cross roads of a double-edged 'Techno-Cultural Asymmetry' transitional historical context.

'Techno-Cultural Asymmetry': Refers to the technological and cultural differences amongst regions or nations concerning their distinct communities or geo-political areas. The extent of the differences depends on the levels of social development and technological assimilation of each area and their characteristics regarding their, technological engagement, cultural identity and/or economic prosperity. It is a recent phenomenon product of processes that accompany technological proliferation and globalization, generally associated with the emergence of counter-cultural social movements and inspired by 'Open Culture' ideology.[3]

Unfortunately, this techno-cultural condition is also creating a contradictory dilemma concerning social empowerment and political control. On the one hand, technology is facilitating people's access to web 2.0 communicational tools and information, which in turn facilitates the implementation of distributed and collaborative networks, but on the other hand, decontextualized regulating policies and associative methodologies conditions restrict their usability and impose developed strategies fostered primarily by an exo-centric and hegemonic global context.

Nevertheless, this apparent conflicting cultural scenario of empowerment vs. control may also be viewed as an opportunity, due to the fact that for the first time in Latin American history access to on-line content – creation and publication – and the establishment of collaborative networks are relatively inexpensive and easy to acquire at least for the majority of Latin America's new media cultural industry stakeholders, independent agents and consumers.

Within this complex and rapidly shifting techno-cultural scenario it would be expected – according to market projections regarding technological penetration – that most of Latin Americans will soon have the opportunity to engage with new and improved web 2.0 tools and information, therefore may one day be able to re-appropriate and re-invent their social, economic and political public domain. That is of

course if socio-political conditions don't undergo radical changes.

A preamble to this pro 'Open Culture' condition may be exemplified by the fact that during recent years, countries such as Brazil, Venezuela, Ecuador and Paraguay have managed to propose and implement the use of free software within their respective governmental administrative apparatus. The adaptation of this free software policy, in all cases has been twofold: It was carried out in order to reduce administrative and logistic government operational expenses, and to promote the public's appropriation of "Open Culture" tools and ideology.

These counter hegemonic political strategies by four Latin American governments may in some way exemplify the potential for the implementation of new social paradigm in the region, that may contribute to the establishment of positive and 'neo-democratic' social transformations. These Open Culture governmental policies are in part a consequence of Latin-America's present day 'Techno-Cultural Asymmetry' phenomenon, which are rooted within a communal intensive cultural identity and 'LatinWare' style survival ingenuity and tactics, all of which play key roles in understanding recent techno-cultural assimilation and development processes.

The following section of this paper briefly describes 10 Latin American new media cultural initiatives which, in different degrees of engagement, promote and/or incorporate 'Open Culture' methodologies and tactics within their mission and operational mandates. Most of these organizations have been conceived and/or inspired by existing regional and local cultural expectations and foster and/or implement associative, communicational and productive 'Open Culture' methodologies and web 2.0 techniques. Through these practices, these and many other emerging organizations offer local and regional and local cultural communal spaces for the reflection and promotion of contextually informed and holistically imbued cultural practices.

It is interesting to note that within the following 5 institutional initiatives, most of them are made possible through funding and collaboration from foreign institutions. They include: Paralelo, Anilla Cultural, CCE Network, Plataforma Bogota.

1. PARALELO: Euro-Brazilian Collaboration for the Promotion of Cultural Exchange for Sustainable Culture. Paralelo: Technology & environment, was a unique five-day project in Sao Paulo, Brazil, consisting of workshops, symposia and live events - supported and organized by the British Council in Brazil and the UK, hosted by the Museum of Image and Sound in Sao Paulo and the Centro Cultural de Sao Paulo, with the support from Mondriaan Foundation and Virtueel Platform in the Netherlands and the Arts & Humanities Research Council in the UK. It brought together artists and designers working with media from three different countries - Brazil, the Netherlands and the United Kingdom to discuss different ways in which collaborations across disciplinary and cultural borders to enable research and new insights into global and local ecological problems. [4]

2. ANILLA CULTURAL: An Iberoamerican-Funded Cultural Center Network. A New International Agora for Contemporary Cultural Initiatives. Anilla Cultural Latinoamérica - Europa is a co-creative, collaborative and participative network that links Latin America and Europe in the field of contemporary cultural initiatives incorporating the intensive use of the Information and Communication Technologies and the Second Generation of Internet. It has been articulated as a collective and innovative initiative to explore, generate and establish new forms of action and knowledge through networking that would allow access for people, groups, communities and countries to varied local and international experiences. Sound art, film, dance, visual arts, performance, multimedia, net art, theatre, literature, video art, exhibitions, festivals and concerts

are some of the various initiatives fostered by Anilla giving special attention to debate, research and experimentation through intercative conferences and the development of digital media libraries and multimedia laboratories. [5]

3. TALLERES EN RED: AECID's Collaborative Network in Ibero-America promotes the creation of Shared Workshops and Educational Initiatives. The Network Workshops have been established as a proposal to generate and spread content related to art and web 2.0 communication technologies. These workshops have been organized by the Spanish Cultural Centres in Ibero-America and are open to everyone interested in these topics. This proposal has been developed through courses and workshops given by renowned artists, researchers and theorists. This platform has the following objectives: To generate knowledge, connect different spaces and realities while establishing itself as a free content production space open to the community. [6]

4. PLATAFORMA BOGOTA: An Interactive Art, Science and Technology Laboratory. Plataforma Bogotá is a free-access laboratory that fosters production, research, training, and the promotion of art, science and digital culture. It is a space for creation that generates interdisciplinary crossings among a wide audience of different ages and training levels interested in carrying out projects for the development and use of Free Software, Open Source, and digital culture linked to art, science and technology. [7]

5. ESCUELAB.ORG is an organization in Lima, Peru that fosters young creators, theoreticians and activists to project their ideas -conceived in the present- to design and built possible futures in which the gap between technology and society will be addressed through imagination. Escuelab offers a dynamic and modular study plan, focused on the development of projects, which combine disciplines usually practiced independently from each other. This action facilitates transdisciplinary knowledge in the fields of art, science, technology and new media. [8]

One can note that the following list of independent media labs is a recent phenomenon, since they have emerged only within the last 12 years, and most of these initiatives are concerned with regional and international based projects. For the purpose of this paper I will only describe a few of them but you may refer to other examples of New Media initiatives, which may be found within the independent Latin American project MapaSur. http://mapasur.wordpress.com/ an online wordpress platform created and facilitated by Alejandro Duque. – You may view and add other local and new initiatives to this Map –

1. MemLAB: An enterprise working on web and video projects, creating free open source software and promoting the idea of free video encoding through the Open Video Alliance. They also develop experimental software for video mapping, and have created a plug-in to allow streaming video in Wordpress. In addition they have created tools for interactive installations, scenery projections and a series of web solutions always using the largest possible number of free tools. They have also helped develop Lives, a video editing software in real-time, and in studio. They are part of the Open Video Alliance, a coalition of organizations and individuals dedicated to the creation and promotion of technologies, policies, and practices in free online video, and are responsible for several actions in Brazil. [9]

2. AVLab: is a meeting platform for the creation and distribution of sound and visual arts from an open collaborative approach. Its objectives are: To offer a place providing information, didactic orientation, and distribution about today's sound and audiovisual creation. Also it seeks to promote encounters among people with similar interests: experimental and electronic music, sound art, and audio and video processing in real time, in general terms. [10]

3. LabSurLab: is a network of independant initatives conformed by hacklabs, hackerspaces, medialabs and all kinds of laboratories and biopolitical collectives working from and for South America

seeking to establish their own spaces for action and representation through experimentation and creation. [11]

4. ArTeK: The Art and Technology Cultural Corporation – ArTeK – is a non-governmental and not-for-profit Chilean-based organization created by a group of multidisciplinary professionals in 1999, in order to foster the development of cultural initiatives and creative projects at the intersection of art, science and technology. ArTeK's mission is to articulate and promote the integration of the arts and multidisciplinary creations, facilitate its access and dissemination, enhance their communication capabilities, offer training in various aspects, assist to stimulate its creative process and help to systematize the utilization of their resources. [12]

5. RedCATsur: is a network of artists, scientists, engineers, theoreticians and institutions promoting communication and collaboration in art, science and technology in Latin America. The network welcomes discussions and critical analysis in the field of art, science and technology in Latin America as well as information on events, artists' works, organizations' programmes and projects. This initiative does not intend to duplicate other efforts in this area. RedCATsur proposes itself as an open space for discussion and collaboration, more than solely for information exchange. It aims to facilitate cooperation within Latin America but it is open to individuals and organizations from all regions. [13]

The five independent media arts organizations described above correspond to only a few grass-root cultural initiatives in Latin America. From the characteristics and content development of these organizations, one may start to comprehend and analyze the possibilities of the emergence of a new 'Open Culture' social paradigm. These organizational and operational models may play a key role in understanding the possible establishment of new types of associative and productive social models in Latin America, since they seem to surge from a symbiotic collective spirit of resistance to globalization.

Some of the commonalities of these new media initiatives are:

- They investigate topics and issues related to: Sustainability, Open Culture and Self-Governance.
- They use operational tactics such as: On-line Networking, Technological Retooling, Adaptive Thinking and Collaborative Creation.
- Their organizational traits are characterized by a spirit of inventiveness, contextual awareness and pro-active coexistence.

Some cultural factors that foster cultural resistance in Latin America:

- High costs for technological renewal.

- The urgent need for self-governance.

- The importance of traditional culture.

- An overwhelming belief in spirituality.

Most of these factors seem to be part of – and emanate from – the inherent Latin American techno-cultural asymmetrical context. Therefore its people have the unique opportunity to take advantage of new technologies and associative collaborative methodologies in order to re-appropriate and re-create a sovereign reality.

These social transformational processes, at least within the Latin American New Media arts milieu, are in part feasible or are developing because of the community oriented collaborative spirit, and in part because of the self-organizational needs that arise in order to address taboo or suppressed social concerns. This sub-cultural emerging resistance has at its core the driving force of the independent futuristic spirit, which articulates the inherent appropriation/improvisational tactics and techniques in order to bypass and/or coexist in parallel to traditional social organizational models.

In conclusion, global technological and cultural assimilation in Latin America – and other parts of the developing world regions – seem to have encountered an inherent and genuine spirit of resistance. Most importantly, its people are appropriating themselves of technology in order to establish the necessary social interconnections and collaborative channels for establishing a new distributed socio-political structure. If all remains in due course it would be expected that this symbiotic exocentric counter-assimilation process will establish a rhizomatic, non-hierarchical, collaborative social system which – sooner or later – will re-shape, nurture and facilitate the emergence of a new 'Transamerican Culture'.

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GESTUS

Hector Rodriguez

Gestus is a moving image analysis and processing framework that explores the relationship between algorithmic procedure and symbolic form. The core technical and aesthetic concept is the vector, understood as a method of representation or symbolic form that expresses an abstraction of movement. Its aesthetic effects are best described via the vocabulary of cognitivist aesthetics, as the posing of a perceptual challenge to an active viewer.
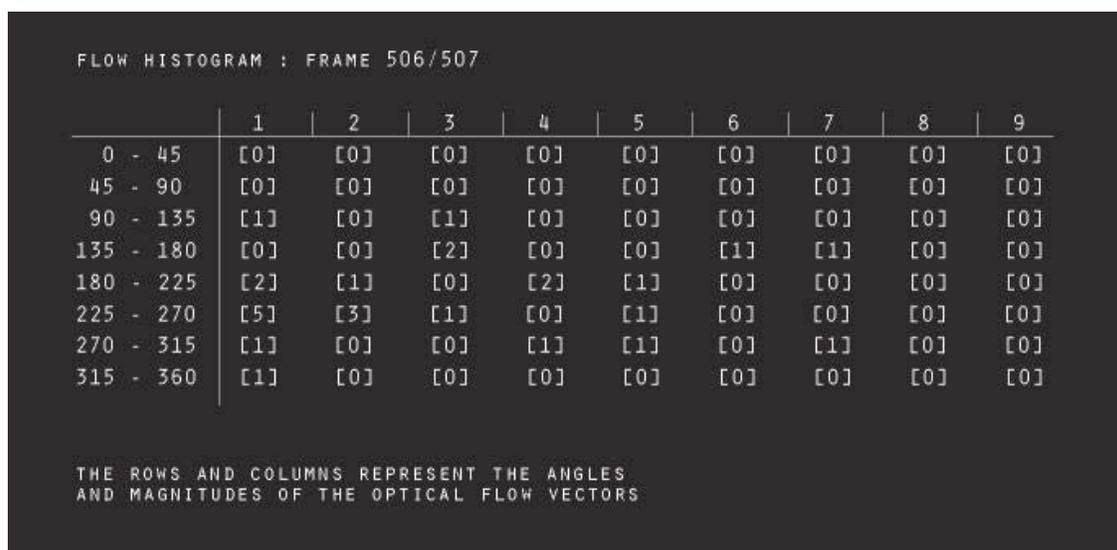
Fig. 1. Flow Histogram representing the magnitudes and directions of a set of flow vectors.

Fig. 2. Matrix display showing a video clip (center) surrounded by the eight best matches.

Vectoral Form

Experimental filmmaking can be seen as a radical critique of the conventions of linearity and transparency that characterize the conventions of "classical" narrative cinema. Classical conventions organize stylistic parameters around the clear and consistent communication of story information. The image is framed to direct the viewer's gaze to the main points of interest, relative to the main line of action, which supposedly unfolds in a coherent spatiotemporal domain and advances mainly through confrontations between goal-oriented agents. This dominant system always binds movement to objects and places. In this respect, classical narration draws on well-established features of ordinary cognition. Our awareness of movement is typically bound to specific objects and locations. We normally see (not movement as such but rather) some*thing* moving some*where*.

Experimental film and video makes have explored alternative modes of narrative organization and spectatorial address. In particular, there is a strand of avant-garde cinema that draws on the power of formal abstraction. Filmmaker Hollis Frampton, for instance, has called for "progressively more complex a priori schemes to generate the various parameters of film-making..." [1] The aesthetic potential of computational media lies precisely in its power to generate abstractions and so to extend this artistic lineage. This essay describes a particular kind of abstraction, which I call "vectoral form", and its potential utility as a method of avant-garde production.

The vector concept is here understood as a symbolic form, a method of representation. A pervasive feature of the cybernetic society, the vector plays a fundamental role in such control and surveillance tasks as motion tracking, action recognition, abnormal behavior detection, and video compression. These tasks substantially depend on algorithms that estimate the movements occurring in some image stream and then represent them as vector fields. A vector is an abstraction of movement. It is essentially characterized by two properties, magnitude and direction, and is often visualized as an arrow of a certain length and orientation. Vectoral form provides a sort of common currency that renders distinct movements quantitatively commensurable. It affords the possibility of measuring the similarity between motions by comparing the magnitudes and directions of their respective vectors. I claim that this abstraction potentially supplies the media artist with a radical principle of formal organization.

This essay explores the artistic possibilities of vectoral form in the context of the *Gestus* framework, a custom software system designed for the analysis and re-assemblage of video data. The system uses vector representations to search for similar movements occurring in one or more movies, and then displays those motions side by side as a split screen or multiple-channel projection. This emphasis on movement-as-such grows out of the technical role played by vector representation in the production process. The formal-aesthetic characteristics of the work are thus derived from the algorithmic principles that produced it. To quote filmmaker Malcolm LeGrice, *Gestus* tackles "the question of procedure as a determinant of form." [2] The technical procedure used here involves several steps.

Abstracting Movement

Assume that one or more "black and white" (grayscale) films are already available in digital form. Each film is represented as a sequence of frames and each frame consists of a two-dimensional array of pixels. The color of each pixel is represented as a floating point number in the interval (0,255). The first step in the algorithm normalizes the data by subtracting from the value of each pixel the mean (computed over all the pixels in one frame) and then dividing by the standard deviation.

The next step deploys an optical flow technique, in this case the Lucas-Kanade (LK) algorithm, to estimate the motion between each pair of successive frames. [3] LK assumes that clusters of contiguous pixels move together as a whole from one image to the next. Take for instance a close-up of a person's face. The eye portion will occupy several pixels, which tend to move together as a single group from frame to frame. The algorithm implements this assumption by partitioning each image frame into rectangular windows or "flowpoints", each of which is then tracked as a coherent group. The output of the algorithm is a field of motion vectors that estimate the displacement of each flowpoint from one frame to the next.

The optical flow for the ith frame gives an estimate of the flow from the nth to the (n + 1)th frame. The set of optical flow vectors for a single frame can be represented as

$F_i = \{f_{i1}, f_{i2}, ..., f_{ij}, ..., f_{iJ}\}$

where

$f_{ij} = [X_{ij}, Y_{ij}, \vartheta_{ij}, S_{ij}]$,

such that the coordinate (X_{ij}, Y_{ij}) represents the on-screen location of each vector, and ϑ_{ij} and S_{ij} represent the orientation and velocity of the flow vector for that location. Optical flow data therefore consists of *bound* vectors, each associated with a specific position on the frame. A vector is bound if it has a definite location, which can be described numerically via (e.g.) screen coordinates.

The algorithm then unbinds these vectors by abstracting away all location information. Flow data is quantized into $N_v \times N_\vartheta$ bins, forming a two-dimensional matrix or *flow histogram* (FH), which will be subsequently used as the basis for comparison. The (i,j)th entry of the matrix represents the number of vectors with magnitude i and direction j. (Fig. 1).The algorithm will henceforth proceed solely on the basis of the magnitudes and orientations of the vectors, not their coordinate positions on the screen, effectively treating all vectors as free (unbound) vectors.

Each FH is then further processed (in technical terms, the algorithm performs a Principal Component Analysis, and selects the top N eigenvectors) and transformed into a descriptor $x = (x_1, x_2, ..., x_n)$. I shall refer to these descriptors as "motion frame projections" (MFPs). Each MFP gives a highly abstract representation of the movement between two frames. The dissimilarity ("distance") between any two MFPs x and y can now be defined as follows:

$\text{dist}(x,y) = (x_1 - y_1)^2 + (x_2 - y_2)^2 + ... + (x_n. - y_n)^2$

This measure expresses a quantitative comparison between the movements of any two pairs of frames. It is straightforward to compute the distance between two video segments, each consisting of an arbitrary number of frames, simply by computing the distances between each corresponding MFP and then adding them together. Two segments "match" if the distance between them is sufficiently small.

After obtaining MFPs for each frame in the film(s) to be processed, the algorithm groups them into short "matching segments" of fixed length. My first experiments used L = 2 frames (1 MFP), but it is more perceptually rewarding to compare movements that extend over several frames, so I settled on a fixed length L = 10 frames (9 MFPs). This length determines what counts as a single "instant" or "gesture",

from the standpoint of the searching and matching algorithm. It is then possible to select any arbitrary segment S0 of length L and search for other segments S0, S1, S2, ….of length L (which can but need not belong to the same movie) that closely match it. In the current version of this project, we select the 8 "best" (closest) matches, displayed as a matrix around S0, which occupies the central cell of a 3 x 3 grid (Fig. 2).

Aesthetic Effects

The chosen source material is Louis Feuillade's 1916 film serial <u>Judex</u>. There are several reasons that justify this choice. Feuillade worked within a tradition of 'tableau cinema' that relied on deep space staging rather than camera movement or analytical editing. Film theorist and historian David Bordwell stresses the director's skill at forming dynamically changing geometric arrangements of bodies in space, carefully directing the viewer's gaze to salient features of a scene on a moment-to-moment basis. "Such gentle geometries of movement hard to find in today's cinema, and observing them in Feuillade reminds us that long ago some directors crafted their images as two-dimensional patterns of bodies in space." [4] Bordwell has noted the rhythmic quality of cinematic motion in Feuillade's work: "Shots are subtly balanced, then unbalanced, then rebalanced..." [5] By focusing attention purely on the magnitude and direction of movement, *Gestus* foregrounds the rhythmic quality of Feuillade's deep space orchestrations.

The multi-channel display cues the viewer to engage in an active process of visual thinking, scanning the various images in an effort to identify the similarities between them. Her perceptual effort becomes an integral element of the vector machine. The system might display a human hand alongside a bird's face, for instance, thus revealing the kinetic resemblances of otherwise heterogeneous objects. This interplay of similarity and difference underpins the main aesthetic effects of the *Gestus* system, its visual demonstration of the difference between movement and the thing that moves.

Sometimes, the viewer easily detects similarities between the various images. In other cases, however, the movements are very subtle and occur in different areas of a crowded image, posing a sharper perceptual challenge. Perhaps a dropping hand near the bottom of one image corresponds to a leaning shoulder near the left edge of another. The system invites, challenges, and sometimes frustrates the spectator's cognitive-perceptual skills. The gaze is made restless. Although the software uses segments of fixed length, the moment-by-moment experience of lived duration sometimes expands or contracts, depending on the effort required to bring the various images into perceptual relation. This destabilization of the gaze demonstrates the transgressive possibilities unleashed by the abstraction of movement through vectoral form. Motion tracking techniques designed for surveillance and control are thus detourned and redeployed.

Liberate the vector.

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THE WORK OF ART AND THE INTERNET. NEW CURATORIAL ISSUES: NETINSPACE – A CASE STUDY

Elena Giulia Rossi

The paper shapes from the experience of *NETinSPACE*, the project I curated at MAXXI — the newly born National Museum of XXIst Century Arts in Rome (2005-2011). With a theoretical, as well as a practical approach, it focuses on curatorial issues raised when dealing with artworks that employ the web as a territory for creation and as a means of artistic production, mostly when within the institutional walls.

Introduction

What is "new media" art? The relation of the term to the medium has been discussed extensively and controversially, in contrast to the ease with which we still categorize more traditional art according to technique, such as "oil on canvas" or "drawings on paper". New media art is generally perceived as existing outside the mainstream art system. This is particularly true for "net.art", a term that recognizes art practices that use the internet as a creative terrain and as a tool for artistic production.

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Much new media art can exist perfectly well without any institutions. But, as Christian Paul, Adjunct New Media Curator at the Whitney Museum of American Art in New York, has pointed out, "new media art constitutes a contemporary artistic practice that institutions cannot afford to ignore". [1] Conflicts that occur as these unconventional and mutable works come into contact with art institutions and their established parameters, inevitably affect curatorial practice.

 The vast quantity of critical writings on the subject shows that there is no universally applicable paradigm. The analysis of case studies can therefore be a useful strategy in the exploration of a curatorial practice that is in constant flux, not only when dealing with new media art, but also when it comes to art that, since the avant-gardes and irrespective of the medium, has dissolved into a "gaseous state" *(état gazeux)* to use French philosopher Yves Michaud's metaphor. [2]

 Issues of terminology, curatorial tasks and display issues, are here explored through my experience at MAXXI in Rome, Italy, where the NetSpace project was launched in 2005, evolving, by 2010, into NETinSPACE. It has proved to be an interesting terrain of curatorial research. Choices – of terms of reference and of display – have been part of the task. The curator, in her role as mediator between the artists and the museum, had to find points of convergence with the institution.

From NetSpace to NETinSPACE (MAXXI 2005-2011)

NetSpace (2005-2008), held at MAXXI when the new born museum was located in the neutral spaces of former military barracks whose shape inspired the design by architect Zaha Hadid, consisted of continuous events as well as an "active" archive closely linked to education and research.Thirteen consecutive events related to net art, including video-screenings and artists' talks, were held in the course of three years. The goal was to provide, throughout significant works and artists, an overview of then over fifteen years activity on the net during which these art practices were shared by almost only specialized artists and theorists. Computers gave visitors access to online works grouped in thematic cycles that addressed the general nature of the internet (i.e. *Content and Forms*, *Art and Virtual Identities, Electronic Landscapes).* The audience were invited to interact with the works, and to deepen their knowledge of historic contexts. The selection of works was never intended to be exhaustive, but to provide an introduction to modes of art production and thinking, new to the institutional scenario, and to encourage visitors to continue their journey by navigating the web – where net.art has originated – from their own (home) computers.

Historic context was a crucial component of the project. Essays realized in conjunction with the Department of Education provided content descriptions and located these works in art history, and in the artists' research. Their historic framing was a task of "interpretation" as intended by Beryl Graham and Sara Cook in their recent, extensive critical survey on curatorial practice. [3] Also, categorizing and defining this particular art form in this particular manner was a useful way of further contextualizing and exploring art practices that were still obscure to many – especially in Italy and at that time.

Now that net.art has crossed the threshold of institutions, despite meeting with some resistance, we need to move on and release it from its ghetto to consider it in the much wider context of idioms of contemporary art and culture in general. NetSpace was already travelling in this direction insofar as each event included international artists who tended to use relatively more traditional media but had begun to experiment with the internet as a tool of creative research. Francis Alÿs (*The Thief*, 1999), Arturo Herrera (*Almost Home*, 1998) were among these artists invited to experiment with the internet, as web commissions, by the newyroker DIA Art Foundation, a pioneer institution to pay interest towards these art practices.

This was the basis for the renamed project, NETinSPACE, which was launched on May 27, 2010, on the occasion of the inauguration of MAXXI, as a section of its first thematic collection called *Spazio/Space*. Part of it has moved beyond the computer screen to invade the museum's physical space, "infiltrating" the passages adjacent to the exhibition galleries. Established and emerging artists, working both on the internet and in a variety of non-web-based idioms, have shaped a new territory where diverse languages interweave and merge into one.

Katja Loher, Miltos Manetas, and artist duo Bianco-Valente were the first to embrace this challenge by creating site-specific installations at MAXXI/NETinSPACE. The web components that characterize each of their works were conceived both in their own right, for on-line viewing, and as extensions to site-specific installations, affording different perceptions. The internet functioned as both "tool" and "space", conceptually and physically meshing with the museum as a location.

KATJA LOHER - *SCULPTING IN AIR*, 2010

Young multidisciplinary artist Katja Loher's work was on display in the foyer which hundreds of people pass through from the main entrance every day. *Sculpting in Air*, Loher's work produced for this occasion, was one of many incarnations of her planets/universes in which choreographed bodies filmed from a bird's eye view come together to form the letters of a new language. In this instance, the post-production editing process orchestrated a dialogue between man and machine. Her projections onto large weather balloons *(Videoplanets*, since 2006), inside circular sculptures *(Miniverses*, since 2008), through coloured water in three glasses *(RGB Well*, 2009/2010), or inside glass bubbles *(Bubbles*, 2010) are just some of the ways in which Loher achieves the transformation of video into sculpture.

The audience's perception of and interaction with her work has always played an important role in Loher's explorations. The different ways in which her videos become sculptures also encourage different modes of viewing: while the balloon projections embrace the audience, the *Miniverse* sculptures force people to bend low to peer at the videos through holes.

Adding the internet component to *Sculpting in Air* enabled Loher to construct a much more complex scenario, pushing the game between observer and observed to its extreme: in the video projected on the front of the balloon, a sudden zoom-in of the camera frames the gaze of one of the dancers, establishing a strong connection with the observer. A moment later, this connection is broken by an equally sudden zoom-out which merges the dancer's face back into the ensemble. Meanwhile, the audience itself is also being watched. Images from a camera that films visitors as they observe the work are projected onto the rear of the balloon and incorporated into the "planet". From there, the images are returned in reverse live-stream transmission to observers who watch both video and filmed visitors on a computer screen located at a distance, in another part of the foyer.

Sculpting in Air emphasises a fragmented vision in which both sculptural component and mode of viewing are based on circularity. Moreover, the internet extends the voyeuristic aspect already present in her earlier works. This time, however, it involves both the online observers and the artist herself, who can stay connected to her work and to its physical visitors regardless of her/their own whereabouts.

MILTOS MANETAS - *IAMGONNACOPY*, 2010

If Katja Loher uses the internet as an experimental tool to extend the scope of her exploration, it is second home to Miltos Manetas. One of the first artists to produce oil paintings of the world of information (e.g. *Italian Painting*, 2000, in the MAXXI collection), Manetas is a pioneer in the use of the internet as a tool of artistic production. His presence in this new stage of the project was of particular relevance as this artist continuously moves between worlds with a forward-looking vision that embraces technological advances as well as new modes of communication.

IamGonnaCopy (2010), the title of Maneta's "action" conceived for MAXXI, constitutes the convergence of a number of elements from his previous on-line work, *IamGonnaCopy* (2001), and from his contribution to *Internet Pavilion*, presented at the 53rd Venice Biennial (2009), which included his manifesto, *Pirates of The Internet Unite.*

The initiator of artistic currents such as Neen, a name Manetas commissioned from Lexicon Branding, the artist has been constantly exploring the interface between the analog and digital dimensions. *IamGonnaCopy* (2010) is a synthesis of his past and present work. It is his vision of a new territory where body and information merge into a unified whole. Manetas' manifesto and new stickers bearing

the title of the work as a logo, design by Experimental Jetset, were distributed in various locations, with the Manifesto posted all over the city, and covering one of the foyer's main walls. The stickers were distributed by hand, and inserted in more than 5,000 copies of the free "cura.magazine". Everything came together in the web component, a platform where, apart from documenting his intervention in physical space, Manetas invited participants in cultural life to vote in favour of or against copyright. While the posters remain on the wall, having almost merged with it, the artist's action has moved on towards a "metascreen" [4] dimension in which a new, post-internet analog era is evolving.

BIANCO VALENTE - *EVOLUTIVE CONVERGENCE*, 2010

At a considerable distance from the main foyer, in the vicinity of the gallery dedicated to the work of architect Luigi Moretti, visitors encountered Bianco-Valente's *Evolutive Convergence,* realized for the transparent elevator that connects the ground floor with the upper level. The Italian artist duo has been exploring the boundary between matter (body) and the ephemeral (mind), experimenting with and using a variety of materials and supports, predominantly video. They are often engaged in site-specific installations related to interior and exterior museum architectures as well as public spaces.

Evolutive Convergence extended the artists' field of interest to a confrontation between real and virtual space that, exposed to mutual influences or cross-fertilization, evokes the functioning of universal natural laws. Ramification processes that are characteristic of trees, for example, also form the basis of most natural ecosystems, including neural structures. Bianco-Valente turned them into metaphors for the organization and visualization of the fluid space of the internet. For the web component, the branching patterns materialized in pastel on the museum elevator's four-meter tall glass surfaces were translated into flash images.

The elevator turned out to be an eminently suitable location to present their work from different angles, not least from the inside of the elevator capsule, which afforded a view of the surrounding space and art exhibits through the filter of the patterns.

NET.ART ON THE COMPUTERS

In a dedicated computer space, visitors could access information about six selected net.art works (1996 – 2008), i.e. site-specific installations as well as their web componets. Each project, both online and on location in the museum, addressed the theme of "space" in its virtual and physical dimensions, and their cross-fertilization. A moving, a-hierarchical cube flash interface gave access to works by Bestiario, Dr. Hugo Heyrman, David Crawford, Les Liens Invisibles (Clemente Pestelli and Gionatan Quintini), Boredomresearch (Vicky Isley and Paul Smith) and Stephen Vitiello. Sustained interest in net.art has promoted a "live" archive where these works are available to the public in a continuing tension between past and present.

The display of net-based art on computers scattered throughout the museum is "barbarian" [5] in the classical Greek sense to identify people alien to Greek culture and unable to speak that language, litterally "stammerer". Here – and also as regards the Museum's section dedicated to net.art – the intention has never been one of "display", even if the media have often claimed this to be the case. Rather, such displays are intended to act as a mode of "live documentation" to capture the interest of both the audience and of the institution itself.

With regard to the net.art section, the delivery of online works on the computer screen is now ready to shift into another, perhaps exclusively online, mode. This also takes into account the Museum's new space and audience, who are not only much broader and more heterogeneous, but also much more easily "distracted" from content, and "attracted" by Hadid's powerful architecture.

Conclusions

The above shows that NETinSPACE is located in between spaces, in between art genres, at the edge of research, and on the borderline between the unconventional and the institutional. Location – or rather, dis-location – metaphorically reflects an art form that is everywhere and nowhere, involving all departments and disciplines. Also, "net" does not exclusively refer to the internet but applies to art that manifests itself in a web of convergence of the virtual and physical dimensions.

The museum has played a dual role in embracing this project, both as the unconventional host of net. art, a process which uproots this art form from its context, and as an active participant in the production of conventional and experimental works conceived for and adapted to the museum space.

Adding site-specific installations has also turned the "interpreter" curator into more of a "mediator" between artists and institution. The presentation of net.art works alongside site-specific installations frames these art practices in a broader art scenario.

Like most unconventional art, Net.art has undergone a number of shifts, many of them determined by its move into the mainstream art system. For some artists this institutional acceptance has opened up new modes of production, encouraging them to conceive their works in formats that, while far removed from the dynamics and modes of involvement dictated by the internet, may better suit the institution in terms of its mission, gallery space and audience. Also, some artists have "translated" their works onto new supports in order to cater for the tastes and needs of this particular audience. The online works shown on the computers at MAXXI have been part of the "live" hypertext archive that has explored works created exclusively for the internet and more strictly associated with the original meaning of net. art.

 Mostly, when operating within large art institutions, the curator has to adopt a certain accepted terminology to communicate with the general public. However, neither umbrella terms such as net.art – nor the broader term "new media art" – will ever completely fit art practices that are not only multidisciplinary in nature, but "alive" and in continuous flux. Repeated – if occasionally critical – usage in a now vast body of literature has nevertheless established a certain vocabulary. Narrower terms such as " interactivity", "connectivity" and "computability," [6] which Steve Dietz uses to illustrate new media behaviour, can therefore improve the understanding of what the umbrella terms refer to.

The decision to use these terms in a field relatively new to museums was as much dictated by practical issues as by necessities of art theory. In regard to NETinSPACE, presenting online art using the term "net. art" has had a dual objective: on the one hand, as has been mentioned above, to place net.art in a broader context; on the other hand, to continue building the "active" archive that keeps alive the names and categories that designate certain art practices associated with a certain period, some of which may continue to evolve, albeit in a greatly changed context.

This is one of many reasons why "providing context" will always be important when dealing with new-media art – not least to give researchers, curators, and future conservators some points of reference. Ever since art dissolved into a "gaseous state", documentation has proved to be an even more important and inevitable curatorial activity than ever before, and it is the very first step towards conservation and archiving.

 As Charlie Gere states in an essay published on the Tate website, "what we choose to archive and thus to preserve for future generations will help determine the future." [7]

This is NETinSPACE's new, intense work being carried out in close collaboration with "MAXXI B.A.S.E", the museum's research centre.

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LABORERS OF LOVE/LOL: BEHIND THE SCENES

Stephanie Rothenberg & Jeff Crouse

In the past 10 years the porn industry has experienced its most dramatic shifts in profit, production and product due to the advent of Web 2.0 and mobile devices. "Laborers of Love/LOL" examines these changes through the creation of an adult entertainment website that outsources customers' fantasies to anonymous online workers.

Be it a robotic dildo or an early adopter to Video On Demand, the porn industry has always been a leader in the development and incorporation of new technologies into the production and distribution of its products. Yet in the past 10 years the porn industry has experienced its most dramatic shifts in profit, production and product due to the advent of Web 2.0 and mobile devices. "Laborers of Love/LOL", an online artwork I co-developed with artists Jeffrey Crouse and Micheal Schieben examines these changes through the creation of an adult entertainment website. The website outsources customers' fantasies to a pool of anonymous online workers seeking temporary jobs through Mechanical Turk, a crowdsourcing job engine created by Amazon. Com. The final product is a short recombinant video, a mashup, where 1970's experimental cinema meets canned Photoshop filters, and ultimately reflects on how desire and pleasure are represented, fragmented and abstracted through the consumption of online digital media.

1. **Profit: The Pirates of Pornzance**

Pirates XXX was released on DVD by the leading Adult Film Company, Digital Playground, in 2005, three years after Johnny Depp's pirate film. Featuring porn star Jesse Jane it was the most expensive pornographic movie ever made with a budget of over $1 million. It was also one of the first adult videos to be made in High Definition DVD. It won a record-breaking eleven awards, including Best All-Girl Sex Scene, at the AVN Awards–the porn world's Oscars.

Yet five years later at the 2010 Adult Entertainment Expo in Las Vegas, the biggest annual gathering of the adult film industry, the event was shrunk down from two floors to one with so many less fans, foot traffic, and exhibitors you could lie down on the floor and take a quick catnap. Even the AVN Awards had been moved from the city arena to the few-thousand-seats theater at the Palms.

So what has happened to the $13 billion dollar porn industry? Pirates! Similar to what the music industry experienced in early 2000, the introduction of digital formats in conjunction with the weak economy has led to severe financial pains. The news site CNBC reported DVD sales down as much as 50% in 2009.

In reference to illegal downloading and "Tube" sites like YouPorn, Steve Javors, editor in chief of XBIZ, a major porn industry trade mag, exclaimed "How can you compete with free?"1

Porn is now also competing with online games like World of Warcraft. An anonymous porn webmaster stated "It is all entertainment that you are getting involved in … [video] games are competition for porn. Fans jerk off to porn and are done, but you can keep playing a game."2

1. **Production: We Are All Sex Workers**

Last year in an article in the Daily Beast, Pete Housley, developer of Porn Star Tweet, a service that verifies and aggregates porn stars on Twitter, said "People used to be ashamed to say their girlfriends did porn. That is gone. Anyone can afford a Web site now."3 Whether it's the girl or boy next door making their own porn site or celebrities making porn flicks such as the infamous Paris Hilton, the gap between mainstream media and adult entertaining is shrinking.

User-generated porn, or Porn 2.0 as it is called, is being enabled by web sites like Xtube, Pornhub or YouPorn—free pornographic video sharing sites similar in format to YouTube. The New York Times calls sites such as YouPorn "a good role model for the sexually naïve" since many of the homemade videos depict amateur couples having ordinary sex in contrast to the unreal scenarios of commercial porn.4 Regina Lynn, sex columnist for Wired magazine, says "Despite social and professional stigmas, a lot of people are putting themselves on the internet. It fits into this era of people expressing themselves."5

An example is Antoinette, a 25 yr old college educated interior designer from Baltimore, MD. A few times a month she and her boyfriend make "amateur" pornographic movies in their apartment under the name "Sexy Secret". Antoinette claims she does not want to be a porn star and considers herself "a pretty normal woman" saying "… I'm nice looking, sure, but otherwise I'm pretty average."6 Yet, this "couple next door" makes films with explicit displays of hardcore intercourse that would garner a XXX billing—and their 20 minutes of "work" in the bedroom earns them an extra $500 to $600 a month.7

In addition, the use of social media such as Twitter and Facebook has had a humanizing effect further mainstreaming the industry by enabling porn makers to directly engage with their audience.

But making videos and conversing with fans through social media is just one aspect of the shifting role of the sex worker. One can remain anonymous and still contribute their labor. Online temporary job agencies such as Mechanical Turk, enable anyone to make porn. By responding to HITS, what Mechanical

Turk calls "Human Intelligence Tasks", an online "worker" can make anywhere from a few cents to several dollars for finding specific images or videos through online searches. The faster you work, i.e. the more HITS you respond to, leads to higher earnings. This anonymous, outsourced distributed global labor is the mode of production "Laborers of Love/LOL" uses to create its product.

2. **Product: The Medium is the Massage**

•Approximately 45% of North Americans and Europeans are viewing media on their mobile devices8

•internet users are shown approximately 1.1 trillion advertisements per year with Facebook webpages taking the lead9

• on average Americans view 3,000 advertisement per day10

•Every second approximately 30,000 people are viewing porn11

•The average online porn flick is 5 minutes long12

•The average time it takes to reach an orgasm while masturbating is between 2-4 minutes13

• average view time on a web page is 33 seconds14

In Linda Williams renowned anthology "Porn Studies", a collection of academic essays on pornography as a cultural form published in 2004, writer/curator Franklin Melendez investigates the relationship between technology and sexuality. In examining the phenomena of video and the advent of the VCR as a new format, he explores the relationship of the convulsing body to the convulsing machine. With references to Jean Baudrillard and Frederic Jameson, he explains how the mechanical apparatus used to construct the image becomes as vital to the experience of pleasure as the sexual event itself in what he calls an "eroticization of mediation" or the "image's commodity texture".15 The material conditions such as the techniques and editing strategies used to construct the video (timing, repetition, special effects) as well as the platform, in his case the TV and the VCR are all critical to creating sexual truth in the scene.

Referencing Jonathan Crary's theory of the carnal density of vision, Melendez states that in watching pornography on the screen we experience two types of pleasure– "the possessing or consuming of the image through a disembodied gaze that operates in conjunction with corporealized vision–the pleasure of pornography's physical effects on the body".16 This relationship of disembodied/embodied then point to the significance of the viewer's encounter with historically specific modes of reproduction. Thus the "performers bodies and the television screen start to question priority of content over medium."17

If we now fast-forward to the world of Web 2.0 and mobile devices, short format wins hands-down. The byte, b-y-t-e as well as the bite, b-i-t-e as experienced on our slick sexy shrinking machines are what's relevant here. In a global culture oversaturated with information, the viewing experience has shifted. Our sight has been subjugated to the media sphere and we see the world in 33-second intervals or less–the time it takes to scan a web page or watch a TV commercial. Through this hyper fragmentation of our vision, a new cultural form has emerged–the mashup. "Laborers of Love/LOL" utilizes the mashup to provide the ultimate in sexual pleasure and fantasy in the age of digital culture.

A demo of "Laborers of Love/LOL" is available online at: http://vimeo.com/17837725

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AESTHETIC 3D RENDERING OF HISTORIC SHIPWRECKS (AN ARTIST'S INTERVENTION IN MARITIME ARCHAEOLOGY)

Chris Rowland

Evidence of our maritime heritage can be found in the thousands of historic shipwrecks that lie beneath the oceans around our coastline. Developments in sonar technology have provided opportunities for high-resolution data to be gathered which can be used to produce accurate 3D images of these important shipwreck sites. This paper describes how an aesthetic approach to visualising data can make our submerged maritime heritage more accessible.

Fig 1. Sonar image of MV California. Copyright C Rowland/ADUS.

Fig 2. 3D Visualisation of the wreck of SS Richard Montgomery using occlusion objects and locoramps. Copyright C Rowland/ADUS.
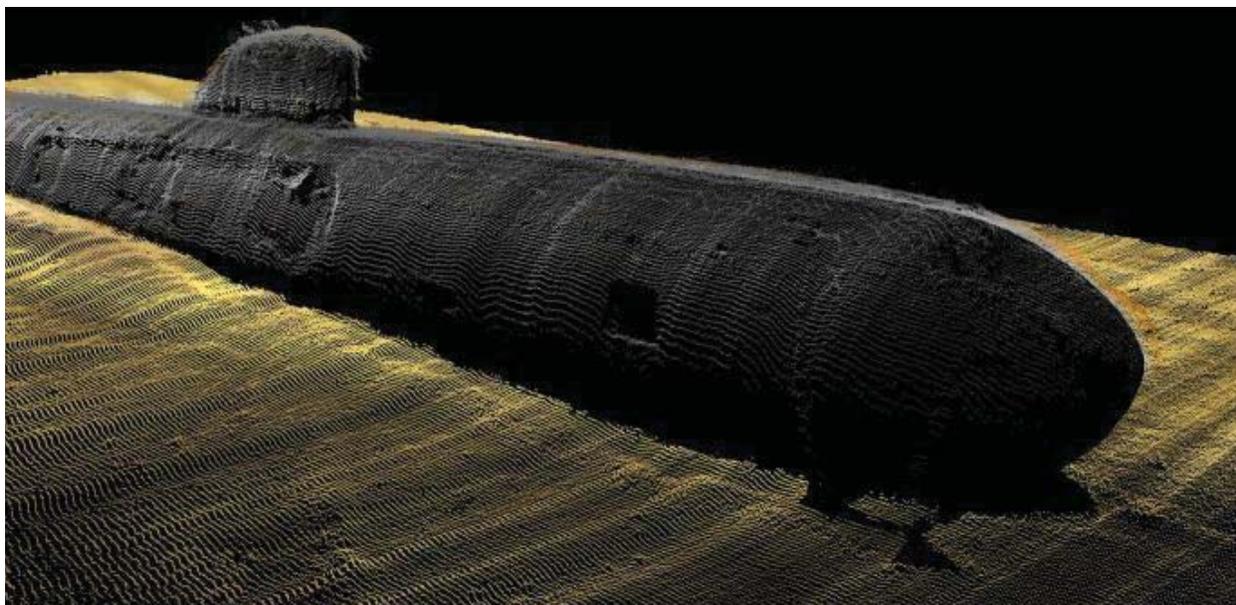
Fig 3. B159 at 250m in the Barents Sea. Copyright C Rowland/ADUS.

Background

There are 62 maritime heritage sites around the UK coast that are designated as historically and environmentally significant under the Protection of Wrecks Act (1973). English Heritage, Cadw and Historic Scotland manage the wrecks on behalf of Her Majesty's Government. The wrecks range from the remains the *Stirling Castle*, a flagship of Samuel Pepys' navy, [1] which sank in 1703 on Goodwin Sands in Kent, to the remains of the WWI German High Seas Fleet scuttled at Scapa Flow, Orkney in 1919. [2]

Designated sites are identified as being likely to contain the remains of a vessel, or its contents, which are of historical, artistic or archaeological importance. Due to the fact that all of these sites are submerged, they are effectively invisible to the general public and the majority of specialist researchers (hydrographers, historians, artists etc). Interest in shipwreck sites is not limited to their cultural or historic significance. Environmental factors are also important.

Marine salvage is carried out when a shipwreck may be a danger to shipping or the environment. When hazardous cargo (e.g. munitions or oil) create an environmental threat, salvage teams are engaged to assess the risk then carry out procedures to minimize the impact. The UK Ministry of Defence is responsible for approximately 20,000 known military wrecks around the world, many of which present such a threat to the environment. [3]

Visualising the Problem

To manage the environmental threat, there is a requirement to monitor the condition of the wrecks as they deteriorate. Surveys of the wrecks are regularly undertaken. Traditionally, maritime archaeologists have used photography, video and drawings to record the condition of important wrecks. However this

is time consuming, hazardous (due to the risks inherent in repetitive diving) and limited to shallow sites where visibility is good.

When visibility is bad or the sites too deep for diving operations, the method of choice has become multibeam sonar. This method uses sound to produce high definition 3D images of objects on the seabed much more quickly and accurately than traditional analogue methods. [4] However, multibeam sonar does not collect colour information from the targeted shipwreck, therefore colour has to be added later in order to visualise the data. The resulting dataset takes the form of a point cloud, i.e. millions of xyz co-ordinates representing the shape of the wreck as the beams of sound reflect from its surface back to the sonar device.

Industry Standard Visualisation Methods

The standard methods of visualizing such point clouds include converting them into simplified polygon surfaces. This has the advantage of preventing the viewer from seeing through the gaps between the points. The main problem with this method is the draped polygon surface also hides detail that was otherwise visible in the original data. This method is fine when visualizing large areas of seabed e.g. prior to laying sub-sea pipelines. However, when surveying environmentally hazardous shipwrecks, important information is often visible in the fine detail. For example, a polygon mesh will hide cracks in the ship's hull or holes in the deck structure, which may indicate how the wreck is deteriorating.

The Ubiquitous Rainbow Ramp

The lack of colour in the point cloud data is most often resolved by the application of a colour ramp that ranges from dark blue to red. In maritime archaeology and sub-sea salvage the colour is used to indicate depth, i.e. blue is applied to the deepest part of the wreck and red to the shallowest. Figure1. However there is no accepted standard use of colour, it can vary considerably from wreck to wreck. The use of "rainbow" colour ramps is not contained to this type of survey data. Aesthetic considerations in the presentation of scientific data are mainly found in the field of visual analytics where large abstract datasets need to be presented in visual form to promote visual interpretation and pattern detection. As Eduard Tufte describes in The Visual Display of Quantative Information: [5]

"Colour often generates graphical puzzles. Despite our experiences with the spectrum in science textbooks and rainbows, the mind's eye does not readily give a visual ordering to colours, except possibly for red to reflect higher values than other colours."

Theory of Data Graphics, p. 154.

Tufte goes on to describe a method for colouring data as used by L. L. Vauthier, [6] called the mountain-to-the-sea method. White is used to represent greater intensity since it was the colour of snow on a mountain, next came green, representing forests farther down the slopes, yellow for the grain in the fields then minimum values were coloured blue, the colour of the sea.

Examples of the ubiquitous rainbow ramp approach repeatedly appear in the visualisation of a wide range of scientific data. A simple web image search will bring page after page of rainbow coloured scientific images whether it's geospatial visualisation from geological survey data, Golevka asteroid explosion

simulations, telemetry from the McClaren Formula one racing team or isosurface normals from the Visual Human Project (to name but a few).

We are presented with these coloured scientific images repeatedly to the point where we don't really question them. Maybe the rainbow colours convince us that they are scientifically generated and therefore are likely to be true? We simply accept their validity. Unfortunately, this method of colouring data has limited benefit when visualising hazardous shipwrecks on the seabed.

An Aesthetic Approach

Working in collaboration with maritime archaeologists Martin Dean and Mark Lawrence at the University of St Andrews, it became clear to the author that the aesthetics of presenting shipwreck data followed a standard approach that did little to reveal the details necessary to understand the condition of the wrecks. Dean and Lawrence had carried out extensive research trials in gathering ultra-high resolution multibeam data from important shipwrecks around the UK. [7] In doing so the team realised that the standard methods where not sufficient and a novel visualisation approach was needed to display the level of detail that could now be gathered from shipwrecks.

The first step in attaining this was to stick with the original point cloud data and reject any form of converting the data into polygon surfaces. If data was incomplete, then it should be portrayed as such and not disguised by any meshing technique. Therefore a new method was required to prevent the viewer from seeing through the gaps between the points. An alternative to the use of rainbow colour ramps, which applied arbitrary colours to data defined by depth, could also be investigated. Finally, the use of digital cinematography offered opportunities to explore how visual depth cues could be enhanced by moving virtual cameras around the shipwreck visualisation.

Occlusion objects were developed as an alternative method to the use of polygon draping and locally oriented colour ramps (Locoramps) were created to replace the use of rainbow colour ramps. Both of these methods are described in detail in prior publications, [8] so will simply be summarized here: Occlusion objects are a solution to the gaps between points problem. They consist of 3D polygon shapes modelled to follow the topology of the wreck data. The occlusion object acts as a mask to prevent the viewer from seeing points on the opposite side of the wreck dataset by its placement in the interior of the point cloud shape.

Locoramps are used to highlight fine detail in the data by the placement of locally considered colour (or greyscale) ramps which are aligned to specific details on the wreck. Structural details are often difficult to see with the use of brightly coloured rainbow ramps often used in data visualisation; locoramps offer an alternative method for adding local colour that can be oriented in different directions.

When both of these methods are used in conjunction, the resulting 3D visualisation reveals the high detail level of the original data by applying aesthetically considered and sensitively positioned colour that emphasizes important details of the wreck's structure.

The most effective way to demonstrate the novel visualisation methods is to describe how they how have been deployed in real world situations. Figure 3 shows both methods employed in the 3D visualisation of the wreck of the *SS Richard Montgomery*, which lies in the Thames estuary. The wreck still contains 1.4 megatons of unexploded munitions approximately 400 metres from the main shipping lane and is considered to be a significant hazard to the local environment. As one of the UK designated shipwrecks mentioned earlier, the wreck is the responsibility of the UK Government and is regularly surveyed to monitor its deteriorating condition.

The tidal water around the wreck is very low visibility due to silt deposits therefore multibeam surveys and 3D visualisation are the only reliable and accurate methods of managing the site. The 3D visualisation that we produced clearly showed the damage to the wreck caused by long term submersion. Cracks along the decks and the sides of the hull were able to be measured due to the centimetric accuracy of the data. By using locoramps, it was possible to reveal high levels of detail on the decks and differentiate between seabed and debris. The wreck's proximity to the local power station, oil and gas terminal and residential housing suggest that careful monitoring of its deterioration in the long term is of significant interest.

Following the *SS Richard Montgomery* project, NATO commissioned the team to survey and visualisation of a sunken nuclear submarine in the Barents Sea near Murmansk. The *B159* was a November Class Russian submarine that foundered and sank when under tow for decommissioning in the Arctic Circle. Of the ten crewmen on board, only one survived the sinking and two bodies were recovered. The remaining seven bodies are thought to be still on board the wreck alongside 800 kilograms of spent nuclear fuel with a radioactivity level of 750 curies per kilo [9] at 250 metres below sea level. The survey successfully gathered multibeam sonar data from the submarine wreck. The resulting 3D visualisation showed the submarine sitting upright on the seabed with a six metre section of its stern missing. Figure 3.

The final 3D visualisation shows the wreck on a pitted seabed with two of the floatation pontoons nearby. Damage to the hull of the vessel is clearly visible along the sides of the hull, suggesting considerable impact from the floats as the submarine sank. In the wider area it is possible to see crater like deformations in the seabed. These were initially considered to be damage from cold war depth charges. However, these features can also be found in areas of UK waters where there is no history of depth charge use. It is therefore most likely that they are caused by gas emissions through the seabed sediment. The survey and subsequent visualisation allowed some conclusions to be drawn which otherwise would have been difficult to surmise, bearing in mind that the depth of the site is 250m and beyond safe diving limits, optical methods of examining the area would be extremely difficult.

"Towards the stern of the wreck, raised sediment ridges are apparent on both sides of the hull. This is evidence that the submarine impacted the seabed stern first then rotated forwards along the keel line, possibly breaking of the stern section under the sediment. The survey data shows no discernable major distortion of the hull although specific damage to parts of the outer casing is evident. This implies that the internal pressure hull will be in reasonably sound condition. If further surveys prove to be the case, it is possible that the vessel could be lifted in one piece."

Martin Dean, B159 Survey report for the Ministry for Defence.

Accurate and easily understandable representation of the data is important to inform site management and potential recovery of the radioactive elements. These steps forward in visualising the data hope to enhance this understanding.

Real World Applications

Other applications of our visualisation methods have been commissioned by commercial salvage companies (e.g. Titan, Mammoet) to examine recently sunken wrecks in shipping routes around the world. The team surveyed and visualised the sunken wreck of the oil rig *Deepwater Horizon* in the Gulf of Mexico in March 2011 following the explosion and sinking that caused the biggest oil spill in USA history. The resulting 3D images are being used to help identify potential causes of the disaster as well as the rig's current condition on the seabed at a depth of 1,500 metres.

The visualisation methods are also in use in heritage applications: twenty wrecks off the coast of North Carolina, USA have been surveyed and visualised for the National Oceanic and Atmospheric Administration (NOAA see: http://desne.ws/nj0qwR). The intention is to produce 3D images of ships that were involved in the Battle of the Atlantic in WWII that will be accessable to a public audience who otherwise have no access to these sites.

Summary

Our approach to visualising sonar data of hazardous or historically important shipwrecks is differentiated from traditional methods through the aesthetic approach that we have taken. The industry standard rainbow ramp approach is useful to show threshold values in some forms of data but in this field it can distract the viewer from understanding what they are seeing. Approaching the problem from a design perspective, and constantly asking the question: *"How can this image be improved?"*, we open up the opportunity for alternative visual thinking. Artists and designers can offer an alternate approach to visual communication, tacit knowledge gained through creative practice is the starting point.

Images of the *B159* survey and other projects mentioned can be viewed at
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DIGITAL PAINT TO DIGITAL PHOTOGRAPHY: THE LONG REACH OF ABSTRACT EXPRESSIONISM

Cynthia-Beth Rubin

Passionate experiments in the interaction of color gave rise to the Abstract Expressionist movement of the 1960s, in which spatial ambiguity ruled above all else. As an early digital artist coming from Painting, this language of abstraction is so pervasive in my thinking that nothing can purge it from my visual vocabulary, even when I move into uncharted territories of meaning derived from mixing real world photographic and "painted" imagery.

Rocks and Trees in the Glen: State IV.

The tension between abstraction and representation has haunted much of the discourse of art over the last century. Passionate experiments in the interaction of color gave rise to the Abstract Expressionist movement of the 1960s, in which spatial ambiguity ruled above all else. Rooted in the explorations of the Bauhaus artists, the concept that an artist can create meaning out of engagement with the formal compositional elements of art, with or without representational content was and remains appealing.

As an artist who embraced digital imaging precisely because it promoted a new visual vocabulary, this is a memoir of my enchantment with the computer as the medium for creating meaning through explorations of composition. Writing code never appealed to me, but the early computer software/hardware configurations developed for artists pulled me in right away. I wanted repetition, I wanted distortion, I wanted parts of my imagery to serve as commentary to other parts of my image.

Beginnings in Abstract Painting

There is no avoiding that the Abstract Expressionists informed the early careers of many of us in the digital media field, leading us to create imagery that obscured any representational content. Although many cite the mess of oil paint and the traces of the artist's brush strokes as the core of Expressionism, for myself, it was the compositional tensions of color, texture, and gesture that enchanted and propelled me forward in my artistic investigations. Abstract Expressionism promised irresistible magic, and I did not resist. We believed that this was a purer art form, that the communications were more significant and subtly complex than simple representation. The readable qualities of the imagery served as a distraction from this magic.

I began my career as an abstract or nearly abstract painter, working with layering of gesture and forms with the goal of teasing out a dynamic image on the still canvas. In the digital art world of today, where moving image is so pervasive, we think of paintings as frozen, but for those of us immersed in abstraction these were moving images, visually unfoldeding over time, despite their physical attributes.

Although it seemed absurd to hide the sources of the natural sources for the shapes of color and textures in my painting, these forms had little meaning in themselves. Flowers became dancing forms, seedpods became glyph-like elements completely removed from their source. Showing the sources would have slowed down the reading of the canvas.

Early Digital Art

I began painting into the computer in 1984, at a time when in my physical painting I was already cutting stencils for forms, so that I could easily repeat them. Additionally, I was exploring innovative compositions by visually dividing my canvases with masks, and then playing with the resulting unexpected juxtapositions.

As early digital artists, using the first dedicated software/hardware systems, we input imagery by drawing directly on digitizing tablets, as scanning was barely readable, and prohibitively expensive. Using existing configurations in the days before "off the shelf software," we could essentially only modify the color of these drawings, repeat them, change scale, and repeat again. These early limitations made the transition from painting all the more natural and alluring for those of us who were more fascinated by formal explorations of the compositional tensions of visual art than with its story telling potential.

Oddly, in those early days, it was no longer necessary to hide the source of our digital drawings. The novelty of the medium, and the lack of expectation that "the computer" could produce anything realist, was enough to free viewers to experience the abstract, lyrical qualities of the imagery even when the evidence of the sources showed through, as in my early series based on forms from flowers. In reviewing a 1987 exhibition that included both my paintings and computer works, Bill Zimmer wrote for the New York Times that the paintings were "pleasant but ordinary" while the computer images presented a breakthrough, even though they represented similar compositional investigations. In painting, representation, especially of flowers, was regressive. In digital work, everything was, in 1987, progressive. [2]

Readable Imagery and Abstract Thinking: My Personal Big Bang

This assessment of digital work as exciting despite the obvious inclusion of readable imagery no doubt fed into what became my own "Big Bang." In 1988 I was working with the motifs of medieval Hebrew manuscripts in my then exclusively digital work. I turned to these sources for compositional inspiration as I searched for ways to break out of the traditions of typical European painting. One day I realized that the decorative motifs of these manuscripts echoed the decorative and architectural motifs of the places where they were created. This discovery set me off to make works about "place", about specific sites, digitally interweaving photographic elements that gave the impression of "place" without direct representation.

As I wrote in 2007: My first series on the Marseilles Bible. . . . was a celebration of the decorative motifs with little readable reference beyond flowers and other natural forms. The motifs set the context for the imagery, encircling it, pushing against it, holding it back. The images from this time are clearly two seemingly opposite references brought together: historical structures and flowing, colorful forms. [3]

Once liberated to create work about place, the pieces slowly evolved to interweave pictorial references, changing as the technology developed. Shunning direct digital photography, I "painted" with image fragments, layering them together in a dialogue of compositional tension that continued to spring from the tradition of Abstract Expressionism.

One can hardly refer to these works as representational, and yet they do present and describe. Often referring to sites of cultural heritage, these images bring historical realities to the viewer in a mediated form, providing a portal to an imagined past or other places outside of personal experience..

Conclusion: Unexpected Return to Drawing

Over the last few years, I have been collaborating with my younger self, interweaving scans of my pen and ink drawings from over 40 years ago with recent digital photographs of the same locations. The mixing of gestures of a young artist with the newer medium of digital photography gives fresh meaning to the space between levels of representation and interpretation.

Suddenly, after years of resisting the "natural media" that imitate paint, I found myself in the right situation to seriously experiment with digital paint. I was recently an invited artist in residence in Arles-sur-Tech in the French Pyrenees, and the natural beauty of the location and the emotionally moving remnants of the medieval city stirred me to simply draw. These drawings in turn were mixed with photographs.

Why is this the Big Bang of Electronic Art? Because while the world is looking at the technology behind the image, the real innovation is in the imagery itself. It is the ability to move from painterly gestures to photographic and back.

The boundaries are gone, and only the visual is left. The medium no longer matters. The image has won out.

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FEEDBACK AS SELF-PERFORMANCE

Steve Rushton

Media-activists of the 60s and 70s (Ant Farm) presented the possibility of autonomy through media. Although now realized through platforms such as Twitter and Facebook, self-performance is of a different character than the one envisioned by the media guerrillas of the past. Feedback loops of non-scripted TV serves as an aid to political reasoning promoting a culture of entrepreneurism, privatisation, volunteerism, and responsibilisation.

The August 28, 2008 issue of Time magazine shows an image of a man who has been caught up in a dispute between drugs gangs in Mexico. He is lying dead in the street, surrounded by a group of onlookers. What makes this a very contemporary image is that the bystanders are taking photos of the man's body with a variety of devices (video, digital, phone cameras). In fact, the people in the picture who are taking a photo of the body almost outnumber those who are not.

Making sense of the economy of such an image requires an understanding of a piece of information (in this instance a photograph) as a unit of exchange in which our attention, and the attention of others, is accorded value. We do not know what happened with those pictures of the dead Mexican, but some may have been posted on the Internet to become units of exchange on blogs, on-line communities and chat lines. We ourselves are involved in an information economy every time we log on to Facebook or send an e-mail, wherever the circulation of information increases our visibility. The economy of such an image is founded on our activity as self-performing subjects, feeding back and exchanging information in order to improve our stake within this economy.

This edict to perform has become a foundational part of the structure of contemporary media, in which TV shows stitch together handy-cam footage of hapless viewers bumping into lampposts or falling off ladders, while amateur videos of natural disasters and terrorist attacks provide the 'authentic image' to the aesthetic of print and TV news. Everyday Joes and Janes confess all, undergo extreme makeovers, have their rides pimped, have their homes refurbished, have their children reconditioned, have their marriages fixed, choose new partners, choose new wallpaper, are fed by celebrity chefs, are starved by personal trainers, run the marathon, make poverty history, bungee-jump wearing a red nose and clown's shoes. In this arena of the information economy, we increasingly use media to police ourselves, maintain ourselves, judge ourselves against others, regulate our behaviour, measure ourselves and measure others. In an era in which direct government intervention is despised (I don't need handouts from Big Government!), new technologies of self-control have grown to replace this intervention, as a greater part of our lives is taken up with the 'work of watching' and the 'work of being watched.'

The reality TV show, for instance, is predicated on the idea of feedback. Indeed, one might understand the new media mix as a circuit of production that collapses the difference between producer and consumer. This has very interesting consequences economically, because although we work in order to make this type of media happen, we are paid little or no money for the work we do – in fact, in most cases we pay out of our own pocket. The profit from our work actually goes to the (TV) production companies, the phone companies and big media conglomerates, along with the media retail outlets that sell

us upgraded equipment. As a consequence of all this, we can no longer say we live in 'the society of the spectacle.' We are everything but passive consumers of products; we live in a society of self-performance in which we constantly present ourselves, and excite the interest of others in what we do; and this self-performance is a commodity that has a price. I don't think I'm straying into the realms of science fiction if I suggest that contemporary media have created a form of immediacy in which human subjectivity is the principal object of production and consumption, and in which media serve to facilitate this production and consumption. Laurie Ouellette and James Hay, in "Better Living Through Reality TV" (2008), link Foucault's idea of 'governmentality' with current liberal strategies of 'privatisation,' 'volunteerism,' 'entrepreneurism,' and 'responsibilisation' which extend media production into the realm of political reasoning. It is the regime of constant testing, perpetual visibility and self-reliance that governs and produces its subject. [1]

So the training and testing which is central to reality TV shows, along with the personal investments in the aims of the show ('this will teach me something, make me a better person'), serve to translate the negatives of travail and ruthless competition into the positives of self-improvement and personal empowerment.

The imperative to perform has been a subject of discussion for some time, of course, and has been variously described as "the experience economy" (Gilmore and Pine), "the immaterial economy" (Lazzarato), "the control society" (Deleuze), "the mode of information" (Poster), "the weightless society" (Leadbeater), "The Networked Society" (Castells), and as the engine behind "the new spirit of capitalism" (Boltanski & Chiapello). All attempt to explain the shift from a manufacturing society, which is based on physical labour and material products, to a networked society, which is based on the exchange of information. The network, or non-hierarchical 'trading zone' are, as I mentioned before, cybernetic notions, and we use them all the time to understand and 'narrativise' the world we live in. The very idea of feedback within the social network is one of those ideas that shape our world. It is inescapable; but it is possible to trace its origins, chart its effects and establish some sort of critical position.

For his part, Andrejevic insists on an understanding of capitalism as a surveillance system that grows more sophisticated as it develops. I find Andrejevic's broad stroke very convincing: since the time of the enclosure of land we have seen a "consolidation of techniques not only of monitoring workers but of centralising control over the manufacturing process." [2] So the phases are: (a.) the enclosure of land, which peaked in the middle of the eighteenth century; (b.) Taylorism in the nineteenth century (scientific management which resulted in the division of material and mental labour); (c.) Fordism in the twentieth century (subordination of the time of the workers to that of the assembly line and the 'de-naturing' of labour); and (d.) the digital age, which promises to restore time to the individual and release the wage slaves from the factory floor, etc. In fact this promise is not fulfilled, because the digital age actually represents a re-ordering of the relations between production and consumption, between 'our own time' and 'the company's time.' As we increasingly attempt to sell ourselves as a commodity, our subjecthood becomes one of perpetual presentation; and of course, we seek to find our destiny in the new subjecthood, which we are forced to invent for ourselves.

Andrejevic argues that the panopticism of modernity (surveillance through monitoring individuals in the workplace – Taylor's scientific management) has given way, through the processes of new techniques of information management, to the dual action of panopticonism (the few watching the many) and synopticonism (the many watching the few). The synoptic is the regime of the celebrity, of course.

Through the necessary exchange of data about ourselves, we are being herded into what Andrejevic calls a 'digital enclosure' in which our identities (or profiles) can be constructed, in which we can be identified as very particular consumers, and in which ultimately our own performance becomes a commodity for exchange. So the digital age essentially represents a new discipline of management relations, and perhaps it would be fair to say, a new discipline of self-management – and as the volunteerist models such as The Big Society are rolled out, a new era of political management.

The feedback loop of reality TV should be understood in this broader social and technological context, as an agent of governance. The word 'cybernetics' (the science of feedback systems) shares its etymological roots with the verb 'to govern', incidentally. It is also worth remembering that within cybernetics the 'control' of a system comes from within that system, it is not imposed from the outside.

How the TV industry understands itself in the light of this shift to self-performance is demonstrated by Chris Short, head of interactive media at Endemol UK, the producers of the reality TV franchise Big Brother. Back in 2002 he said: "We're creating a virtuous circle that excites the interactive audience about what's going on in the house, drives them toward the TV program, the TV program will drive them to the internet, the internet to the other ways they can get information, and the other ways back to the TV." [3] The non-scripted TV show is at the high end of an imperative to perform, which can be seen in any number of instances where the community is sold back to itself as a commodity.

To understand how the ontology of television has shifted during recent years, it is worth looking again at Richard Serra and Charlotta Schoolman's "Television Delivers People" (1973), which came at a time (the early to mid-1970s) when a number of artistic and critical projects suggested alternatives to the mainstream. These included TVTV (Top Value Television), Raindance, Videofreek and Ant Farm. Along with them came a new critical literature, including Michael Shamberg's seminal book "Guerrilla Television" (1971) and the magazine "Radical Software" (1970–1974), which provided a platform for critique and media activism. All combined the collectivist ideals of the 1960s with the potentially democratising (new) technologies of video, closed-circuit TV and cable. Here I would like to take a little time to investigate how these TV Guerrillas helped provide the conditions that made the current media feedback loop of self-performance possible.

Back in 1973, the TV audiences described by Serra were 'distracted' by scripted entertainment or information (news and quiz shows for instance) while advertisers smuggled messages into their consciousness. The model for the television economy (in the United States at least) traditionally worked on the principle that the networks would lease programs from production companies and take in the advertising revenue.

In contrast, Chris Short, our man from Endemol, describes a media economy in which the advertiser is no longer necessarily linked to the show's production, because the money from telephone calls and SMS text messages to the show provides at least a portion of its income. In 2005 Endemol's combined U.S. productions took money from 300 million calls and SMS messages. Also in 2005, the U.S. "American Idol" registered 500 million votes (63 million for the final) at 99 cents a pop. Although still providing a comparatively small portion of the overall budget, these methods of income generation for programmes are growing fast within the non-scripted sector of television production, with product placement – in which products are scripted into non-scripted shows – rising from a once-negligible share to 10% of the total share of the income of non-scripted U.S. programmes. Another source of income which allows production companies to compete (at increasingly tight margins) in an industry where four out of five new

shows fail, is the sale and export of formats in which the 'playbook' and the 'coach' are provided on a franchise basis (the European companies Endemol and FreemantleMedia are very successful at this). [4]

The radical change in the network-advertiser system, which served the industry for decades, is graphically illustrated by the example of the reality TV hit show "Survivor." In 2002 CBS agreed to share the advertising revenue from "Survivor" with its producer, Mark Burnett, who also agreed to pre-sell the sponsorship. Burnett secured eight advertisers who each paid $ 4 million for each show. This was a combination of product placement, commercial time and a link through the website. By contrast, the last season of "Friends," which was produced by Warner Brother for NBC, cost $ 7.5 million dollars per episode, with $6 million going to the six principal actors.

"Survivor" wasn't only cheap to produce (a reality TV show cost $ 700,000 – $ 1,250,000 per hour at the time) and effective at generating advertisement revenue, it was also popular, even outperforming NBC's highly popular and hugely expensive "E.R." in ad revenue. The success of the new model represented a tipping point for the broadcasters, and by 2005 20% of primetime programme hours consisted of non-scripted content. This 'Wild West' of television is funded through an increasingly diverse mix of sources, from SMS to product placement and online advertising through web sites that feed into the TV show. Furthermore, increasingly sophisticated techniques for analysing how effective a particular advert might be, have resulted in more diverse and sophisticated targeting strategies by advertisers; a process that will certainly be intensified and refined even further using profiling work from Google and Facebook. [5]

It's ironic that the abolition of the space between production and consumption – which we now see happening as viewers provide funds for production via phone calls to the show, as well as their on-screen and online presence while they deliberate the fate of a particular contestant – was the dream of the architects of the critical, self-initiated media that grew out of the counterculture of the 1960s. They wanted to see the end of the grip, which the networks and advertisers held over the industry. Central to this critique was the notion that in order to break the circuit of monopoly of production, it was necessary to dive into the feedback loop of self-production. Indeed, the rise of the participant – the self-performing subject – is no coincidence in an economy where visibility itself has become a commodity.

In the July 1968 supplement of the Whole Earth Catalog, Ant Farm published their text on the "Cowboy Nomad" in which they cast themselves as cybernetic cowboy prophets of the future technological revolution:
YET THERE ARE COWBOY NOMADS TODAY, LIVING IN ANOTHER LIFE STYLE AND WAITING FOR ELECTRONIC MEDIA, THAT EVERYONE KNOWS IS DOING IT, TO BLOW THE MINDS OF THE MIDDLE CLASS AMERICAN SUBERBANITE. WHILE THEY WAIT THE COWBOY NOMADS (OUTLAWS) SMOKE LOCO WEED AROUND ELECTRIC CAMPFILES. [6]

Michael Shamberg, in "Guerrilla Television" (1971) wrote about how the feedback technology of TV might be used to break the stronghold the networks and advertisers held over the minds of viewers back in the early 1970s: "[strategies] might include tactics like going out to the suburbs with video cameras and taping commuters. The playback could be in people's homes through their normal TV sets. The result might be that businessmen would see how wasted they look from buying the suburban myth." [7]

For both Ant Farm and Shamberg, the subject ready for change is 'the corporation man,' the individuals conditioned by the commodity-centred media to accept their hollow existences and to throw in their lot with the commodity. This is the endpoint of spectacular media: the message (the advert) stops when it

hits the consciousness of the consumer, who, intoxicated by the spirit of bad faith, will go forth and buy stuff.

Both Ant Farm and Shamberg understood that in order to break the hold of monopoly, it was necessary to include the viewer into the feedback loop of production: making the viewers visible to themselves would create a shift in the economic logic of the media. The understanding of TV as a feedback mechanism that could 're-form' an individual's behaviour had already been appreciated by social psychologist Stanley Milgram, who conducted the infamous "obedience to authority" experiment in 1961. Milgram was greatly influenced by Allen Funt's "Candid Camera" (perhaps the TV format closest to present-day shows). [8]

So how do we explain the schizophrenia of a radicalism that mistrusted (monopoly) technology, and a radicalism that looked to technology for the solution?

Fred Turner's book "From Counterculture to Cyberculture" distinguishes two political trends that emerged in the United States during the 1960s. These can be broadly categorised as the 'new left' and the 'counterculture'. The new left emerged from the civil rights and anti-war movements. This group understood the world as driven by the material realities of class, race and labour. The second group, the counterculture, emerged from a heady blend of beatnik literature and cybernetics, which understood individuals and systems (including ecological systems) as components of networks that exchanged information with others. In this scheme, the media could be understood as a media-ecology, the evolution of which could be redirected. Those experimenting with LSD understood the drug as a technology of the self, as a form of software that could change the program of a group or an individual.

The underlying philosophy of the network was also a major inspiration for the 700,000 individuals who set up a series of communities throughout the United States between 1967 and 1971. [9]

By the early 1970s, cybernetic ideas were axiomatic amongst the media activists who had grown through the counterculture of the 1960s; the Portapak and video represented new tools that would extend the scale of human potential, just as every other new technology had done before, while loopholes in licensing regulations (in relation to the new technology of cabal) allowed for new modes of production. As Ant Farm put it, riffing on media theorist Marshall McLuhan's idea of the global village:
HOW LONG WILL IT TAKE THE LAG
IN OUTLOOK AND CONSCIOUSNESS TO WHIPLASH
FITTING THINKING/IDEAS TO TECHNOLOGICAL CAPABILITIES. [10]

Shamberg, in "Guerrilla Television," made the radical distinction between a materialist left and a cybernetically inclined left: "True cybernetic guerrilla warfare means re-structuring communications, not capturing existing ones" [11] while Timothy Leary, championing the new technology of mind-expanding drugs, stated that "[People should]…drop out, find their own center, turn on, and above all avoid mass movements, mass leadership, mass followers." [12] The imperative for the individual to re-program (rather than for the masses to revolt) reaches its technocratic extreme with Buckminster Fuller's assertion that "revolution by design" will mean that "politics will become obsolete." [13]

During the 1960s and 70s, European media critique (grounded in Marxism) tended to emphasise the alienation engendered by the mass media – the distance between the viewer and the shining world of

the commodity. In the United States, by contrast, a network of activists, architects, artists and critics experimented with a different understanding of the medium of TV. Freed from the stranglehold of the networks, accessed by the people, TV could become a technology for 'making' reality. Groups like Ant Farm, Raindance, Radical Software and Videofreek (versed in the cybernetic lore of Norbert Wiener and Marshall McLuhan) tested the possibilities of a medium that could indeed produce a participating network, which would collapse the difference between performer and producer. What could not be easily foreseen though, was how the feedback loop of TV could turn the commodity and the commodity-performer into same thing. The feedback loop of non-scripted TV shows is where the contestant and the prize find their equivalence. It is here that the figure and ground that defined the old mass media are replaced by a constant oscillation between producer and consumer.

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INSECURE TERRITORIES - INTERVENTIONS IN CITY INTERFACES

Georg Russegger

Abstract

The paper reflects on artistic interventions in urban public space. By using digital-media and -devices new forms of hidden and invisible territories has been created. Mediatechnological networks such as wireless-lan or mobile phone infrastructures extend the city with complex layers of interaction and create new spaces of communication. The presentation emphasises artistic projects based on the CODED CULTURES Festival in Vienna, that are creating protocols and interaction scenarios to enter and display insecure and hidden territories in the city based on communication technologies and media-cultural structures in urban life. Public space does not end at the borders of visible, perceptible reality but extends into the invisible. The increased population of communication devices in public life results in a dense layering of electromagnetic content passing through both air and bodies, on route to its target. As such we are not just senders and recipients but carriers of signal. We unwittingly move through numerous digital and analog networks, leaving traces of our electronic passing with the devices and gadgets we carry. More so, we inadvertently leak information about ourselves that can be analyzed to a disturbing level of accuracy with publicly available forensic tools. The city in this sense stands for an interface mixing diverse layers of individual representation, orientation, presence and participation, which can be observed and traced by unknown invaders.

Background

Based on theories of Mark Weiser (1), a pioneer in the field of pervasive computing, the connection of humans and computers will be ubiquitous. Relating this understanding to the dominant living environment of humankind, the city itself becomes a core interaction hub and by this means a complex communication interface. Data is stored, up- and down- loaded onto context, embodied devices and multi-sensory environments, as Malcolm McCullough stated (2). Physical-digital Interfaces just as MEMS (Micro-Electro-Mechanical-Systems) have changed our whole relation to the surrounding devices and our interaction methods with them. Combining this media- and communication-technologies and media-architectonical developments with a global perspective of city development, how Joel Kotkin analysis, 5 billion people are living in urban environments by 2030 (3). City policies worrying about expanded landscapes, no-go areas and blind spots of transportation and maintenance have been accomplished by believing in problem solvers like new technologies and communication infrastructures. Like the Anthropologist Robert Mc C. Adams puts it: "We have accomplished an awesome technological destruction of distance" (4). Meanwhile those communication technologies intervene into urban structures; there are no municipal strategies to handle the massive individual data interference within public spaces. The security and observation paradigm, which can be seen in cities like London or Tokyo, promotes the development of hyper-networked, panoptic and multi-sensory urban mediascapes, but most of the people are unable to understand what is going on behind the interface. While in 2005 the market penetration of mobile phones in Austria added up to 106% (8.6 mil. Sim-Cards registered by 8.1 mil. inhabitants) it still grew and totals up to 146% end of 2010 (www.rtr.at) because of the additional usage of mobile internet. Moreover in 2011 a typical urban resident carries around multiple communication devices, capable of

various protocols like Wi-Fi, GMS/UMTS, Bluetooth and others, rather then having "only" a mobile tele-phone. Moving through public urban spaces, those devices leave invisible tracks and leak private infor-mation of their carriers without their knowledge and furthermore are used for commercial, user focused Data- mining as in case of Apple's hunger for location based Information. Besides the issue of being used as an unwilling part of Crowd-Sourcing campaigns of multinational companies there is a serious intimi-dation in leaking private and personal information that can be used for controlling and manipulation. In addition to that a typical user does not only send out digital information and leave his traces but also consumes, and trusts the information which is consumed on the devices. Especially on "not secured" Wi-Fi Networks, the risk of receiving manipulated Information is very high, as shown by Julian Oliver and Danja Vaillev with their Project "Newstweek" (5). There is a crucial need to raise the awareness of those invisible fields of electromagnetic communication and accept their meaningfulness as extended parts of the public sphere.

Workshop and Artistic Practice

To create a practical basis for this observations several workshops during "transmediale 2011" (6) have been organized by the CODED CULTURES Festival in cooperation with the artist running the hack-space "Weise 7" in Berlin. Within the workshop practical exercises, talks and presentation related to technolo-gies and techniques of how to read the plethora of signal in the air, manipulate it and pass it on were covered within different viewpoints on the topic of how territories in the city can be or can be made in-secure. Several strategies based on the practice of hacking and modding of devices have been applied within the workshop. Unter the title Network Insecurity Experience wireless hackers Julian Oliver and Bengt Sjolen presentsd the WiFi spectrum (2.4-2.5Ghz) as a rich material for activist intervention, study and play. In tandem with Gordo Savicic and Michal Wlodkowski, from a temporary outpost in Sao Paulo, they lifted network packet analysis and manipulation into a transcontinental domain. Under the title "In-visible Territories" Brendan Howell and Martin Howse have taken investigations and interventions into other bands of the spectrum, introducing custom hardware and rigorous techniques for a psycho-geo-physical reading of the area around the former "Tempelhof" airport in Berlin.

Conclusion

This is the time where artistic projects using the city as a laboratory, exhibition space, communication platform or hack-spaces, having good chances to try things out and develop test drives for future appli-ances. It is as well the time where open design thinking meets city development on the level of wilder-ness. Interface cultures can be developed in a prototypical sense, since only minor rules have been made and the borders and gates have not been set by profit-oriented organizations and thin innovation. It opens the fields of free development within a mainly cacophonic media-composition, lacking of struc-tural preciseness and offering opportunities for new forms to overcome limitations. Nothing the less it is a short window of opportunity to add crazy and valuable ideas on the intersection of materialized archi-tecture and its connectedness via waves, data, sensors, protocols, scripts and everything which is perva-sive without a suitable interface or device. This can be seen as a kind of vireal (real – virtual) testlabs to experiment with existing infrastructures, standards and norms of interaction. The so called »real« stands for the materialized and not for reality. The »virtual« stands for digitally and media-integrated forms of information, including digital environments and all code-based action and interaction interfaces. This

blended realm is the cognitive environment where we try things out, learn, organize, create, design and establish knowledge. The combination of architecture and media architecture in the city such as wireless networks, sensors, RIFD systems, 3G mobile-phone networks included in existing materialization of classical architecture is a basic requirement in urban development today.

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THE CITY AS LUDIC INTERFACE - VECTORS OF VIREAL TESTLABS IN URBAN MEDIATECTURE

Georg Russegger

This paper focuses on new forms of artistic and playful assemblages within urban environments. Artistic project cultures which are using existing media-technological infrastructures, networks, communities and ideas to invent new frameworks to interact and experiment within the city.

Introduction

This paper focuses on new forms of playful assemblages within urban environments. Artistic project cultures which are using existing media-technological infrastructures, networks, communities and ideas to invent new frameworks to interact and experiment within the city. By this means media architecture developed in urban space not only relies on building materials, but also encompasses a virtual framework to enable "new socio-cultural contingencies"(1). These have intensively changed over the last decades because multiple extensions of media-infrastructures e.g. mobile-technology, locative-media and location-based-services have been installed largely in the city. Under these circumstances urbanity has become a complex interface, which is one of today's dominant forms of human selforganization. To deal with these developments on an artistic level, ludic methods are opening chances to get to know possibilities, risks and new forms of interaction within this emerging new communication formats. Ludic in this sense stands for a playful practice of testing out possibilities without a clear goal or ruleset. It stands for approaches characterized by experimental and mistake friendly behavior, to create a perspective shift in user centered data handling and mediated self-representation. Based on joy and motivation of looking at this mediated disposition in different ways, it forces artistic projects driven by flowful interactions. As an effect it foments new ways of abstraction by using public space in unusual and alternative ways to produce an unforeseen intermingling of real and virtual spaces. It seems that the city itself is becoming the environment of choice for media activists and alternative artistic structures. The city is turned into a ludic interface, a playful environment and urban playground by several artistic projects that transform it into a performative space. They are as well working as access points for a better understanding of media-technological infrastructures and tools to create a new understanding on the value of public space in urban environments. My presentation based on this paper will introduce examples of new artistic practices and ability profiles using the city as laboratory, exhibition space, communication platform or hackspace. These examples will exemplify an understanding of ludic interfaces as artistic test-spaces and proto-types based on a reinvention of urban space.

Ludic Tendencies in Media Arts

Starting my research nearly ten years ago on artistic projects using locative media and mobile technology the movement shared plenty of fresh ideas and concepts how this can shape the vectors of interaction in urban space. At this time it was hard to use the available, mainly proprietary, soft- and hardware

to get artistic projects done properly. Artists invented concepts which had to be rich on connotation and storylines to encourage the very raw and minor opportunities with this new media- and communication-infrastructure. Today the available technologies have been opened up on availability and extracted a large global community of modding culture, home brew technologies and DIY inventions based on media-technological artifacts. Artistic projects like the artist collective LUDIC SOCIETY(2) or UBERMORGEN. COM(3) still follow a hacker paradigm and by this means try to use the available infrastructures under conditions they haven't been designed for or to circumvent limitations. Early projects like the ones from the meanwhile well know group „Blast Theory" tried to get their hands on users, receivers or participants, to enable them within a method of gameplay. On the contrary many artistic projects from the field of digital media based arts have nowadays been transformed into small businesses. Former artists are working as programmers or designers for all kinds of smart-phone apps, media companies or start-ups on mobile social media to make there living. This reminds to a blog entry on the website called „Networked Publics"(4), where I was reading the following quote from Michael Liebhold and Anthony Townsend, both working at this time at the „Institute for the Future"(5). They forecast:

"Geohackers, Locative Media Artists, and Psychogeographers, as key players in constructing the 'geospatial web', in which the web becomes tagged with geospatial information, a development which is having enormous unharvested business opportunities."

As we see today this has become reality dealing with an infosphere of mobile computing and locative media. It has as well become a mass movement of mediamorph lifestyle, which is constantly expanded by thinkers, designers and producers. For the arts this means more or less to get sober again from the businessman's dream of interface phantasms and the endless dream of (thin) innovation. At the moment it seems that the playful potentials of artistic projects to try new things out and experiment within the city as interface are at risk to get fettered by „playbour" (J. Kücklich, 2010), using playful methods as new forms of productivity and resource in a post-industrial age. Since cities have turned into enriched mediadispositions with hyper accesssibility and endless numbers of devices, sensors, cameras and networks alternative abstraction models based on artistic interventions have to be enabled. It emphasizes the fact that artistic practices have to recapture the freedom to create meaningful small scale projects within an experimental setup. Reintroducing basic situationist practice such as "dérive" can help to see the city as a laboratory, where people create shared backgrounds and intensions to experience things on a quite open level of understanding. On this level artistic methods of playing in the city can invite users to taking part in actions they might don't know or realize.

The City as Playspace

The ludic approach of artists dealing with media technological interfaces becomes more and more related to context- and interaction-design rather than to the technical configurations of the interface itself. Projects using the city as playspace, like the LUDIC SOCIETY's projects called "Tagging the City"(6) is using technologies like RFID-chips and digital mapping systems which are applied in a citywide gameplay. With the slogan "we are selling play not game" they also created an open framework of how the

conceptual structures of the project can be understood. Another example is the project "re:farm the city / tools for urban farmers"(7) ,which combines the topics of urban farming, guerilla gardening and media arts with the support of a global mobile phone based gardening interface. Both projects function on a level where new awareness and relationship to the territory is created by a ludic interface and by new forms of interaction scenarios on the intersection of real and virtual space. It introduces the chance to create awareness for users and change their knowledge and habits by transforming the way to deal with their interests within a certain environment. This art projects are using existing structures in new ways by the reconfiguration of preexisting infrastructures of media architecture. The basis for the usage of the city as playspace is created by a large amount of opportunities within media-technological infrastructures. The introduction of new technical programs opens up the development of ideas to establish new alternative social and cultural programs of interaction for users and producers. The catalyst for this development is the "digital ground"(8), like Malcolm McCullough calls it, which is embedded into the city ground. By this means the significance of computing in this environment has become its capacity to let us take part in shared representations of action, as Brenda Laurel describes this in her essay "Computers as Theater"(9).

Using and expanding the city as interface of social, cultural, artistic, (media-) technological and architectonical interactions is not common practice and common ground so far. At the moment the city still functions as a laboratory for temporary usage, and ad hoc appliance, even if the gentrification models are strong they seem unsustainable for a valuable development of cultural sustainability. One of the interesting challenges will be to attract people to invent as interesting social interaction spaces as the buzz of technology used to create.

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VIRTUAL DOPPELGÄNGERS: EMBODIMENT, MORPHOGENESIS, AND TRANSVERSAL ACTION (PANEL INTRODUCTION)

Susan Elizabeth Ryan

In 1969 Gilles Deleuze theorized the Body without Organs (BwO). The term refers to the virtual dimension of the body likened to the egg as site of embodiment (in Deleuze and Guattari's *Anti-Anti-Oedipus*)—a set of multiple potentialities and dysfunctional repetitions. In this panel we seek to explore the relations between fleshly bodies and digitized ones as sites of embodiment for our current, informatically energized existences.

In 1969 Gilles Deleuze theorized the "BwO" or Body Without Organs (in *The Logic of the Sense*, after Antonin Artaud's origination of the term in 1947). [1] [2] BwO refers to the virtual dimension of the body and its potentials, likened to the egg as the site of embodiment. [3] This BwO-as-egg is further described by Deleuze and Guattari as a set or "*spatium*" of multiple intensities or potentialities. Deleuze and Guattari's body without organs is not against organs, per se, but opposed to the *organism*—the body subjectivized through organization. [4] Moreover, there must remain a connection between the organism and the BwO. D&G: "You have to keep enough of the organism for it to reform each dawn; . . . you have to keep small rations of subjectivity in sufficient quantity to enable you to respond to the dominant reality." The BwO is a way of transcending the strata of subjectivity and freeing its lines of flight.

The image of the BwO is one that, for many, has suggested the analogy with the digital or avatar body, clearly a BwO, but only insofar as it is fluid and unsubjectivized and occupies what D&G call the "plane of consistency," for which the virtual world stands as a figure. Slavoj Zizek even calls Deleuze the "philosopher of the virtual." [5]

In the spirit of the BwO thus interpreted, then, this panel explores relations between fleshly bodies and digitized ones as sites of embodiment for our current, informatically intensified existences. From Facebook to online games and performances in Second Life, many of us experience various parts of our lives virtually today. But how are these experiences absorbed into our so-called "real life"?

There have been controversies and supporting studies (esp. concerning virtual games) suggesting that too much virtual mediation is harmful to our "sense of reality" and ability to interact well in society. This idea has been around for a long time as progeny of old, unresolved debates about violence on TV. Clinical studies of violent virtual games are still ongoing and as yet inconclusive, but speculation continues. And many say online socializing, which (like gaming) offers action free of consequences, has encouraged the growth of bullying and even occasions of lynch mob mentality, pointing to phenomena such as the responses to the recent Casey Anthony trial in the US (the young Florida woman charged with murdering her infant daughter). That trial, which used virtual simulations in the courtroom itself, was the subject of obsessive coverage in both TV and social media including animated simulations on YouTube of the crime scene for "virtual jurors." Media pundits speculated as to whether or not heightened access to visualizations of the case incited members of the general public, who repeatedly mobbed and fought

each other to gain entry to limited public courtroom seats, and demonstrated for a guilty verdict, outside.

In our session, Patrick Lichty will discuss the scientific discovery of mirror neurons, which attach us to others, or the images of others or ourselves, on an autonomic level. Researchers like Jeremy Bailenson (Virtual Human Interaction Lab, Stanford University) and Nick Yee (Palo Alto Research Center) provide evidence for the idea that our conduct as avatars in online worlds has an aftereffect, a "Proteus effect" as Yee calls it, such that our behavior and feelings in real life are adjusted. In a study in which participants were given tall avatars and asked to negotiate tasks with other (shorter) avatars, subjects were then told to negotiate similar tasks with people in real life. The study found that persons experiencing taller avatars negotiated more advantageous results, and this effect also carried through when they negotiated a similar deal face to face—they "acted" taller, in effect. [6]

Bailinson's group did studies of *doppelgängers* - specifically, avatars that are built to look exactly like us. In a series of studies, Bailenson and co-researcher, Jesse Fox, at Ohio State, used doppelgängers as theraputic tools. Test subjects who observed their near mirror images exercising and losing weight, for example, were followed after the test and shown to be more inclined to exercise than a control group. Subjects who observed their virtual selves manipulated to look much older, displayed heightened interest in their retirement savings. Studies were, of course, suggestive rather than conclusive.

But similar effects are the focus of simulations like the multi-platform "Always in Season Island" an educational and consciousness-raising project in which (when the Second Life portion of the site is released) visitors will participate in reenactments of lynchings and torture that took place in the American South from the 18th century through the mid 1960s. [7] Participants will see their clothing transformed to period dress, and they will become virtual witnesses. They will also receive information about historical lynchings and be connected to the project's Twitter or Facebook pages to share their feelings about the SIM. The project aims for responses that show real concern for the scenarios because of the experience of virtually witnessing them and bearing the moral tension such witnessing holds.

According to philosopher and researcher Philip Brey, there are clear ethical issues entrenched in our behavior as virtual selves, and these involve two categories of assumptions; he writes:

According to the argument from moral development, it is wrong to treat virtual humans cruelly because doing so will make it more likely that we will treat real humans cruelly. The reason for this is that the emotions appealed to in the treatment of virtual humans are the same emotions that are appealed to in the treatment of real humans . . . The argument from psychological harm is that third parties may be harmed by the knowledge or observation that people engage in violent, degrading or offensive behavior in single-user VR . . . [8]

Clearly, our evolving abilities to mash up real and virtual existences has both therapeutic and educational potential, but also responsibilities. It holds promise of empowerments—Deleuzian *intensities*—but also of manipulation and subjectification.

Sherrie Turkle suggests that most of us already live in both virtual and physical realities and our "life mix," as she terms it; our "multi-lifing," has become the norm. It can function efficiently or go off the rails, but Turkle finds that the most beneficial doppelgängers - beneficial, that is, for their real operators

and overall life mix - are those who participate in "real" online relationships, or situations with consequences. [9]

The session addresses both artworks and theoretical frameworks that engage our replicated bodies, the relations they create, and their transversal effects across multiple platforms and modes of existence. Greg Little will tell us more about the metaphysics of the BwO in the context of avatars. Micha Cárdenas and Elle Mehrman explore how virtual experiences can transform our real-world identities. Stephanie Rothenberg will discuss the mash-up between work and play. And Patrick Lichty discusses affective potential of virtual performance art.

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CRYING WITH THE VIRTUAL

Semi Ryu & Stefano Faralli

This paper will deal with the ontological issue of the virtual body, exploring the rich meta sensory experience of the user with an avatar. It will explore the sensory dimension, emotional flow, and transcendental quality of the virtual body. This will be investigated in the context of Korean experiential reality and the concurrent process of gradually transforming emotional psyches.
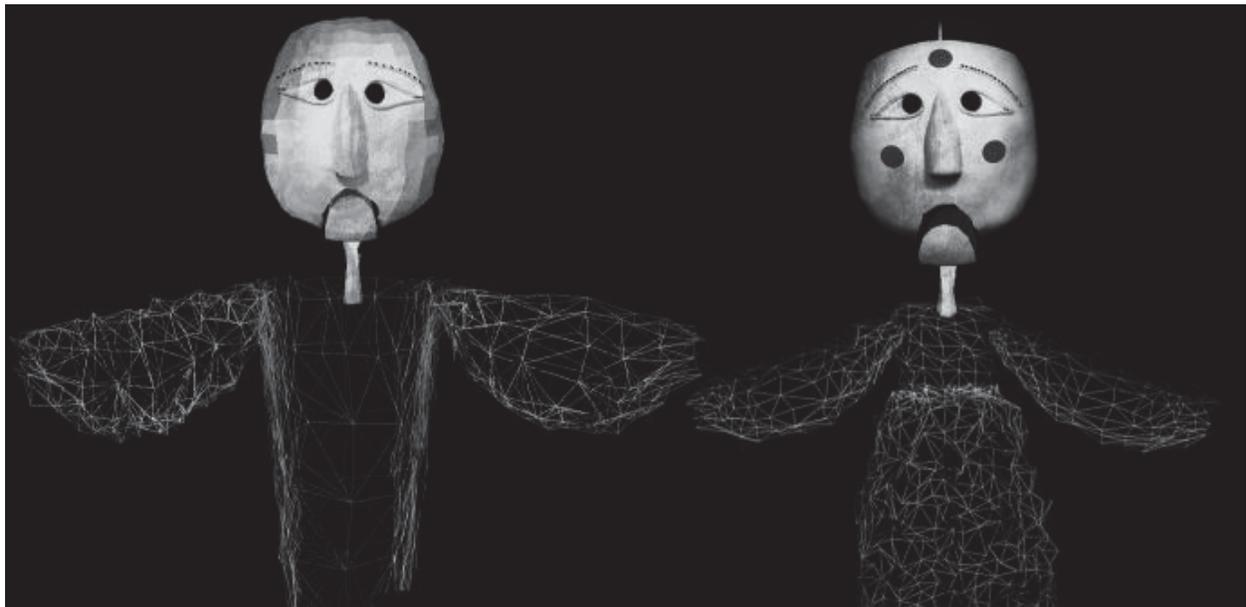
Parting on Z London, 2010, Semi Ryu, Interactive Media Performance, Copyright Semi Ryu and Stefano Faralli.

Introduction

Historically there are evidences of individuals inhabiting an alternative body in many ritual and performative contexts. Becoming a ritual body, or leaving/transcending the physical body, demonstrates the continuous emotional development and perceptual changes of body and mind over time. It provides a platform for understanding the potential of digital bodies in virtual space; what we call "avatars."

Virtual space affords an infinite depth along the Z-axis, bearing both physical and psychic dimensions. Virtual bodies traveling on such a vast Z-axis constitute new ritual bodies parting on Z, becoming increasingly remote, intangible, flexible, deconstructed, multiplied, and fragmented. Virtual bodies present us with a new challenge and distance to overcome in the process of interacting, communing, spiraling, coping or conflicting with the actual body. This paper introduces a paradoxical inquiry of seeking the full potentiality of being and experience between multiplied selves assisted by digital technology.

Korean experiential reality runs on infinite paradoxical loops, swirling like a tornado, deeply touching the human psyche and emotion. It integrates body and mind, creating a meta layer of experience and body, continuously negotiating the state of "neither-nor": neither physical nor mental, neither actual nor virtual. The emotional flow of the meta body will be explored through the perspective of Korean experiential reality—a paradoxical process of constant becoming—and through the "virtual" as the potentiality of being and experience in the digital age.

Ritual Body, Parting on Z

In order to discuss the virtual body, we begin by discussing the alternative bodies used in ritual, such as masks, puppets, and performing objects. These ritual bodies have the essential characteristic of continuously traveling on the Z-axis in both the physical and psychic dimensions. In the history of ritual, mask, and puppetry, technological development has focused on the critical quality of the ritual body continuously parting from the actual body. Baird notes that "gradually, in the course of centuries, the hinged and jointed mask moved upward, off the head, and was held in the hands in front of the body. Later it moved farther away and was made to live by the manipulation of strings. [1]Baird's linear progression places the ritual body on an outward trajectory, leaving the performer's body and changing from a mask to a puppet. In this evolution of the ritual body, the moment of physical detachment from the performer's body is a critical shift, yielding two centers of gravity. Kaplin notes,

 "The performing object has become detached from the actor's body, developing its own center of gravity, its own presence. It is at this point, where the center of gravity of the performing object and the performer are distinct from each other, that the term 'puppet' can be used." [2]

This moment of detachment and separation would be the point of farewell between the actual and ritual body, creating distance. Distance provides, in both the physical and psychic dimensions, the ability to watch one's own performance on the Cartesian Z-axis at eye level. Separation yields detachment, but also a view on one's own becoming. This separation is a tragedy, which activates the paradoxical process of the ritual of becoming, akin to an impossible love dilemma between symbolic lover. The potential body constantly parts from the actual body in farewell. Supported by virtual interactive technology, the ritual body parts on the Z-axis of the virtual realm—the metaverse—over the network. In this context, virtual space can be considered an infinite space for farewell. It becomes a space for an active void connected with Korean experiential reality initiating the ritual—tearful, but also joyful.

Korean Experiential Reality: Active Void

Korean experiential reality is about lightening the weight of actuality in order to open the infinite space of meta realms to full potentiality. [3] Distance is created and even celebrated. If one continuously "fills" oneself, one becomes overloaded—too heavy to fly. Taoist Lao-Tze tells us to empty ourselves until we are light like a feather, and then "being itself" will find place in the void. Emptiness will take us to the sky, to the infinite space of meta realms where we may find being itself—potentiality. [4] In this space, emptiness will shift into fullness. The void will be filled. This is the paradoxical state of *Heo-Lyeong-Chang-Chang*—completely empty and completely full. [5] It is the Korean experiential reality in continuous conflict between the actual and the meta layer; the chaotic state of neither here nor there—a quantum state of paradox. This state is an "active void," an ontological journey of taking flight—continuously dreaming, desiring, and eventually transcending the sky.

This is a complicated and rich emotional psychic journey, presenting:

- *Jung*: the nostalgic dream towards infinite oneness—unconditional love
- *Han*: an extreme state of grief, distinguished by a strong wish to overcome a situation that seems impossible
- *Shin-Myeong*: the ultimate state of playfulness and joy
- *Moo-A*: a transcendent state of quiet mind and detachment from the phenomena, which moves our attention to the horizon, looking at entire quantum fields of nature.

Jung

Jung is the Korean psychic feeling of "us" [6] It represents strong nostalgia towards infinite oneness, and the Korean sense of affecting and caring for each other. The Korean word *Ha-Na* means "one" with the added dimension of "single" or "whole," reflecting continuous movement between single and whole. [7] Jung is voluntary emotion towards other selves, transcending rational criteria of judgment or likability. [6] There are two opposing cases where Jung might be created.

Mi-Un Jung is created when one individual experiences difficulties and disagreements with another. Individuals may not like each other, but this situation creates Jung between the persons as they share time, place, and story together. On the other hand, *Ko-Un* Jung is generated when one individual has positive experiences and memories with another. Jung is usually mixed feelings of these opposing aspects—some of Mi-Un Jung and some of Ko-Un Jung. Even if the two Jung start from almost opposite situations, they are considered to be the same Jung. Jung is a warm and peaceful mind embracing all, beyond agreement, belief, preference, comfort or likability.

Jung is a property of connection not only between human beings but also between human beings and inanimates, such as between a human being and the sky. Jung may also be explored between the actual and virtual body, pursuing infinite oneness in potentiality. It is like the concept of Eros in Whitehead's terminology, which states that the unification of the ultimate is Eros. [8] Eros is the will for life towards which every potential being strives.

Han

Han exists on the other side of Jung. Ironically, Jung sensitizes us to the distances we confront in our daily lives. However, there is a sense of deep frustration and incompleteness about our current situation of "not yet one," paired with a strong desire to overcome the limitation. Han emerges from the gap between potentiality and actuality. At the end of Jung, there comes Han. [9]

 Han is a paradoxical state of consciousness that combines an extreme state of grief in a feeling of incompleteness with a great hope and desire for overcoming the situation that seems almost impossible. Han is the Korean psyche of the determinant of the struggle. It is created in the void we are eager to fill. It is a complicated emotion composed of a grief and a strong will to overcome that grief. Fundamentally, Han is a feeling of incompleteness and absence, activating the powerful wish to be completed or fulfilled in infinite wholeness. It is a determination of the struggle with and honest examination of the current tragedy in a fundamental level of Korean consciousness. In a romantic sense, it is a tragically impossible

love story. It is the Korean way of lightening the one's psychic weight by acknowledging one's pain in a dream of flying to full potentiality.

Han has tremendous power to turn the world upside down. What the king of the Cho-Sun dynasty of Korea feared most was to see people looking up to sky with sighs or tears, since this is the sign of Han. Han calls forth revolution, which makes people look to the sky with fearsome desire for change, wishing to fly. Han motivates people to see beyond restrictive procedures and power structures, opening their eyes to fundamentalinquiries.

Shin-Myeong and Moo-A

Shin-Myeong, the ultimate state of playfulness derived from Han, is the opposite state of tremendous constraints. Han works as a springboard, allowing us to fly higher and higher. This condition brings a synergy that cannot be explained in a logical way. It has the dynamic power of swirling movement, passing from one to another. The real potential of Shin-Myeong is driven by Han. [10]

The paradoxical relationship between Han and Shin-Myeong can be described in the Korean clown's tightrope walking: the act appears risky; the clown is unstable and unbalanced, continuously swinging left and right. The clown usually holds a fan in one hand, which seems to defy the act of balancing but actually demonstrates a different philosophy. One oscillates continuously between balancing and unbalancing in order to find the greater moment of balance. It is the cosmic "tree" connecting two separate poles—left and right. The taller the cosmic tree, the more unstable it appears, and, paradoxically, the greater its stillness also appears. We may find ultimate joy in this process of unstable walking.
The deeper the Han, the more Shin-Myeong and the more powerful the ritual.

In the climax of the Shin-Myeong, the experience would move to a meta layer, detached from the phenomena. It is this shift from desire to non-desire, from mind to no-mind, which turns the world upside down. [11] It is the moment when we realize that we and the sky are parts of the entire picture; we are looking at the sky transcendentally in a no-mind state. This is the Korean state of Moo-A-Ji-Kyung, or Moo-Shim, where the self is completely erased, abandoning our tedious efforts for owning or rationalizing. This state is quiet but also noisy. It welcomes the tremendous paradoxical conflicts of the actual and potential, but the frequency rate exceeds the audible range of human perception, and therefore we experience quiet, as in the eye of the storm. This is the point when our experience turns upside down, accompanied by completely different perception. Our narrowed focus shifts to the horizon, and we move from desire to non-desire. We find our entire selves looking at the sky with the ability of looking at entire fields—being itself. This state brings sensory integration, meta sensory experience, and intuition—opening space for creative imagination.

Virtual Body

Deleuze defines the virtual as a potentiality that becomes fulfilled in the actual, adding that this state is not material, yet it is real. [12]

In Korean experiential reality, the actual and the virtual contrast and balance each other in a paradoxical context. The virtual as full potentiality of experience can only be defined "from" and "through" the actual layer in the effort of erasing the actual itself, creating an "active void." It is an ironic process of creating the problematic situation of impossible love on purpose.

In the virtual puppetry projects presented here, the word "virtual" continues to be in the context of Deleuze, but also refers to the technical terminology of 3D "virtual" interactive technology, proposing a marriage of ontological and technological issues. The physical presence of the user has been transferred to a virtual body, such as an avatar, a virtual object, or sometimes to an entire virtual space. I seek to find Jung between multiple bodies in multiple dimensions voluntarily having affection and feelings for each other. Here we can begin to process the ritual through the different entities as they are emotionally and psychologically involved.

It has been said in Korea that Jung exists between the human and the sky. [5] In the state of Jung we feel another's heart and emotions, even with inanimate things. Feeling others' hearts is a Korean way of extending one's own body, organs, and senses. Jung is a way of relocating, distributing, and expanding the body to a different dimension of reality.

Crying with the Virtual: Performer's Perspective

My virtual puppetry projects explore the paradoxical relationship of multiple body presences in the layers of virtual, actual, and in-between, within the context of impossible love. The story of impossible love highlights the tragic component of the cosmological relationship, exploring the infinite and loving-constant process of dreaming the virtual.

Although this virtual puppetry project is still in the beginning stages of critical inquiry, my experience performing "Parting on Z" in London would be an interesting case study for future research. In collaboration with Stefano Faralli and in the context of the ritual body parting on the Z-axis, the "Parting on Z" performance explored Han in the paradoxical relationship between the virtual puppet and the puppeteer via the distance between avatar and user—symbolic lovers facing each other, continuously exchanging dialogues of love and farewell. The story chosen for this performance was the farewell scene from Chun-Hyang-Ga, the Korean impossible love story that demonstrates Han. The entire performance produced a flow of sensations, moving from Jung to Han and field consciousness. My experience as performer was emotionally overwhelming, causing my whole body to shake and weep with my lover-avatar, and the audience appeared to make an emotional connection to this performance. The performance started with an impossible relationship between two virtual lovers, and then it evolved to a relationship between the virtual body (avatar) and actual body (performer) as they faced each other and exchanged dialogue.

Speaking into a microphone and standing on a Wii Fit balance board, I played two virtual characters who are deeply in love but having to say farewell. The realtime voice input and balance signals from my body caused the virtual puppets to produce synchronized and responsive face and body movements. In the middle of the performance, I turned on two candle lights, which projected onto my face. I was dressed as Chun-Hyang, the female character, and started performing her in real space, facing Mong-Ryong, her male lover, as a virtual body on the screen. From this point forward, there was a farewell between my actual and virtual body. The process of handing Chun-Hyang's ring to Mong-Ryong and drinking from a glass in farewell was emotionally overwhelming. My body and lips were trembling violently, and I was unable to speak.

During the last scene, as I watched my lover slowly disappear beyond virtual fields, I walked with him in virtual space connected by the Balance board. I was standing on my toes, lengthening my neck and narrowing my eyes. Based on the original script of Chun-Hyang-Ga, I said, "You look as big as a moon, a star,

a butterfly, a firefly, and disappearing beyond the horizon (Z). I don't see your shadow. I don't see even a bit of shadow." This describes the constant process of parting on Z, putting this farewell in a two-dimensional perspective—a different dimension of reality which is quite humorous and poetic. I felt myself stop crying in the middle of the process, in an extreme state of grief but with a smile on my face, by the time my virtual lover was the size of firefly. I began looking at entire virtual fields connected to my walking steps. My attention had shifted from a narrowed focus to the horizon. I watched my virtual body departing over the horizon until he became a tiny bit of shadow, a tiny bit of information, slowly disappearing on the Z-axis. I maintained my gaze until his tiny bit of body was erased completely, just as Korean people wave goodbye until the other is completely out of sight. This may be a way to welcome and celebrate the full pain of farewell: grief, regret, and longing; the full process of emptying self. I left my avatar to infinity, forever walking on Z.

Future of Virtual Puppetry

I have been working on virtual puppetry projects in collaboration with Stefano Faralli, exploring the relationship between the user and the virtual body. It started in 2002 with the simple idea of a voice-activated puppet, investigating the spiraling interaction between puppet and puppeteer. This involved a talking puppet lip-syncing with the user's words spoken into a microphone, which somehow magically drew the user into a transformative state in the process of oral storytelling. Oral storytelling has been a major component of virtual puppetry, with its roots in shamanism and traditions of mask and puppet theatre. Computer technology can support a free improvisational environment for live orality. Data analysis of human voice such as texture, volume, rhythm or tone adds more playful interactive components and fosters an interesting relationship between the actual and virtual body. Potentially, a combination of speech recognition and simple text classification techniques can produce a generic idea of the topic of the dialogue, and open the possibility of appropriate graphic and/or acoustic feedback for perceptual developments in human psyche. By deeply investigating the psychic and emotional states of the performer and spectators, virtual puppetry may benefit those who have difficulties communicating in traditional ways.

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SUZUMUSHI: A SILENT FUTURE

Gavin Sade

This paper introduces the creative work *Suzumushi: the silent swarm,* produced by Kuuki. The paper provides an outline of the work and draws together the ideas that influenced the works form, the conceptual material and interaction design, including acoustic ecology and emergence.
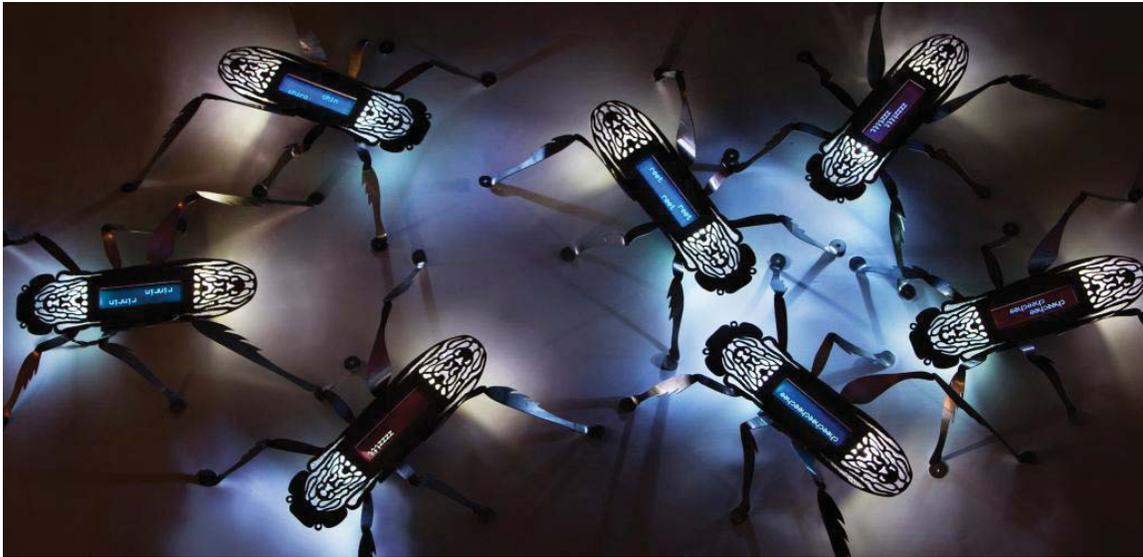
Fig 1. Suzumushi: The Silent Swarm (2011) Priscilla Bracks and Gavin Sade. A view of the work installed at the State Library of Queensland with the cricket in the foreground displaying text from a recent search of the library database. Laser-cut stainless steel, post-consumer plastic and electronics. Dimensions variable. Image: Gavin Sade.
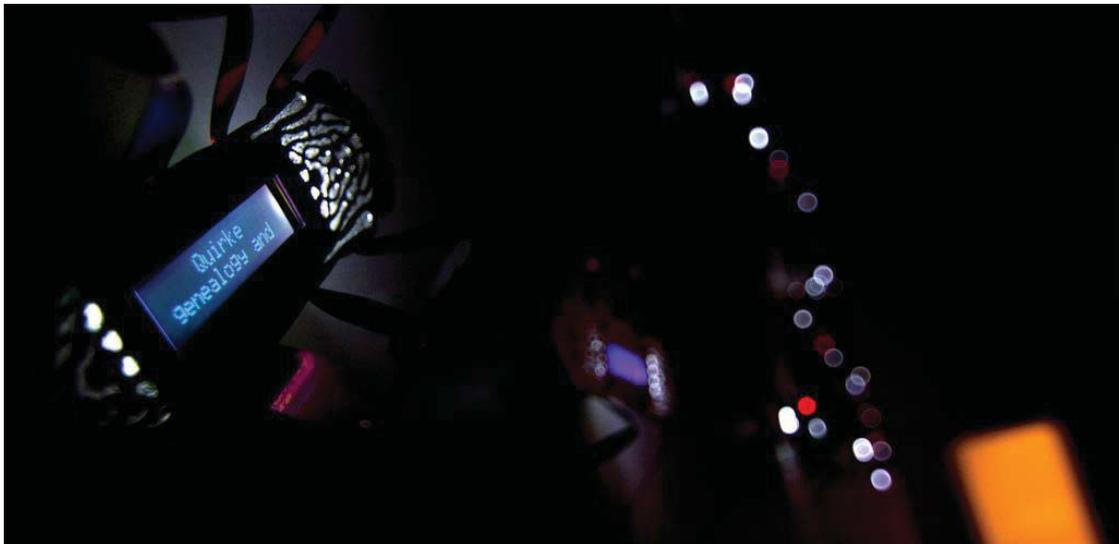
Fig 2. Suzumushi: The Silent Swarm (2011) Priscilla Bracks and Gavin Sade. Seven crickets, each displaying an onomatopoeia call . Image: Gavin Sade.

Fig 3. Suzumushi: The Silent Swarm (2011), Priscilla Bracks and Gavin Sade. A single cricket displaying an onomatopoeia call. Image: Priscilla Bracks.

...chaos is always there to serve as a foundation, the noise is always there to invent new music and new harmonies, the beautiful noiseuse *always there, a horn of plenty whence come thousands of forms, the source of brilliant pictures.* [1]

The emergence of a creative idea from what Serres describes as a foundation of chaos is often difficult to trace. Yet in the context of practice-led artistic research there is an interest in charting the dynamics of the emergence of creative ideas, their transformation through practice, and interaction with the worlds in which they draw meaning. For *Suzumushi: the silent swarm* the seeds of the idea can be found in the a coincidence of seasonal sounds, specifically that of crickets and cicadas in South East Queensland, acoustic ecology and an interest in the way species of animals and plants tell stories about the world we collectively inhabit. The work is part of the *Specimen* series of interactive sculptural works produced by Kuuki, which are each created as speculative species that exist within human constructed niches.

It was the process of thinking about sound in the context of the *Specimen* series that resulted in a creative work about sound and noise becoming silent. This direction is informed by Schafer's research into acoustic ecologies, [2] a focus that has been an aspect of Kuuki's work since *Charmed.* [3] In his work Schafer proposes that many species develop calls that fit niches within their acoustic environment. He also describes how an increasing background of "lo-fi" noise dominates the acoustic environment of urban human habitats. Thus it was the experience of standing on the side of a busy city street – where the passing traffic and construction drowned out the sounds of insects and birds – that lead to the silent cricket in this work.

The silence in *Suzumushi* also comes from a tension we found in *Charmed*. The sound design for *Charmed* was informed by Schafer's observations about our increasingly lo-fi acoustic environments, the listening situation – headphones within a controlled gallery setting – presented the noises of urban environments as what Schaeffer would call sonorous objects within a composed sound-scape. While Schafer's acoustic ecology focuses on sonic environments and their "health", Schaeffer's *musique concrète* considers the musical possibility of all sounds when separated, or abstracted, from their source. [4] It is this tension that we wanted to explore in *Suzumushi*. Instead of giving the crickets an artificial voice, or composing a soundscape for the work, we created a silent work. This was in part an exercise in restraint, as the electronics for the work were designed to include a vibration motor to simulate cricket stridulating. When the sounds of our world are transformed into music, or used in a "musical context" within designed listening environments and situations, the question is not one of sound pollution, but one of aesthetics. When experienced in the world, the questions are very different – they are about the character, richness, and health of an acoustic environment – how it tells the story of place, marks the passage of the day and the seasons. Thus it is through silence that we draw attention to sound and the act of listening.

In making *Suzumushi* we do not aim to present a quieter world as some form of ideal or healthy acoustic environment. Instead we set out to create a speculative species that has evolved to fit a niche within a human designed world. This speculative species of *Suzumushi* is not actually silent, but communicates via short messages at radio frequency inhabiting one of the human regulated bandwidths. Technically the swarm forms an adhoc XBee wireless network communicating in short bursts in the range of 2.4Ghz. While humans cannot hear this communication, the crickets' call has not disappeared entirely from human perception. It has been transformed into onomatopoeia displayed on a small LCD screen on their back. The audience thus speaks the calls aloud or as an inner voice, as they attempt to pronounce "tz tz tz tz tz" or "rin rin ricket".

While our speculative cricket species has evolved in this manner, it is hard to imagine such an evolution considering that the sound of crickets and cicadas in summer where we live in South East Queensland, Australia, can at times be so loud, so unavoidable, that it drowns out everything else, even making it hard to think. However, it is an uncanny coincidence that a after we settled upon silent crickets we were to discover that a species of cricket, the *Teleogryllus oceanicus,* on the Hawaiian island of Kauai has rapidly evolved to become silent. [5] Not in response to human made sounds, but in order to avoid a new predator; the *Ormia ochracea*, which has exceptionally good directional hearing and locates it prey by its call. In this example of rapid evolution there is a strong relationship between sound production, sexual selection, hearing and humans; as the *Ormia ochracea* invaded Hawaii from North America presumably hitching a ride with humans.

It is living in close proximity to humans, and in human made environments, that has guided the evolution of our *Suzumushi*. Not only have the crickets evolved to communicate within this new environment, but it has also shaped their calls. The swarm of *Suzumushi* are slowly replacing their onomatopoeia with text scrapped from human networks – more specifically searches of the State Library of Queensland (SLQ) databases made by the public. This choice of data source was made because SLQ was the site of the works first major public exhibition, in *LUMIA art | light | motion* 2011. Like the Australian lyrebird, the subject of a pervious creative work in the *Specimen* series, [6] the *Suzumushi* mimic these many voices, which an audience again reads aloud, or as an inner voice, when they encounter the swam. Carroli suggests that this new call of the *Suzumushi* brings forth and makes present an alternative kind of social dialogue, with its brevity evoking the tweet or sms, while the name 'suzumushi' alludes to another literary trope, the autumn kigo in haiku, a word associated with a season. [7]

Since our experience of crickets and their calls are tied to the seasons, our speculative species of *Suzumushi* has evolved to replace once seasonal calls with the 'seasonal' patterns of searching of the SLQ databases. The patterns of memes that pass through the swarm across the day, weeks and months, provided a unique insight into the invisible use of the SLQ databases. At times the swarm displayed strings of numbers that seem intriguing until one realises they are searches for ISBNs. During schools hours on weekdays the searching of school groups drown out any other terms, and overnight searches by genealogist, historians and researchers see the swarm speaking the names of ancestors. Noisy swarms of insects blend into noisy crowds of people, which in a digital age occur not just within the physical world, but a silent environment – beyond our auditory capabilities. Glimpses (or the auditory equivalent) of which we hear as static of a detuned radio, the once iconic sound of a modem, or the chirping of a mobile phone as it induces a current into speaker cable. In the modern open plan office the hum of air conditioning and tap of keys conceals a cacophony of communications, both human-to-human, human-to-machine and machine-to-machine.

Each *Suzumushi* is a stand-alone electronic object that will function as an individual, but when in the proximity of others will become part of a larger swarm. The behavior of each *Suzumushi* is influenced by the calls of other crickets, resulting in emergent patterns of behavior that vary depending on the size of the swarm. The work does not directly encode models of cricket (or other insects) behavior, but is instead loosely inspired by a pastiche of insect behaviors. For example the patterns of cricket calls as they compete to attract a mate or the relationship between call frequency and temperature [8]. The work is also informed by the cyclical nature of firefly flashing and resulting synchronicity. This synchronicity in a congregation of flashing fireflies is the result of each one continually sending and receiving signals, yet there is no central conductor, instead this synchronicity is emergent. [9] Similarly each *Suzumushi* responds to the radio frequency chirps of other crickets – competing for attention, influencing the call cycles of each other, and propagating texts heard from the network. The combination of insect behavior and language see *Suzumushi* as a mix of insect and social network.

Each of these behaviors is encoded into each cricket as a set or low level rules, when put together in a group of 5, 25 or 50, differing patterns emerge – illustrating one of Johnson's principles of bottom-up systems, more is different. [10] In *Suzumushi* there needs to be a mass of crickets between 45 and 55, one or two do not make a swarm. This emergence of order, or pattern, from the swarm is the result of the interactions between so many individual *Suzumushi*, as well as interaction with the network data sources and the environment. Individual crickets also respond to sound in the environment, with noise triggering calls and influencing call cycles. Thus audiences may talk to a cricket or make other sounds, which will eventually alter the behavior of the swarm. This ability to hear allows the swarm (as a whole)

to map the acoustic environment within which they exist. Loud sounds heard by one member of the swarm triggers calls, and a cascade of interactions between other crickets.

When encountered in a gallery the *Suzumushi* tell the story of the information environments that they exist between, as an audience reads the onomatopoeia cricket calls; sees waves of short search phrases pass from cricket to cricket; and, experiences synchronous patterns of flashing occur or attempts to tell the temperature from the changing rhythms of flashing. For us the story of *Suzumushi: the silent swarm* goes beyond that which an audience experiences when they encounter the work within a gallery setting. It is our experience of cricket calls, from the deafening cascade of calls in summer to the call of a lone cricket in a vase in the living room that forms our lived memory. This work marks a moment in our practice, connects to these memories and experiences, and the acoustic ecology of the place where we live and create. As part of the *Specimen* series*, Suzumushi* another exploration of the complex relation-ships between the social and the environmental, which has been described as Kuuki's brand of post-en-vironmental politics. [11] Yet the ideas discussed in this short paper and our deeper ecological philoso-phy and concern for our relationship with the world are not dealt with in a 'didactic' manner. Instead Brown describes Kuuki's approach as "light and playful coercions (…) unwittingly lead [the audience] via a natural and seductive interaction into a space where a more profound comprehension of our world and our place in it can emerge." [12]

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STOP-MOTION ANIMATION: TOWARDS A REALISTIC 3D CAMERA MOVEMENT CONTROL

Laura Saini, Nicolas Lissarrague, Gudrun Albrecht & Lucia Romani

In stop-motion camera animation the camera is slightly moved between frames, and once these are assembled, it produces an illusion of movement. We are concerned with improving the existing stop motion camera animation practice. To this end we present a survey on its current state of the art, and present an "ideal" process for stop motion camera animation in order to develop an animation interface capable of producing realistic camera moves.
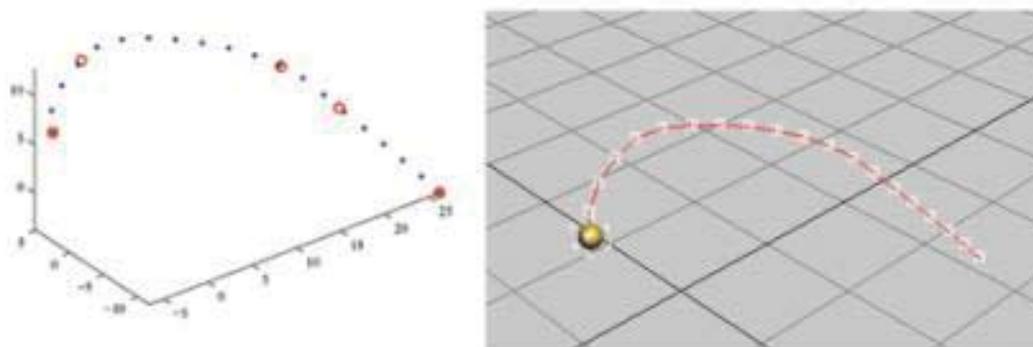
Fig. 1. Left image: the entire parametric Hermite quintic space curve interpolating the keyframes (red circles) and parameterized by equally spaced arc length parameters (blue points). Right image: Motion curve of left image imported in 3D Studio Max.
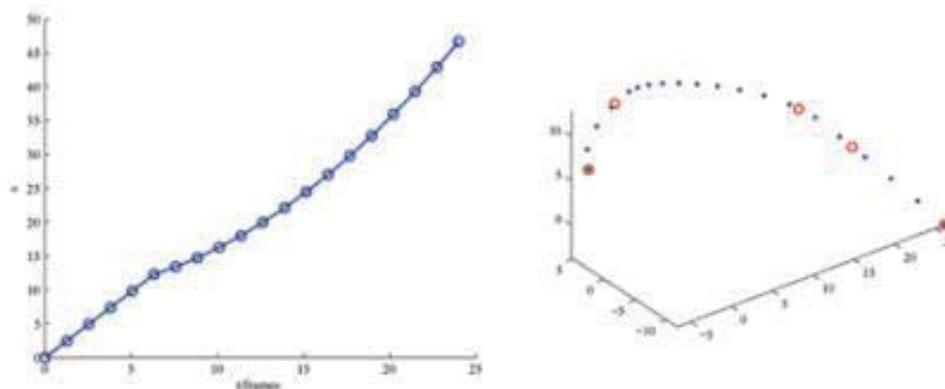
Fig. 2. The Figure in the left shows an Ease curve composed by a linear (s1(t) = t for 0 = t = 6) and a parabolic part (s2(t) = t^2 for 6 < t = 24). The Figure in the right shows the corresponding parametric Hermite quintic space curve.
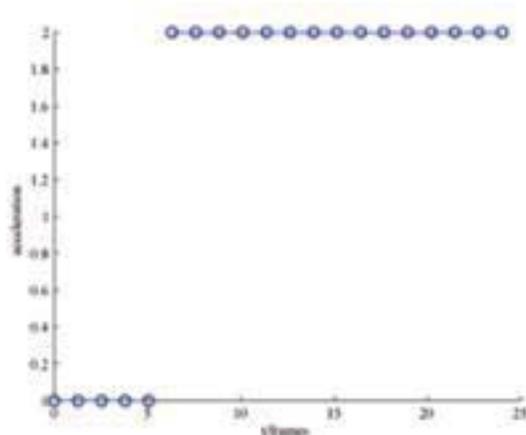
Fig. 3. The acceleration curve corresponding to the parametric space curve in Fig. 2.

1. Stop Motion & Camera Movements: A State of the Art

Almost as old as cinema itself, stop motion is a method of animation that brings any object (model, puppet, clay, etc.) "alive", making it appear to move on its own. By manipulating objects through a series of still positions, photographing each position on a still camera and then playing these as a continuous sequence, the illusion of movement is created. It's a (very) long and (very) tedious process. To complicate the matter, if an animator does a mistake on stage, it is not possible to go back and repeat parts of a movement as it can never be recaptured exactly in the same way. With these constraints, animating the camera is a hazardous task. It is almost an impossible job to move the camera frame by frame along a perfect curve to produce a smooth move, mainly because the slightest imprecision produces an unnatural shake in the final sequence. And, unlike on real stage, there is no way to make several shots and choose the best one as the process is too long: a talented stop motion animator can handle only a few seconds of animation per day:

1. *"An animator's day is structured around the few seconds he will shot, and the delay is judged to be a long one if it is about twelve seconds or maybe an easy day if it is only four seconds long..."* explains Barry J. C. Purves. [1]

For a long time, these technical constraints forced directors to fix the camera on stop motion sets. On the contrary, on real stages since W.D. Griffith in the beginning of the 20th century, camera movements are mainly recognized as part of the aesthetic cinematographic specificity. In order to overcome this frustrating status, stop motion animators first tried to find hand-made tricks that could give more freedom to the camera, but these increase the complexity of the production workflow. In 1993, to obtain the same camera move freedom as on a real stage, Henry Selick used for the first time a motion controlled camera for *"Tim Burton's The Night before Christmas."* Comparing the two ways to move a camera in stop motion, we can resume the benefits and disadvantages of each animation process:

- **Hand positioning**: it can work for one axis of freedom (unusually two, like the travelling and panoramic move in *"The Secret adventure of Tom Thumb,"* David Borthwick, 1993) but no more than two degrees of freedom as the process would become too complex and hazardous; it works well with linear acceleration moves but is not precise enough to handle acceleration ease in and out, or slow moves; adds unnatural shakes to the move because of the human hand lack of precision which on the other hand confers the specific quivery stop motion aesthetic. Some examples of such moves can be found in *"9.99$"* (Tatia Rosenthal, 2008), *"Fantastic Mr Fox"* (Wes Anderson, 2009) or shorts like *"Western Spaghetti"* (PES, 2008) and *"MUTO"* (BLU, 2008). In *"Peter and the wolf"* (Suzie Templeton, 2006), animators even tried to simulate a camera on the shoulder shot for a subjective view of the wolf.
- **Motion control**: as these devices are intended for live stage, their characteristics are far too sophisticated for stop motion needs in terms of speed, size, weight and cost; the device's trajectory is computer controlled by 3D curves such that the camera executes perfect moves. On the one hand this is a blessing for the stop motion process as it prevents from any shake caused by animators' mistakes or imprecisions. On the other hand, this doesn't correspond to the stop motion aesthetic since it constrains the stop motion move to appear as perfect and lifeless as a computer interpolated move. The following movies have used a motion controlled camera: *"Wallace and Gromit: A grand day out"* (Nick Park, 1989), *"Corpse Bride"* (Tim Burton and Mike Johnson, 2005), *"Wallace and Gromit: The Curse of the Were-Rabbit"* (Steve Box and Nick Park, 2005) *"Wallace and Gromit: A matter of loaf and death"* (Nick Park, 2008), *"Coraline"* (Henry Selick, 2009), and also the 2011 advertisings TV campaign for the Brother printers.

In this context we cite Peter Lord (see e.g. [2] and [3]) *"Stop-frame is like live music, played on traditional instruments, compared to a studio recording using the finest instruments in the world, all the latest technology and some electronic instruments. The latter is more polished, more perfect, bigger, better, showier - but maybe lacks humanity. Stopframe is much less perfect, much less polished, unrepeatable, inaccurate - in a word, human."*
This analysis allows us to conclude that a certain limited amount of "shakiness" is desired as it provides realism to the stop motion movie but the process of hand positioning the camera is a too tedious and slow task. We are thus interested in a motion control system specifically designed for stop motion that is able to simulate a realistic (hand made) camera animation. To this end we first review the existing tools for camera animation in section 2 and then describe the first steps towards a new system for controlling camera movements for stop motion in section 3.

2. Existing Tools for Camera Animation

As our new system's objective is to allow precise camera moves on stop motion stage, it is not possible to use hand positioning. Thus, existing software like Stop Motion Pro [4], [5], iStopMotion [6] or Dragon Stop Motion [7] are not relevant as they only can control camera settings and not camera moves. This section shortly reviews the state of the art for 3D animation of camera movements. We are aware of the following 3D animation software programs: Maya, 3DStudioMax, Lightwave, Blender, Cinema4D, Softimage, Houdini. These programs have two main tools to animate an object: "Keyframing Animation" and "Path Constraint Animation".

- "Keyframing Animation" is based on the traditional animation technique, where the user only sets the important frames, called keyframes, and, using interpolation techniques, the software program generates the intermediate frames, called in-betweens. The object's trajectory is internally represented as a

parametric space curve where the animator interacts with its three coordinate curves *x(t), y(t)* and *z(t)* in order to change position as well as speed. Note that position and speed can not be modified separately.

- "Path Constraint Animation" separately constructs the 3D space trajectory and the so called Ease Curve that controls the object's speed.

The main advantages and disadvantages of these tools are:

- Keyframing Animation:
- o Separation of position and speed: Not possible
- o Global/Local control of space trajectory: Only local control
- o Addition of constraints: Possible
- o Space trajectory's x-y-z-coordinates accessible: Yes
- Path Constraint Animation:
- o Separation of position and speed: Possible
- o Global/Local control of space trajectory: Only global control
- o Addition of constraints: Partially possible
- o Space trajectory's x-y-z-coordinates accessible: No

As far as the mathematical background is concerned there exist several interpolation techniques to fit a piecewise curve to a sequence of given points (keyframes), depending on the final motion desired. The most used techniques in animation may, e.g., be found in bibliography of [8]. In order to overcome the major disadvantage (dependence of position and speed) of the most popular animation technique, the "Keyframing Animation", several approaches aim at reparameterising the curve by arc length and thus controlling the movement along the curve by an Ease Curve, see bibliography of [8]. The author of [9] adds so called displacement functions in order to modify the space trajectory as well as the Ease Curve.

3. Experimental Environment for a New System

We present an experimental environment for a new system conceived to overcome the existing drawbacks of the traditional animation methods in 3D software animation programs. In particular we will focus on "Keyframing animation" and we will tackle the following issues: separating position and speed of the trajectory curve and proposing a representation that allows us to add constraints of real camera devices such as ranges for curvature, acceleration and deceleration. As recalled in section 2, the most used interpolation methods in animation give the possibility to control only first order derivatives at the junction points of the piecewise interpolant. To get a smooth trajectory curve that takes into account the constraints of a real camera move, every curve segment should be defined in terms of tangent and curvature vectors at its endpoints. To this end we consider the class of piecewise G2 continuous interpolants where each curve segment is described either by a parametric Hermite quintic or by a rational Bézier cubic, like the one described in [10]. For the mathematical details see [8]. As concerns the problem of separating position and speed of the trajectory curve we proceed as follows. Using existing numerical techniques (see references in section 2) we parameterise the entire curve by arc length, such that a unit change in the parameter value results in a unit change on the trajectory. See Fig. 1 for an illustration. Thus, by using the concept of the Ease curve, which represents arc length over time, we can choose the speed at which the curve is traversed, see Fig. 2. Moreover, also the acceleration curve is controlled (see Fig. 3).

Currently, an experimental environment to test our system has been implemented in *Matlab®*. Given a sequence of points and chosen the desired parameterisation, the program computes a G2 Hermite quintic space curve and gives the possibility to change the speed along the curve without modifying the trajectory. Vice versa, it's possible to modify the trajectory without changing the parameterisation. The points of the new parameterisation computed by *Matlab®* are given in input to 3D Studio Max by an external script and the new trajectory is visualized in the Motion curve window (see Fig. 1, right).

On the basis of this first step, our objective is to elaborate a system (e.g. by integrating the above process in an interactive interface in an animation program such as 3D Studio Max) that gives stop motion directors and animators full camera move freedom and respects the handwork visual aesthetic of stop motion. In particular we are aiming at the following system properties:

- The 3D animation part should allow to simulate a 3D camera move that can integrate constraints and imperfections (noise) of real camera devices (louma, steadycam, dolly, crane, etc.). The classical keyframe or path constraint animation should first be split in a position curve and a speed curve. Different parameterizations could then be applied separately to these curves and simulate, rather than imitate, the behaviour of a real camera device. The positions of the virtual camera should then be exported frame by frame to the motion control system.
- The motion control software, once these data have been imported, should allow to calibrate the motion control robot, to control the camera settings and, finally, to execute the sequence. It should also give some options to enhance creativity: frame by frame shooting for classic stop motion, automatic sequence shooting for timelapse, multiple takes with different camera settings for each frame (for HDR shots or Depth of field stacking).
- Last, the motion control robot should be affordable for any-sized budget production, handle a 2Kg camera, and have at least 1/10th of a millimeter precision for positioning and 1/10th of a degree precision for rotating.

We've already built two versions of the motion control robot. The first one moves on one translation axis and respects the required precision for a 300€ budget. Images of this robot and videos of several stop motion tests can be found at www.crealyse.com/recherche/dossiers. On the basis of this first version, a second "upgraded" robot has been built which is able to move on one translation axis and two rotations axes, respecting the required precision and for a 400€ budget. We are now working on the motion control software and tests have been scheduled for the next months.

4. Conclusions: Benefits of the Whole System Workflow

Computer graphics and SFX software have already simulated many cinematographic visual specificities to strengthen the illusion of reality: adding digitally generated motion blur, film grain, lens flares or glow let the spectator think that what he or she is looking at is real and not computer generated. Being able to simulate the influence of floor irregularities, human manipulations and mechanical imperfections of a camera device on a 3D camera movement would also contribute to the illusion of reality. Thus a motion control system specifically designed for stop motion would be a benefit for all types of stop motion productions: "specifically designed" means that it should be adapted to stop motion stages in terms of size and weight, accessible to any-sized budget productions and give animators enough control to stylize the camera movement. With an optimized workflow, such a system would significantly encourage creativity while respecting the handwork aesthetic of stop motion, intensify cinematographic illusion by giving life to camera and allow as much freedom for camera moves as on a real stage.

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GUTAI MOVEMENT IN JAPAN AND ART AFTERWARDS. TOWARDS NEW UNDERSTANDING OF CURRENT MEDIA ART

Rie Saito

This paper will explore about GUTAI and Japanese avant-garde art especially concentrate on Atsuko Tanaka's 'Electric Dress' from cultural and sociological view to reconsider contemporary role of art and the relationship between culture and society. The paper will open a path to new understanding of media art in today's situation.

Is contemporary art still functioning as a role to propose an issue in a current society?In a complex world like today, it is difficult to answer this question and to think about the relationship between art and society. However, even under chaotic circumstances after postwar in Japan, there were specific intentions and certain art movements that took place, such as GUTAI, which is one of the most important movements that took at that time period. By focusing on this movement, it may enable us to rethink the practice of today's media art.

This paper will focus on Atsuko Tanaka (1932 – 2005) who expressed her artistic work in GUTAI during 1950's in Kansai, western region of Japan. The purpose of this paper is to investigate how the artist's personal catches and transforms to the public perspective.

Moreover, by reconsidering Tanaka's work as a prehistory of media art, the paper will particularly examine how postwar Japanese avant-garde art connect to today's media art. Especially, focusing on the work 'Electric Dress' will bring us a new understanding towards current media art in Japan.

In 1945, after the World War II, under chaos and desperation in the Japanese society, some artists tried different artistic work and activity to find the new world. GUTAI was one of these movements which happened in Hyogo prefecture in Kansai more than 500 km away from Tokyo. The artist Jiro Yoshihara formed GUTAI as a Gutai Art Association. In the first issue of GUTAI magazine, Yoshihara wrote a manifesto as below.

The most important thing for us is that present art is in the most liberal position for these who are living in this a severe time, because they deeply believe that the creation of freedom leads to human development. We earnestly wish to specifically indicate and prove that our sprits are free, and continue searching for fresh impression in every creation to the end. [1]

As described, the idea of GUTAI was to confront with the severe reality of the society and to conquer this situation. Atsuko Tanaka, who was active in Zero-kai emphasized this idea, and decided to participate in GUTAI officially. The first exhibition of GUTAI was held in June 1955 at Ashiya-city in Hyogo prefecture. It was an outdoor exhibition and Tanaka created 'Stage Clothes' which can be said the basis of 'Electric Dress'. There Tanaka made an enormous seven human figures and these figures had many colorful electric bulbs.

On October 1955, GUTAI held the first group exhibition in Tokyo. Tanaka exhibited one of her major work entitled 'bell'. Next year, October 1956, the second GUTAI exhibition was held in the same place in Tokyo and she placed her works on the show, including the 'Electric Dress'. Tanaka herself had put on the dress. In the famous photo of this work, her face shows obvious anxiety covered by the wrapping electricity. At that time, she had support from the electronic professionals to construct the electric dress,but there was certainly a risk for an electric shock. Tanaka herself says that she was a little bit scared. [2] This performance could be seen as insane. However, because she had put the electric dress on herself, the work was accepted with overwhelming existence.

Kato describes that in order to distinguish from all the others, Tanaka's 'Electric Dress' needed to cross over and transform the visual surfaces of the 'clothes / body'. Moreover, she considers Tanaka's 'Electric Dress' implies the general nature of clothing profoundly related to the formation of the 'self', which could also be expressed as 'Meta Clothes' by presenting a figure of continuing change in the body's image. [3]

According to Kato's opinion, Tanaka's 'Electric Dress' connotes various meaning about the body. Electric Dress is an extension of the body and it represents the body itself. The electric bulbs somewhat look like bone structure and blood, which have an uplifting image. However, the most critical point is the anxious face of Tanaka herself who actually controls the real body. She has an uncertainty towards her body but as an artist who tries to transcend this skepticism, the cloth, which is made from electricity, must have had a heavy strain. This is connected to Japanese traditional Kimono that wraps the body with many layers of fabric. Actually, when Kimono becomes a formal attire, the heaviness of the cloths constraints the body. Nevertheless, by bearing with this restraint, Kimono brings out its beauty as a dress. It can be considered that by putting her electric dress, Tanaka struggled to overcome the low status of female artist at that time and the burden from the society. When these personal issues forms as an artistic work, "Electric Dress" sublime as a crucial work that is still considered a remarkable piece until the present moment. One could feel her eagerness to create a new sensitivity after the defeat of war and the rapid transition of the society.

Today many contemporary artists create works which reflect a social issue where private and public sphere is ambiguous. Even more, they try to subvert the dualism itself. In the world where every issue can become a pop and mob, we are confronting the state which we cannot differentiate the reality and fiction in our daily life. In a situation like this, there is a lot of work that refer to virtualism or 'new' gender images of the body. It is clear that the body images change accordingly as time changes. When we look back to the work of Tanaka, it is notable that she was seeking the area where contemporary media arts were groping -- in the very early era of 1950's.

In addition, one must not miss that Tanaka was producing the 'Electric Dress' as stage clothes. In GUTAI's use of the stage in 1957, she made a performance called 'Stage Clothes". She changed her clothes continuously in this performance and the 'Electric Dress' recreated fluidity in space. Regarding 'Stage Clothes', Tanaka describes as follows.

This cloth start form the green cloth, the figure and the color of the clothes transform with rapid blinks of the electric light bulbs.

Electric Dress starts from small colorless bulb, then one hundred volt color bulbs, color pipe bulbs, bulbs which is covered by rigid vinyl and so on. Many figures, colors and lights of clothes appear blinking, and the tempo speeds up to a point where blinking lights look messed up.

What is interesting to me is that by blinking the electric bulbs with a motor machine, the electric bulbs that I myself set up turns with obsessive beauty that cannot be created by human's hand. [4]

From this, it is understandable that Tanaka focuses her attention to the change of time and brings her stage performance toward space to attract the audience. Her ability to construct the special atmosphere can be seen in her another work entitled 'Bell', her first GUTAI exhibition, which presents a blinking motor switch and continuous sound of the bell.

As just described, Tanaka's work is not just using the newest technology but it is a pioneering experiment by using the electric media to create an artistic work at that moment. Moreover, her skills to change small object into dynamic dimensional work is extremely avant-garde and still gives unjaded impression to us.

Unfortunately, Tanaka's work could not be appreciated by the right in Japanese art scene. Her work may have been too radical and awe-strike for the new born of art. However, person from overseas who is related to the art world such as the French critic, Michel Tapié, gave her a reputation. Nonetheless, a sequence of GUTAI's activity and Tanaka's work gave an enormous encouragement to Japanese media art afterwards. They cultivated its pioneer spirit, avant-garde motivation and the quest for new beauty.

In 1960, Tanaka contributes articles to the magazine titled "Search for an Unknown Aesthetic" which states:

The new artistic work has to create different beauty that past works already have. Repeat of presenting already existing beauty is a kind of handwork by craftspeople. I think person who tries to create art has a responsibility to find unknown beauty and set it in place.

Everyone can paint on a canvas and it is totally free to express anything. The most interesting thing is to draw the thing, which nobody knows, including myself. [5]

If contemporary art still respond to the complex society and create new work, this text most directly expresses the situation. We are now surrounded by the confusion and anxiety as if it is postwar, but we are still trying to find a faint glimmer of hope. In such circumstances, conflicts are natural and many work will express embarrassment and delusion. However, unfazed attitude to search for a new art will bring out hope that will brighten the present and future with self-reflection. Now in Japan after the disaster of March 2011, this movement is slightly seen. Japanese contemporary art nourished the spirit to move people's feelings even if it is made of a very simple structure. From this point of view, Tanaka's 'Electric Dress' will be reappraised as a pioneering piece.

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MOMENTS OF LIMINAL SPACE: METHODOLOGIES AND PRACTICES FOR THE STUDY OF TRANSITION

Melissanthi Saliba

The waiting room of a train station is a space lost in time where I go to observe strangers. The waiting body becomes the threshold between the everyday experience of public spaces and the unexplored territory of subjective motional states and gestures. Moments of Liminal Space is an installation of rhizomatic portraits composed of video, prints and writing, mapping the waiting body, withdrawn from its everyday functional state.
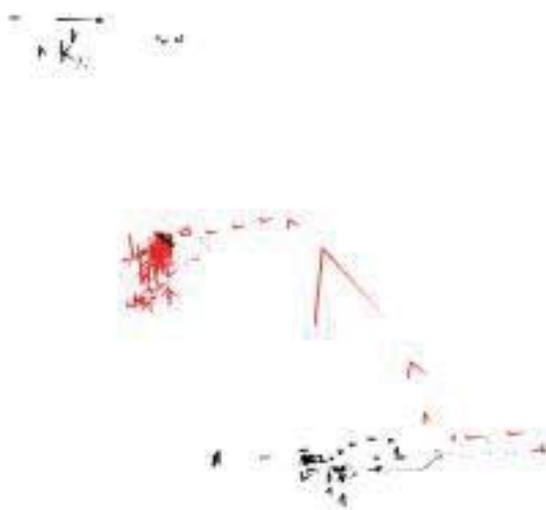
Fig 1. 525 Seconds Spent Together, 2010, Melissanthi Saliba, Inkjet Print, 45x34 in.
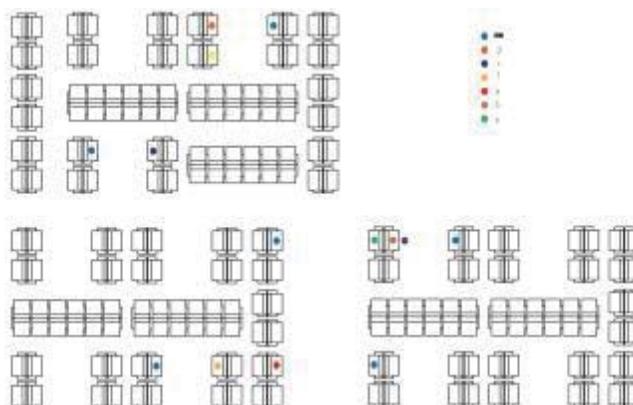
Fig 2. People I have waited with and me. Diagram of the Waiting Room in the Los Angeles Union Station, 2010, Melissanthi Saliba.

The waiting room of a train station is a space lost in time where I go to observe strangers. The waiting body becomes the threshold between the everyday experience of public spaces and the unexplored territory of subjective motional states and gestures. *Moments of Liminal Space* is an installation of rhizomatic portraits composed of video, prints, sound and writing. The waiting body, withdrawn from its everyday functional state, reveals the microgeography of the space that surrounds it. The project brings into attention the purposeless forgotten gestures of waiting, addressing their need for representation. *Moments of Liminal Space* suggest a subjective tracing and mapping of different ways by which individuals move in space.

The seemingly unimportant, the marginal, and the unintended gestural activity is placed in the center of attention as an experience that will reveal the spatiotemporal nature of contemporary public spaces. Movements of the body and gestures that aim almost solely at releasing physical and psychological pressure (adapters), become the rhythmic measure of time and space and reveal the ways by which individuals occupy and experience space.

The condition of being in transition between different locations, during which the waiting occurs, happens in spaces where bodies are prepared to exit the home of a culture and transfer to another place, often unfamiliar to their previous experiences. Los Angeles Union Station, constructed just before the end of the railway's heyday, is the setting for studying *Moments of Liminal Space*, considering it's role as an archetype for in-between spaces.

This in-betweenness renders *liminal space* the land where the rigid structures of consciousness retreat and the Self opens up to the Other, the unknown potential of the waiting, the unconscious, the foreign territory that often controls the Self. The body under this condition becomes objectified and exists as part of the space. *Moments of Liminal Space* explores the waiting of strangers as an activity of the 'here' and the 'now.'

The slippery, momentary gestures of waiting, lacking of meaning, suggest a cultural sensibility based on the premise that the Self is a stranger. These movements are captured through the lens of a video camera, and then tracked and translated into 'data' that are 'expressed' rather than visualized through different media forms. Print, writing, video documentation and video animation are platforms used for the composition of waiting portraits.

The installation of the different parts of the artwork in space, establishes interconnectedness, a necessary condition for unfolding the *liminal*. It is through the different connections made by the viewer that meaning and form are interwoven. Waiting produces 'data' that can be interpreted in subjective ways and their expression becomes an attempt of factless portraiture that is focused on human experience rather than visualization through the knowledge of events.

The waiting body has its own movement rhythm, that escapes attention as an activity that happens in the background of everyday life. This point of entry to *Liminal Space* calls for the abandonment of knowledge in the sake of experience, through measuring that can only rely on the human senses and "geographies of human agency." (Pile 1996:48)

TOWARDS A LIMINAL DEFINITION OF WAITING

The *liminal* interprets the movements of the waiting body as *lapsi corpi* (slips of the body). In analogy to the role of the *lapus linguae* in Freudian methodology, the almost purposeless movements of waiting, can reveal concealed states of the body and the human condition of individuals. Waiting, interpreted as an error, can reveal moments of a bodily epiphany, becoming an activity that allows the body to either withdraw from the constraints of public space, or to collide with them by failing to obey. Thus, the *liminal*, becomes a condition in which body language can escape meaning and unfold in a form which retains its independence from external points of reference and rules of social discipline.

Waiting inherently takes place before something scheduled happens, and in that sense, it is a liminal activity similar to the speculative execution of code from computers. Speculative code ascribes to the computer processor improvised tasks that have no reference and are irrelevant to the 'main' program that is just about to happen. The reason for the execution of speculative code is keeping the processor on the right track, in terms of the sequence and the timing of the programmed computations.

The aesthetics of the improvised, the error, the unnecessary, the failure, are elements that the *liminal* system uses to its advantage. The *dérive*, as the act of purposeless drifting, offers the possibility to escape rationally defined and calculated space supposedly designed to achieve the highest level of efficiency in production and functionality. In the 1950s and 1960s, the *Situationists* proposed a strategy they called *psychogeography* to study and embrace *liminal* space, emphasizing the notion of experience as opposed to knowledge. Waiting as a set of unintentional of gestures in space is a strategy resisting the vertical organization of meaning production.

Moments of Liminal Space focuses on waiting in order to map spaces through the movement of individuals. The unintended gesture is translated into 'information' through its tracking, and space is visualized as a dimension that opens up through these movements. The print work, explores the spatial dimension of waiting, through the position of the captured bodies. The duration, the frequency and the intensity are factors taken into consideration for the visualization of the movements. Waiting is approached as a drifting activity, a condition during which the body 'fails' to produce meaning, exposing its own image to the viewer.

Aharon Kellerman, writing about personal mobilities uses the term *homo viator*, to refer to human beings as constantly moving entities in both society and space (Kellerman 2006:1). Under the conditions of our new constantly mobile existence, the Self and the Other is deconstructed and reconstructed in motion. *Supermodernism*, a term introduced by the anthropologist Marc Augé, has appointed the transitory spaces as highly important in the context of the contemporary globalized condition. These are the spaces where one can encounter strangers, an experience that contemporary anthropology considers as rather valuable. Marc Augé refers to these spaces under the name of non-places:

If a place can be defined as a relational, historical and concerned with identity, then a space which cannot be defined as a relational, historical, or concerned with identity will be a non-place. The hypothesis advanced here is that supermodernity produces non-places, meaning spaces which are not themselves anthropological places (...). (Augé 1995:78)

What Marc Augé calls *supermodernity*, seems to produce spaces which are at least 'relational' and 'concerned' with identity. The main difference that separates transitional spaces from the so-called anthropological, in the traditional sense, would be that meaning today is, most of the times, not superimposed. On the contrary, meaning in waiting spaces is created through the interrelations taking place within them. Places are spatial entities that exist on fixed points, whereas the transitory condition of non-places seems to relate more to a sensibility formed around space.

The waiting body is open to space through its senses to the point that it becomes strange and withdrawn. Phenomenology has offered an insight to the relationship between the human body and the space by focusing on experiential aspects. Part of The *Fundamental Concepts of Metaphysics* is devoted to boredom. Martin Heidegger begins his exploration by the hypothesis that a number of people are waiting inside a train station, and through this example he is trying to define the ways by which the waiting body is experiencing this condition. He speaks of the undefined, unexplained, and unjustified reasons that cause waiting to be boring. Through the unfolding of his thoughts, he presents the mechanisms and dynamics of waiting as processes that undermine consciousness. The idea of indifference is one of the central points of his thought:

Each and every thing at once becomes indifferent, each and every thing moves together at one and the same time into indifference. We no longer stand as subjects and suchlike opposite these beings and excluded from them, but find ourselves in the midst of being as a whole i.e., in the whole of this indifference. Beings as a whole do not disappear however, but show themselves precisely as such in their indifference. The emptiness accordingly here consists in the indifference enveloping beings as a whole. (Heidegger 1895:138)

The eventlessness of waiting renders the incision of time impossible. The mind cannot divide the experience in units, and along with that impossibility, comes the failure to divide the Self from the space, as the subject can no longer discern spatiotemporal progression. Every moment is equal and identical to every other one. The subject uses the capacity of the observer to define a point of view that retains a relationship to real space and time. The condition of waiting brings about the loss of self-image and eventually the transformation of the subject's perspective that remains detached from the rest of the world. The direct signal in the communication between the body and the environment is lost and under the condition waiting self-image can only be constructed through the Other.

LIMINAL SPACES AND THE RISE OF THE SEMI-PUBLIC

Los Angeles' Union Station is often being mentioned as "the last of the great stations." The reason for this distinct title was the fact that it was built exactly after the railway had reached its glorious period at the threshold of the 20th century (Bradley 1989:6). Union stations were stations where passengers could transfer from the trains of one railway company to the other. Eventually, these venues became nodal points, both for travelers and citizens.

The study and discussion around railway stations often draws comparisons between these spaces and other establishments that are loaded with great significance for the members of a community. People often compare the major stations of this period to cathedrals. The church is the archetype for all networks as it was the first medium that penetrated in full success most of the forms of human communities. It is not surprising that any network technology that shares similar goals would borrow elements of church culture. Murray Schafer, while referring to sacred sounds writes the following about railroads:

In the Middle Ages it was church bells that rang constantly, to which was later added the organ, the loudest machine on earth prior to the Industrial Revolution. During the early part of the 19th century, however, the Industrial revolution replaced the churches, and railroads carried industrial noise throughout the countryside.

Sound can define the limits of a community; exiting the range of the church bell could be synonymous to de-parting from a community, while exiting the range of the railway could be a retreat from civilization altogether. Railway was the most internationally spread travel network, it was an the equivalent of today's airways. Probably because of the hours that passengers would have to wait for their train it seems that the 'comfort' factor was an important one. In waiting rooms, habits belonging to private spaces would occur frequently. Passengers could rest, sleep, occupy space in more comfortable ways, to the extend that the opposite sex was excluded. Segregation, apparent in the waiting between two different locations, is implied by architecture. Sketches and floor plans of railway stations reveal spatial separations that reflect cultures and mentalities from the end of 19th and the first half of the 20th century.

Besides from the revival of Gothic architecture –seen as a religious style– reflected in the high ceilings,

the tower-like structures, the cathedral windows and other structural elements of railway stations that implied analogous interrelations of people in space, there was also an integration of Roman architecture. Roman baths were particularly inspiring spaces for some of the architects who designed railway stations. New York's Pennsylvania Station was modeled after the baths of Caracalla and the Washington D.C. station was inspired by the baths of Diocletian, both typical examples of Roman architecture. Public bathing, a quotidian Roman habit, was part of a culture revolving around the care of the body. Baths were spaces open to everyone, where an intermingling between the public and the private, would take place. The public aspects of these spaces were relevant to the role of the state, which involved the care for the citizen's body, but also the discussions that would take place there, concerning -amongst others- political issues. In addition, Roman baths have been acknowledged as a space where every man, including slaves, was equally privileged (Crowther 2007:98).

The architectural elements that architects used to design railway stations drawing from Roman baths were both formal and structural. Monumentality is the main element, as Roman baths meant to honor the emperor (Crowther 2007:95). An important characteristic that this influence could provide was the coexistence of the private and the public. These architectural references would establish the monumentality and meaning that was not widely apparent at the time within the function of the railway stations. Meaning in civic places is mostly obtained by their importance for the city, defining the difference and autonomous value of the city to others. Terminals acquire their importance from the potential of transition that they offer. Their importance lies on the indefinite interrelations that they can create between the City -the Self- and the Other. Terminals are spaces constantly referring to the absent Other rendering thus the construction of meaning around them an ironic and hard task. Waiting, before transitioning to an unknown destination, can create a state of openness, an in-between land where one is in the process of leaving the familiar culture and opening up to a new and unknown one.

CONCLUSIONS

The *liminal* suggests the exploration of the Self and the Other within the 'here' and the 'now'. This contemplative position is rooted within a condition of 'being' where time cannot be divided in past, present and future as it can only unfold through its contemporaneity. The gaze of *liminal* geography is excluded from the sphere of super-vision, as it involves the activity of wandering and encountering strangers, rather than the supervision of others.

The *liminal* takes place in transition and reveals ideas that can be seen only within the blur of mobility, presupposing the detachment of meaning from places and the emergence of spaces. To understand while being in transition is to abandon the condition of certainty connected to the already known that exists in fixity. *Liminal* time is eventless and microscopic, generating docu-fictional narratives, rather than documenting the significant. Meaning is relational, deriving from connections that are drawn between different points of observation and multiple forms.

Waiting engages with the everyday, the casual and the anonymous. As strangers withdraw from the sphere of language and meaning, the body becomes the actor. Through the movements of waiting, the body transforms into an object, becoming the visual abstraction of a functional and meaningful entity, allowing for the purposeless gestures of waiting to take place.

Liminal aesthetics suggest the reinvention of the Self as a stranger among other strangers. The encounter and the embrace of the unknown allow for a gaze eager to explore space through experience and engage with different cultures as equals. The absence of scientific premises and conclusions suggests a participatory geography where people are invited to interpret space using their own points of reference and their imagination.

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FASHIONABLE WEARABLES IN DIGITAL PERFORMANCE

Marios Samdanis, Yikyung Kim & Soo Hee Lee

This paper explores how fashionable wearables affect digital performance, stressing the sensual and embodied abilities of electronic arts. Focusing on the notion of 'wearable performance', this study explores its link to the theory of remediation, providing a conceptual framework that includes re-embodiment, digital bricolage and interdisciplinarity as the effects of fashionable wearables in digital performance.

Introduction

Proceeding from the notion of the 'wearable performance,' [1] this study stresses the display and performative aspects of wearable technologies in the performance context. In particular, performative garments generate digitally mediated events in the wearable space. Revealing digital performance as an interface of creative activity, this paper analyzes how wearable performance remediates digital performance, enabling three particular effects: re-embodiment through the wearable space; digital bricolage as artists' experimentation with wearable technologies; and interdisciplinary collaborations that provide new creative structures for the wearable performance.

The first part of this paper presents the current trends in fashionable wearables, highlighting key theoretical points, [2] [3] while the second part focuses on digital and wearable performance. [4][5] [6] The third part introduces the theory of remediation, [7] presenting re-embodiment, [8] digital bricolage [9] and interdisciplinarity; [10] which are further discussed in the next part, while tracking future research implications.

Fashionable Wearables

In 2000, Sabine Seymour introduced the term 'fashionable technologies' in order to describe wearables that rely on the intersection of design, fashion, science and technology. By coupling expressiveness and functionality, fashionable wearables fulfill high aesthetic and stylistic requirements, in contrast to the weirdness of wearable computers, incorporating electronic textiles and smart garments. [2]

Electronic textiles, including technically enhanced textiles enabled for sensing, communication, power transmission, and interconnection, and smart garments, which can "sense stimuli in the ambient environment...see and smell on behalf of the wearer," [3, p. 12] create new standards of "wearability, comfort and aesthetic"; acting as embedded interfaces that contain microprocessors, sensors, actuators, software or intelligent materials. [2, pp. 15-16] Thus, fashionable wearables emerge as an interface between the body and the environment, able to communicate and interact with other digital agents. [2]

In particular, fashionable wearables can take the form of 'interactive interfaces' that electronically change surface patterns, based on embodied or environmental stimuli. [2] [3] As interactive interfaces they require inputs, outputs and the ability to communicate with digital media. Inputs include textile or

embedded sensors that capture data from the body (blood pressure) or the environment (light or humidity). Outputs are usually technologies that can be seen (Light Emitting Diodes/LEDs), felt (heating), touched (conductive fabrics), heard (speakers), and smelled (scent capsules); while the ability to communicate refers to technologies such as ubiquitous computing and wireless communication (WIFI, GPRS, RFIDs). [2]

Fashionable wearables can also sense human emotions, as 'emotive interfaces' that capture and broadcast feeling and mood. [3] Based on artificial intelligence that recognizes emotions such as "anger, fear, sorrow and joy", an emotive interface visually broadcasts our emotions, resulting in changes in the wearables' surfaces and/or forms. [3, p. 22] For instance, fashionable wearables "can identify the increased heartbeat and the perspiration that accompany fear as easily as they can record changes in the wearer's health." [3, p. 24]

While fashionable wearables' applications range from medical applications or electronic fashion, this paper concentrates on digital performance, focusing especially on the wearable performance. [1]

Digital Performance

Although technologies have intersected with theatre and performance since their very beginning, [4, p. xxii] digital performance mainly flourished throughout the 1960s as an effect of the "cross-fertilization between theatre, dance, film, video, and visual art", based on interdisciplinary collaborations between artists and scientists/engineers, [11, pp. 32-33] Digital performance, also known as multimedia performance or performance art, is an art form that includes "all performance works where computer technologies play a key role rather than a subsidiary one in content, techniques, aesthetics, or delivery forms." [4, p.3]

In some cases, digital technologies are highly visible to the audience but not interactive with the performers, usually taking the form of video projections or sounds; [4] while in other cases they are invisible, applied as digital tools in the design of a digital performance. [6] However, digital technologies usually generate various forms of interactivity between performers and digital artefacts. For instance, Cunningham's digital performance 'BIPED' (1999) engaged dancers' interaction with pre-designed digital forms produced in a studio based on 3D motion-capture software. [4]

In addition, alternative forms of interactive digital performances explore interactivity between performers and live-created abstract digital images called 'sprites', which are created by a performer-operator on a graphics tablet and are instantly projected on stage. [12] Other modes of live-created digital artefacts include effects such as the digital double, the digital twin of the performer's figure captured by digital media and projected on stage; performance in virtual environments; or the distribution of choreography among different locations. [4] Thus, digital performance engages with various forms of interactivity, whilst still sustaining an external relationship between the performer and the digital artefact.

Wearable technologies emerge as an additional stream of experimentation in digital performance, enabling an internal relationship between the performer's body and digital technologies, as they manifest "the transition between the inside (biological/emotional) and the outside (gesture and movement with the smart materials/garment) which affect the visibly and audibly revealed (screen and sonic architectures)." [1, p. 106]

Despite the early attraction of performers to experimenting with wearable technologies, these initial applications only incorporated wearables as flexible surfaces for digital display. [11] Later explorations in the field of electronic music performance integrated the sensing technologies of wearable computers with digital performance. For instance, in her project 'Ladies' Glove' (2004), performer-musician Laetitia Sonami "turned their bodies into alternative 'controllers', translating real-time flesh-and-blood movements into synthesis parameters through wearable sensors, carried objects, maladjusted instruments, and augmented outfits." [6, p. 217] Through gestures, these technologies experimented with broadcasting internal aspects of the performers, causing them to be visibly and audibly revealed. [1]

Focusing on wearable technologies in digital performance, Birringer and Danjoux (2009) coined the term 'wearable performance', distinguishing display and performative/interfacial garments. On one hand, display garments make wearables part of performance's digital environment, by broadcasting on their surface the performers' embodied conditions and environmental stimuli, or the audience's reactions, based on various programmed patterns. On the other hand, performative/interfacial garments operate based on a sensorial embodiment that senses the performers' bodies and actuates changes in the digital environment. Performative garments enable the 'wearing of space', performing real-time patterns based on embodied and environmental stimuli. [1]

Projects on the wearable space experiment with sensory technologies, and the connectivity between the wearers and their affective environments. For instance, Kozel and Schiphorst's project 'exhale' (2006) used sensors to capture the breath patterns of wearers, which were projected onto their wearables (self-to-self interaction) or onto those of other participants (self-to-other interactions) as vibrations and fans. The wearables were also able to capture the collective breathing patterns of a group of participants, translating them into visible or audible representations on wearables or other devices. [5]

Birringer and Danjoux (2009) stress that designing for the wearable space requires new perspectives that exceed 2D/3D design. Their research project 'design in motion' introduced a new design approach that fostered the development of wearables based on interdisciplinary practices that share elements from films, architecture, or dance; as well as digital art and interactive installations. The concept of design in motion springs from the "collaboration between choreographer, designer, digital artists, composers and engineers", and "focuses on the real-time relationship between the tactile performance experience of the garments and the projective visual and acoustic/sonic visual environment." [1, p. 98]

Fashionable wearables, and especially the wearable performance with its performative garments, have had a unique impact on digital performance; shifting the performers' external interaction with digital artefacts into an internal relationship that integrates wearable technologies as digital extensions of their bodies. This paper analyzes this impact based on the theory of remediation, providing a conceptual framework of the field by identifying three effects of fashionable wearables in digital performance.

Remediation of Digital Performance

The concept of remediation describes "how new media forms emerge from older ones," [7, p. 83] based on two opposing interface design strategies: 'the strategy of transparency' and 'the strategy of reflectivity'. Transparent interfaces deliver information to users with clarity, accuracy and efficiency, while reflective interfaces aim to generate an interactive and compelling experience. As no digital design can achieve pure transparency or reflectivity, all interfaces share both transparent and reflective elements. [7]

Digital performance reveals interface qualities, delivering information in terms of transparency and generating interactive experiences between the performers and the digital artefacts. In particular, digital artefacts, such as pre-designed forms or digital doubles, require effective transmission and display of data; while reflectivity shapes the ontology of digital performance as an interactive experience and integrates it with these digital artefacts. In general, digital performance emerges as an interactive interface that remediates non-interactive forms, exploring various forms of interactivity that drive the evolution of interactive digital performance.

However, wearable performance remediates further digital performance, introducing the performative interface that links the performers' senses, the stage's architecture, and, in some cases, the audience with real-time compositions on the wearable space. [1] [5] [7] The performative interface incorporates transparent characteristics, stressing the functional dimensions of the affective and sensing technologies that maintain effective communication between the inside and the outside, as well it demonstrating reflectivity as a responsive co-performance of performers and fashionable wearables in real-time. [1] [7]

In particular, the remediation from the interactive to the performative interface causes three particular effects: (1) re-embodiment, (2) digital bricolage, and (3) interdisciplinarity.

(1) RE-EMBODIMENT

Hansen [8] introduces embodiment, disembodiment and re-embodiment as three interrelated terms that describe the integration of the body with digital technologies. Embodiment is the process that enables the body to generate informational objects, such as images, space and events; disembodiment is the process that captures and transmits embodied data across different digital agents, transforming the body into a 'body-in-code;' [8] and re-embodiment is the "convergence of technology and the body that facilitates the extension of the body into other dimensions." [13, p. 77]

While embodiment and disembodiment are evident in interactive digital performance, such as in the cases of digital double or distributed choreography, the performative interface is only realized through re-embodiment, which considers fashionable wearables to be an indispensable digital extension of the performers' bodies. [13] Re-embodiment becomes the necessary condition for the generation of the wearable space that shapes the wearable performance's reflective experience. [8]

(2) DIGITAL BRICOLAGE

While bricolage derives from "the remixing, reconstructing, and reusing of separate artefacts, actions, ideas, signs, symbols, and styles in order to create new insights or meanings," [9, p. 70] digital bricolage of wearable performance exceeds the mere aesthetics and style of fashionable wearables, indicating design for the wearable space.

Digital bricolage indicates a new stream of digital experimentation in digital performance, as well as a process that invites performers and designers to interact with fashionable wearables in order to shape them as performative interfaces that demonstrate functional, aesthetic and performative qualities in the wearable space. [2] Digital bricolage requires a new combination of professions, skills and methods that remediate the creative process of digital performance; paving the way for new challenges, such as how to design for the wearable space.

(3) INTERDISCIPLINARITY

Interdisciplinarity is defined as cross-discipline integration and communication, aiming to produce context-specific knowledge through new structures and collaborations. [10] In fact, interdisciplinarity has been evident in digital performance since the 1960s, sharing skills and knowledge between the domains of art, engineering, and science; as well as important cultural organizations and academia. [6] In wearable performance, interdisciplinarity establishes new collaborations that integrate fashionable technologies and digital performance, mixing skills and practices in order to create the performative interface. [1]

Furthermore, the interdisciplinary integration of fashionable technologies and digital performance results in a mutual ontological impact between disciplines that affects their evolution. [10] Wearable performance represents the ontological impact of fashionable wearables on digital performance; while the introduction of the performative along with functionality and aesthetics comprises the ontological influence of digital performance on fashionable wearables.

Discussion

Fashionable wearables remediate interactive digital performance into wearables performance, resulting in significant effects on the creative practice. The wearable performance enables transparent qualities in terms of functionality and effective communication among the responsive network; while reflective qualities link the performer's senses and embodied conditions with the audibly and visibly perceived. Ultimately, wearable performance emerges as a novel mode of digital performance, as the performative interface remediates the interactive, effecting re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment remediates the performer's body, which is realized as a performative interface in mixed reality as flesh overlaps with digital technologies. [7] As fashionable wearables become the digital extension of human senses and the performer's body, re-embodiment enables the body to become an active digital agent shaping a visible, sonic or sensual experience that functions in terms of an affective network. [8] Re-embodiment results in a shift of focus of digital performance from the external interaction performer/digital artefact into the internal interaction of performer/wearable that transforms the body into an interface linking emotions and expressions to the wearable space.

Digital bricolage remediates the process of designing for the digital performance. Interactive digital performance seeks design principles that capture and display digital artefacts on stage, while integrating them with the performers' bodies. In contrast, wearable performance, through the process of digital bricolage, aims to design for the wearable space; and therefore seeks novel design practices that integrate different disciplines and methods, such as the concept of design in motion developed by Birringer and Danjoux (2009), which aims to create for the performative interface. [1]

Interdisciplinarity collaborations remediate digital performance as new structures which are formed to create for the wearable performance. By challenging the role of the choreographer as the artistic originator of digital performance, wearable performance introduces new roles, such as the fashionable wearables designer, which collectively compose digital performance. [6] Through the ontological effect of interdisciplinarity, [10] elements from other disciplines, such as digital art, are also expected to infuse digital performance.

Finally, the application of fashionable wearables in digital performance revisits the theory of remediation, and especially the notion of reflectivity as the only alternative to transparency. While the performative interface emerges as a form of enaction that exceeds the external character of reflectivity and interaction, re-embodiment merges the live with the digital in a state of mixed reality. [4] In particular, wearable performance demonstrates the performative that implies "a world in which subjects and objects have not yet come into being, and even if materialized, are always in a constant state of flux and transformation that is unstable and difficult to repeat." [6, p. xxvii] This notion of the performative emerges as a key element in the design of fashionable wearables in digital performance; at the same time challenging the theory of remediation by the introducing the performative as an alternative or more refined version of reflectivity.

Future Implications

Future implications can focus on the development of case studies of wearable performances, surveying diverse forms of remediations and performative interfaces. Springing from the new performative qualities of wearable performance, future studies can also focus on the intersection of fashionable wearables with other digital design fields, such as interactive architecture. An additional future implication can study the performative interface in real-life context beyond digital performance, capturing broader cultural implications of wearable technologies in contemporary life.

Conclusion

Fashionable wearables remediate digital performance, shifting from interactive digital performance that enables the performers' external interaction with digital artefacts to wearable performance that enacts the performers' internal interaction with wearable technologies on the wearable space. In particular, this remediation results in the emergence of the performative interface that causes three particular effects in digital performance: re-embodiment, digital bricolage and interdisciplinarity.

Re-embodiment generates wearable performance as a new type of digital performance that places the body and fashionable wearables as its indispensible extension, at the centre of all experience. Digital bricolage introduces new processes in the design of the performative interface, as the development of fashionable wearables becomes a new stream of digital experimentation for the wearable performance. Interdisciplinarity provides new structures of collaboration that integrate diverse professions, skills and methods.

Interdisciplinarity facilitates the ontological impact of the contributing disciplines. While wearable performance emerges as the ontological effect of fashionable wearables in digital performance, the performative is expected to infuse the development of fashionable wearables in addition to functionality and aesthetics, as a spin-off from the wearable performance. Finally, the study of wearable performance contributes to the theory of remediation, revealing the performative to be an alternative or more refined version of reflectivity.

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SOCIAL MEDIA AS ART AND VS ART

Manthos Santorineos & Stavroula Zoi

WWW space has always been an attractive space for artists, providing a virgin area for discovery. Gradually it was filled with shops, newspapers, maps, advertisements and became everyone's daily routine. Where does the artist stand in this situation? As visitors' animator through the social web? In the compromise in order to be included to a new populous and commercial Internet? Or in the exploration of virgin areas on the edge of the WWW?

Introduction: From the Heliocentric System of Copernicus to the Google Earth

The heliocentric system of Copernicus, in the16th century, modifies human thinking, by posing as a basic principle that neither the Earth, nor her Inhabitants are the center of the world. In the era of Google Earth, four centuries later, the system of the World Wide Web (WWW), by embracing (webbing) the Earth, overturns the established Copernican perception of the world. There is not one central system – as western culture defines it- but a grid of central and non-central systems, interconnected in a dynamic way.

It's a new image of the world, even more complex than modern physics' spatiotemporal views. Apart from time and space, it involves concepts such as information in the form of metadata, real time actions, dynamic files, and complex actions of human-machine combinations.

In the era of the "Google-Face-Booking Earth", it is necessary to reconsider the problems of globalization refreshing the arguments of the last decade. It would be interesting to consider the argument of Peter Sloterdijk about the historical perspective of globalization [1] and to reflect upon the new situation that is shaped by the wide participation of people in the Internet Galaxy, through the Social Web. This new situation could be related to the prospect of a new artistic or philosophical view of the world. This is the point of the emplacement of the artist and the question that rises is whether this new situation has been formulated from the artistic perspective.

The Real Space of Web

In order to develop our view on the matter, it would be useful to have a thorough study on the environment in which it unfolds, namely the WWW. It can be divided into five periods.

FIRST PERIOD: EXPLORERS, PIONEERS, ACTIVISTS

The WWW from its very first days has been an attractive space for artists. It provided a virgin area of unknown characteristics, dispensable to be discovered, with anticipated adventure and new opportunities, an area that had not been mapped, therefore an open space for a new beginning. Artists, professional pioneers as they are (or addicted to the avant-garde), found interesting the exploration of the new

world (wide web) and fascinating the ideas of the (virtual) terra incognita. To those familiar with technology as an expressive tool, it was the perfect place to develop their artistic, conceptual or social behavior. It was a place in which they believed that, they could inexpensively build their own ideas and to set their rules.

It is from the world of Art that the first name and description of this new space (the web space) was given. It is to literature that we owe the term "cyberspace" (William Gibson Neuromancer 1984). It is also literature that mystified the new space to an extent that the artists, youth, and people who like adventures, consider it as their own space.

The first inhabitants of cyberspace, originating from the world of art, as well as programmers who considered programming as creation, were characterized as web or (Inter)net artists, and shaped the web's initial form. Later came web designers, practicing an applied media art, related mostly with manipulated images, sounds and texts. The Web designers, drift from older techniques of design, tried to create an impressive picture, but soon the technological developments overcame the culture of printed materials: the internet was much more than a well-made layout surface.

SECOND PERIOD: THE RELOCATION OF THE COMMERCIAL REAL-WORLD ON THE INTERNET

Real explorers formed a community of cursed, adventurers, or romantic revolutionaries such as those of the 18 century, in the new American continent that formed the vacant and wild area in a utopian state. (The list of these people, artists, intellectual groups, various institutions… is too long to be fully mentioned.) Gradually the situation changed: Internet space was filled with shops, newspapers, yellow pages, maps, or even sexual or political advertisements. It became everyone's daily routine. But the evolution of the new land was not easy to stop there.

THIRD PERIOD: WEB FOR EVERYONE

The WWW was not for the few and elected. Just like photography, characterized with the advertisement of Kodak "You press the button, we do the rest", every user-visitor could have their own environment in the WWW by effectively utilizing the new features of the communication digital space, as Manuel Castel states in [2]. It is something that the media industry did not achieve since it used the WWW only as "information highways".

FOURTH PERIOD: PERSONAL MASS MEDIA

In the last decade we observe a crucial transformation of space, the details of which are of particular interest. The first tools for communication and people networking (the first generation social media like mailing list, forum, and chat) are transformed into powerful personal-mass media (facebook, youtube, myspace, etc). This new kind of media overcome the dynamics of information, as well as personal views and audiovisual content exchange, and approach the dynamics of large-scale decision making. From mass-media they turn into mass-opinion-leaders (for example, the revolutions in Egypt, Tunisia, Libya, etc, as well as the "movement of indignant" in Spain, Greece and other countries.)

FIFTH PERIOD: FROM THE NETWORK TO DIGITAL GROUND

There is another significant level of change beyond WWW: A new type of user is formed, which adds an extra dimension to the new environment. According to Malcolm McCulloch, [3] a Digital Ground is created and we live on it. In this way, the changes, apart from the structure and functioning of the WWW internal, impact also on its body.

From the «home» computer and internet «cafes», in other words from an architectural space in which the user must be physically present in order to use his/her digital extensions, we pass on to an extension of the user's body, connected to the Digital Ground (smart phones, gps, iPads, etc).

In order to accomplish this description it would be interesting to mention some of the results.

FIRST RESULT: THE WORK OF ART IN THE AGE OF ITS "DIGITAL" REPRODUCIBILITY

We refer to the field of the traditional industry of art and entertainment, subject to devastating consequences:

The public manages for its own self what it wants to hear and see, disseminate or collect: The "see and hear" becomes "download and upload". In other words, we observe a new industry of spectacles, which is shaped by its own base (the public) and is at its infancy: Musical vanguard influenced by technology, after the playback of 60s, the synthesizers of 70s, and the samplers of 80s, now with myspace and youtube, shifts from the creation to promotion, presentation and sharing of artworks. The aforementioned procedure does not stop to the collection of artworks from the internet, but to a special production: hybrid machines telephone-cameras, and cheap or hacked software programs of sound and image editing contribute to the development of a digital folk art. Young people, amateurs, pensioners, but also artists use the network for promoting their work. [4]

SECOND RESULT: THE WORLD OF DIGITAL GAMES

The field of digital games is a field under rapid development and affects the areas of entertainment, art, artistic education and further on the overall status of the artist.

Digital games industry is already ahead of film and music entertainment industry**.** Thus two important new situations emerge that will significantly affect, apart from many other things, the evolution of art itself: the first is a new generation of artists of media industry type (a creative team of writers, designers, artists - technicians, musicians, etc. that are all working on a project) with all its implications (development of schools, festivals, theoretical analysis, etc.). The second is the development of extremely powerful tools of low cost that literally reverse the technological structure of research and production (i.e. the kinect sensor of Xbox).

Social Web as Art and vs. Art

It has already been mentioned that artists from every field of art followed, experimented, and used the constantly evolving digital environment (WWW).

At the same time web users (amateurs, young people or students), succeeded in changing important parts of industrial art (music and audiovisual expression), concerning the distribution of artworks and the promotion of new talents.

But do the artists feel the need to redefine once again their status by exploring virgin areas that are situated on the edge of the Internet and social media?, or will they follow (as most people do) the demands of social web?

Hasn't the artist yet managed, as Velázquez in Las Menina, to capture the "fourth wall" and himself/herself in front of it and outside of his artwork?

The answers can't be impressive because the construction of the "fourth wall" at the new space, in other words the creation of an extra surface which may - at the same time - produce the image of the creator, open a dialogue for self-awareness, and present the artwork itself, has not been created yet. The creation of such an infrastructure is neither easy nor impressive.

However, has this WWW utilization produced something new for artistic expression or is it just supporting old existing forms? Are the artists pioneers inside this space or are they just following the needs of the market that push technological developments? What is the difference between the "digital" folk art developed by the public with very cheap equipment (e.g. a mobile phone with camera) and the professional artist? Is it sufficient to present experience as art in the intangible world? Is the Web a "side" space, that only assists artistic expression in the real space, or is it an autonomous space of artistic innovation?

Has the opportunity of the internet to be a common utopian homeland for artists - researchers been lost? Is it possible that the physical and national boundaries of the homeland of every artist or cultural center do not confine the freedom of the artist? Does the artist himself request for that freedom? There are only a few individual cases of artists who reacted in an activist way beyond boundaries.

The artist, his/her laboratory, or the artist's work is hosted by virtual spaces. But more often the same process is repeated.

The Next Step: Is It the Creation of Art, or Is It the Creation of a Special Space for the Artistic Creation?

The role of the WWW should not be restricted only in communication and information archiving, but it should also include information processing. To serve that purpose work of the artist on the WWW should not begin from the artwork itself, but from the environment and the structures that will host the artwork; it could be the contemporary laboratory of the digital artist. [5] In this way, the artist moves one step forward from the existing tools, creating the new tools for the new creation.

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COSMOPOLITANISM AND NARRATION: THE DIGITAL TALE

Viola Sarnelli

I will focus on a group of Arab female bloggers, questioning the notions of 'exile' and 'cosmopolitanism'. Bilingual, bi-cultural interpreters of their societies, these women are offereing their views on the ongoing Arab revolts to people living away. Thanks to a media environment easy to access and to personalize, they can become active members of a 'community of equals', gaining the space of expression they often lack in their societies.

I. Exile and cosmopolitanism

In *Reflections on Exile*, Edward Said makes a distinction between 'cosmopolitanism' and 'exile', between the "incurable loss of the exile" and cosmopolitan "romanticism" (1984: 175): "Paris may be a capital famous for cosmopolitan exiles, but it is also a city where unknown men and women have spent years of miserable loneliness: [...] the hopelessy large numbers, the compounded misery of 'undocumented' people suddenly lost, without a tellable history"(ibid: 176). At the same time, this distinction can be put in perspective when considering exile in its more private dimension. Speaking of the opposite and interconnected phenomena of exile and nationalism, Said claims that "… both terms include everything from the most collective of collective sentiments to the most private of private emotions, there is hardly language adequate for both. But there is certainly nothing about nationalism's public and all-inclusive ambitions that touches the core of the exile's predicament. Because exile, unlike nationalism, is fundamentally a discontinuous state of being"(ibid: 177).

Probably, one of the most interesting aspects of Said's perspective on exile is the emphasis on the possibilities provided by this "discontinuous state of being". Even if loss is never underestimated by Said, at the same time he recognizes in exile a possibility for strengthening individual skills, with an emphasis on mobility and the use of technologies of expression that allow both the individual and the community to share and transform memories: "Exile is not, after all, a matter of choice: you are born into it, or it happens to you. But, provided that the exile refuses to sit on the sidelines nursing a wound, there are things to be learned: he or she must cultivate a scrupulous (not indulgent or sulky) subjectivity" (ibid: 184). The subjectivity Said speaks about, is especially conscious of the fact that "Most people are principally aware of one culture, one setting, one home; exiles are aware of at least two, and this plurality of vision gives rise to an awareness of simultaneous dimensions" (ibid:186). This description seem to apply well to the life conditions of some female bloggers, who are constantly translating their personal/collective stories for an audience which is different in culture and language.

In *Strangers to Oneself,* Julia Kristeva argues that "Those who have never lost the slightest root seem to you unable to understand any word liable to temper their point of view […]. The ear is receptive to conflicts only if the body loses its footing" (1994: 17). What Kristeva describes seems to be close to the idea of solidarity, connecting different cosmopolitan communities, depicted by Jacques Derrida in On Cosmopolitanism and Forgiveness (2003). The communities that Derrida portrays are 'cities of refuge' that offer asylum to exiled writers; this idea is not so far from that of the cyber cosmopolitan communities offering visibility to men and women who are oppressed in their real societies:

"That, in effect, very much resembles a new cosmo-politics. We have undertaken to bring about the proclamation and institution of numerous and, above all, autonomous 'cities of refuge', each as independent from the other and from the state as possible, but, nevertheless, allied to each other according to forms of solidarity yet to be invented."(Derrida 2003: 4).

Both the 'cities of refuge' and the 'cyber citizens' can be considered as examples of different "imagined communities" - as Benedict Anderson defined the groups of people connected by "invented" forms of solidarity, that were at the basis of the birth of nation-states. These connections can rely on different kinds of media, used independently or simultaneously. Following the works of theorists such as Arjun Appadurai (1996) and Manuel Castells (1996), we can re-consider the condition of exile as a phenomenon that follows the planetary fluxes of images and information produced through the satellite and the web communication systems. On the one hand, we can consider the use of communicative platforms by immigrants and exiled people, that allows the mediated rebuilding of diasporic communities (Aksoy & Robins, 2006); on the other hand, some of these "imagined communities" develop new forms of social grouping and new identities (Giddens 1991), based on unconventional forms of social inclusion and exclusion.

II. Women and blogs in the MENA region

The use of blogs and social networks acquired a particular relevance in the countries undergoing political and social crisis, as for some of the Arab states. Recently, despite the persisting high levels of illiteracy and the difficult social and political position for female citizens in most of the Middle-Eastern/North African region, women seem to have played a central role both in participating to the protests in the streets and in narrating these events. Particularly through their personal blogs, they seem to have gained and managed a "technical and cultural control over external representations" (Brock, Kvasny & Hales, 2010) - representations that, in the specific cases of the region, are constructed by Western mainstream media.

Blogs have been interpreted as privileged spaces for the convergence of the private and the public sphere, "the means by which the 'feminine' voices, previously excluded from public discourse and kept hidden in the 'private' sphere, can now be released" in a public/politic environment (Kambouri & Hatzopoulos, 2007). Similarly, Fatema Mernissi (2005) describes the effects of the digitalization process in the MENA region:

"The key problem giving anxiety to elites and masses, to heads of states and street-vendors, to men and women in the Arab world today is the digital chaos induced by Information Technologies such as the internet and the satellite which has destroyed the*hudud*, the space frontier which divided the universe into a sheltered private arena where women and children were supposed to be protected, and a public one where adult males exercised their presumed problem-solving authority".

III. Blogs and narrations of war

During the past years, an increasingly high number of citizens have taken part in the collective narration of events of social/political relevance through blogs. In the case of the Iraq war, two of the most popular sources were the blogs of Salam Pax and Riverbend, a male and a female Iraqi citizen reporting, in English, the everyday implications of the U.S. invasion. Seven years later, the political revolts spreading from one country to another in the Arab region seem to acknowledge an even bigger role to the blogosphere and social networks, actively used by a huge number of citizens of different ages, gender and social conditions to promote revolutionary contents and to consolidate virtual communities, overcoming their oppressing regimes' control.

In this sense, blogs can be considered as pieces of postcolonial re-writings, that question the cultural and geographical centres, and especially the vertical structure of traditional media, making the hidden archives, that are part of our everyday life, visible.

Being spaces of questioning, these blogs often represent an alterity that cannot usually find place in the outside world; bloggers are often themselves a mixture of cultures and identities, acting as cultural mediators and interpreters – otherwise, as Salam Pax writes in one of his posts, "'Western' readers wouldn't get it, because it would be so out of their cultural sphere" (2003). They try to render the sufferance and anger, the horrible conditions of life of the populations they belong to, comprehensible; to make them emotionally and rationally understandable to people who belong to other cultures, through their mastering of the English language and their cosmopolitan education. Their position is often accompanied by a feeling of being a stranger and a betrayer in both cultures, experiencing the same tension of the 'exiled' person. Later in the same post, Salam Pax confesses:

"I feel like the embodiment of cultural betrayal. The total sell-out – and this is making me contradict myself all the time. [...] This is not the dialogue of equals we used to talk about. I keep making references to their – everything – because I am so swallowed up by it". [December 21, 2002].

Particularly in the case of the Arab female blogs, these digital diaries become the spaces where it is possible to negotiate the author's identity both inside and outside the political and social contexts. This happens thanks to the exchange with the readers - people from all over the world, mainly from Western countries - who become the loyal followers of these chronicles, giving the authors a well-defined role within the cosmopolitan public sphere. In order to allow the readers to identify with the experience of their everyday lives, each blogger choses a different strategy. Riverbend's blog, born in Iraq in 2003, is one of the best examples of a "domestic perspective" on the outside war. Here is one of her chronicles of the post-war period, implicitly underlining the fact that the Iraqi population consists of "normal" people living an absurd and nonsensical situation. provoking a kind of "It could be you" effect.:

"My mother stood anxiously by the open kitchen door, looking out at my father who was standing at the gate. E. and I ran outside to join him and watch the scene unfolding only 3 houses away. [...] I'll never forget that scene. She stood, 22 years old, shivering in the warm, black night. The sleeveless nightgown that hung just below her knees exposed trembling limbs- you got the sense that the troops were holding her by the arms because if they let go for just a moment, she would fall senseless to the ground. [...] It was the first time I had seen her hair… under normal circumstances, she wore a hijab. That moment I wanted to cry… to scream… to throw something at the chaos down the street. I could feel Reem's humiliation as she stood there, head hanging with shame - exposed to the world, in the middle of the night". [September 19, 2003]

For Riverbend, claiming that Iraqi civilians are "common, normal people" also means to defend the conditions that Iraq women apparently used to enjoy before the United States' invasion:

"I am female and Muslim. Before the occupation, I more or less dressed the way I wanted to. I lived in jeans and cotton pants and comfortable shirts. Now, I don't dare leave the house in pants. A long skirt and loose shirt (preferably with long sleeves) has become necessary. A girl wearing jeans risks being attacked, abducted or insulted by fundamentalists who have been… liberated!" [August 23, 2003]

IV. The 2011 Arab revolts seen through female blogs

In the case of female blogs that narrate the revolts in Egypt and Tunisia between January and March 2011, there seems to be a constant attempt to keep national and female issues together, sometimes with uncertain results. On her blog (justurhead.blogspot.com), the Egyptian Eman Hashim writes:

"I chose to look for the bigger picture, just neglecting women role in the constitution reforming committee, which included only men, as to put aside any battles that will distract us from the main bigger goal… The Revolution. But I think now is the time to say it loud: stating a constitutional amendment that will prevent women from the possibility of running for presidential elections is not and will not be accepted". [March 8, 2011]

In other occasions, the revolt seems to be an extraordinary occasion for allowing women to take part into the public life of their country for the first time. Bloggers can be found giving a patriotic nuance to the posts, as with Afrah Nasser, a young Yemenite journalist (afrahnasser.blogspot.com), now exiled in Sweden, who writes:

"Minutes ago, I was at a Men's rally where hundreds of thousands of Yemenis marched through Sana'a's streets. I marched with them. Keep in mind that Yemeni women never march with men for social, cultural and/or religious reasons, but I did it! It was an amazing feeling.. I had nothing but looks of respect and care from the men demonstrators. Long live my beloved people and my country!". [April 13, 2011]

These digital diaries are always made of different media, a personal bricolage of various means of expression - short movies, cartoons, literary pages - that contribute to the construction of another world, and the re-invention of the limited freedom of action that affects their lives. As Amira Al Hussaini summarizes on her blog homepage, provocatively called *Silly Bahraini Girl* (http://sillybahrainigirl.blogspot.com/):

"Silly Bahraini Girl is a blog for all of us - women blessed with a brain which ticks and a heart that throbs. A Bahraini girl is never silly but there are some factions out there who insist that we are not given our place in the society".

Even if most of these women denounce big limitations in female rights in their countries, they are well aware of their universal rights as cosmopolitan citizens. At the same time, their blogs are the platforms where to re-discuss the international representations of Arab societies. As Eman Al Nafjan explains in the "About" section of her blog, "There are so many non Arabs and non Saudis out there giving 'expert'

opinions on life and culture here, hence my blog. Get it straight from the source: Saudi, genetically wahabi and a woman" (http://saudiwoman.wordpress.com). Eman's objective, among many others, is to reach her reader directly, in order to negotiate those individual and collective representations she considers to be inaccurate. Her readers seem to be thankful for this approach, as demonstrated by many comments on her blog:

"It's intriguing to see what life is like in other parts of the world that are so different from mine. In America we have such pre-conceived ideas about other nations and their people that we get from our media. Most people believe it as truth and never take it upon themselves to discover the truth for themselves. Yes, there are differences. But not all differences are bad. We are all people. We all laugh, cry, hope, dream, breathe, love, die. We just do it differently" . [*loisanne67*, February 24, 2010]

In the central days of the revolts, the blog's task was to spread the 'revolutionary' view of the political situation, and to overcome the barriers of language. As it emerges in this exchange of opinions on the blog of the Yemenite Afrah Nasser, when answering one of her readers:

Nadia said...
The world is indeed thirsty to hear from Arab youth because most information available is in Arabic. For example, without blogs like yours how else would they know what's going on in Yemen?

Afrah Nasser said...
Nadia, my dear sis, I agree with what you mentioned. We have to tell our countries' stories in all languages so harmony could exist! [May 19, 2011]

Such a truly, even if simplified, cosmopolitan view of the world politics gives a pivotal role to new media. This role is also of direct witnessing for the ones who are unable to participate to the events. We can see it in the comments to a post of *A Tunisian Girl*, the blog by the political activist Lina Ben Mhenni (atunisiangirl.blogspot.com):

"I'm another Tunisian citizen of the world livin in France. We are so proud of you here and in so many other places... we just have to look at Egypt! But we're also so scared for you too, and so frustrated not to be there with you all right now, in Tunisia! [...]You have already proved that we can fight for freedom! And gain it! [...] And your precious posts are here to tell! You, our eye-witness, and even ear-witness! I know. You among others. You, a Tunisian girl, among others. You are not alone! [*Anonyme*, January 29, 2011]

There is a final element that unifies the narration of these women, a kind of temporal displacement, the fact they often offer a view of the present from the perspective of the past. The Syrian blogger Mariyah (mariyahsblog.com) on February 2, 2011, comments on the revolts in Egypt with a long quotation from Khalil Gibran, and publishes episodes of a novel based on her parents' story. The Egyptian Zeinobia (egyptianchronicles.blogspot.com) describes herself in the "About" section of her blog with these words: "I am just an Egyptian girl who lives in the present with the glories of the past and hopes in a better future for herself and for her country". The need to connect the present with the past, and the will to regain possession of this past in the contemporary Arab societies, has been stressed by Fatema Mernissi (2005) when she speaks of the state rulers' despotic attitude to the access to museums and to other art institutions. "It is this despotic appropriation of the past and all innovative domains from arts to domestic crafts by the rulers which explains why the issue of museums and time navigation are such sensitive

topics in the Arab media today" (Mernissi 2005, personal website). In the same online article, you can find her intense warning:

"The challenge for the intellectuals is to help rulers to equip the youth to surf responsibly on the internet by inventing futuristic solutions which equip them to navigate not in space only but also in time. Mastering time is the secret of graceful navigation in a globalized planet where meeting strangers daily is the only way to make a living. To travel in the past, that is to navigate in time, is the best way to teach oneself tolerance, and respect for diversity".

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FUTURE MASTER CRAFTSMANSHIP: WHERE WE WANT ELECTRONIC TEXTILE CRAFTS TO GO

Mika Satomi & Hannah Perner-Wilson

Craft, both as process and resulting artifact, implies notions of care, foresight, human skill and investment. In this paper we examine the practice of creating E-Textiles as a contemporary craft, and we ask ourselves what will become of this craft when the first fully automated machine for E-Textiles production hits the market. Will the craft in E-Textiles survive, and why do we care that it does?

Figure 1: screenshot from 'How To Get What You Want' (www.howtogetwhatyouwant.at) online database.

Figure 2: workshop participants discussing over their textile circuit design. (photo: Mika Satomi).

Figure 3: Summer Camp participants collaborating on their embroidery circuit project. (photo: Hannah Perner-Wilson).

INTRODUCTION

Researchers, engineers, educators, artists and designers combine electronics and textiles for different reasons, to produce seamlessly integrated artifacts known as E-Textiles. While E-Textiles are produced for different reasons, the individuals involved in the process of making them, all benefit from exercising E-Textiles as a craft.

Researchers and engineers are looking to make electronics smaller, more flexible, stretchable and washable. Finding reliable and durable ways of creating electronic textiles is one of the most immediate research goals in their field. [1] Educators are introducing E-Textiles into the classroom as a means of situating electronics and computation in new, attractive and more accessible contexts. [2] Designers are conceiving garments, accessories and furniture upholstery that incorporate sensors, actuators and computational power into soft, comfortable, wearable experiences in order to demonstrate the possibilities of future textile technologies. [3] Artists are producing work that combines electronics and textiles as an expressive medium, often using E-Textiles as a vehicle for other content. [4] [5] [6]

While their motivations and goals my be different, craftsmanship is exercised throughout all of these disciplines. The researcher, the engineer, the educator, the artist and the designer are all capable of creating work in their field with attention to the craft quality of their work. As we continue to talk about E-Textile craftsmanship, we are not referring to a specific discipline or application, instead we refer to the skilled craft of individuals experienced in the use of the materials and tools involved.

THE CRAFT IN E-TEXTILES

We consider E-Textiles to be a contemporary craft, not only because it combines novel materials, tools and techniques with those traditionally associated with crafts. The process of creating functional, reli-

able and aesthetically pleasing E-Textile results, also relies heavily on the manual skill and technical expertise of the maker. It is a risky process, full of opportunity for innovative solutions and new inventions. It fits David Pye's description of workmanship of risk [7] - one of the defining notions of what constitutes craftsmanship.

"(I shall say as a first approximation that) it (craftsmanship) means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgement, dexterity and care which the maker exercises as he works." [7]

In David Pye's terms, we can think of craftsmanship as a process of making, in which the quality of the result is continually at risk. When we use the term craft, it does not exclude the use of hand operated machines. Craft does not mean made by hand, without tools or technology. It means made with care, with foresight, with skill and involvement. Drawing with Computer Aided Design (CAD) systems or programing computers can be also considered craft, as long as they involves human skill and judgement in their process. The balance between the difficulty of the required task and the skill one possesses determines the size of a risk. The bigger the risk you take, the bigger the accomplishment and the greater the feeling of reward.

"Craftsmanship names enduring, basic human impulse, the desire to do a job well for its own sake." [8]

By calling E-Textiles a contemporary craft we don't want to take anything away from existing and traditional definitions, rather we want to add a contemporary notion of craft as an interdisciplinary practice, producing cutting edge artifacts, use of novel materials and high-end technologies. The results of this contemporary craft process are unique and novel artifacts, they are inventions, innovations, artworks and personal accomplishments. While some of these artifacts remain strictly decorative, others fulfill specific purposes. Craftsmanship itself is not an indicator of good research, engineering, education, design or art, it can be applied and appreciated for its own sake. As automated production processes become capable of doing what we currently craft, the question presents itself: what will happen to the craftsmanship in E-Textiles?

WHO ARE WE, AND WHY DO WE CARE

Now that we have established E-Textiles as a contemporary craft, we want to introduce ourselves as E-Textiles craftspeople. We are individuals from different disciplines who have a stake in the craftsmanship associated with E-Textiles.

Currently, production of textile circuitry relies heavily on skilled work, mostly executed by hand and semi-automated machines, simply because automated manufacturing methods for combining textiles and electronics do not yet exist. As the field develops and demand for mass-produced soft, textile and wearable technologies increases, it will not be long before the processes that currently involve human skill, can be replicated by automated machines.

If the industrial revolution defined craft from industry, [9] maybe we are now in a position to launch the "craft revolution," in which we seize the opportunity to situate our practice as contemporary and progressive, adjectives not normally associated with craft. Progress is a big word, that often seems to stand between industrial production and craft, and is one of the first things that needs to change in this craft

revolution we envision. Progress does not imply quantity as much as it implies quality. Quality, individuality, uniqueness, are becoming important social values, as movements such as slow food, slow life and DIY practices demonstrate. [10] [11]

Production, formally known as craft, was swallowed by the industrial revolution, and craft became known as non-industrial production. But there is no real reason why craft has to exist as a counter movement to industry. It is not simply nostalgia for the rewarding feeling of a job well done, we also believe that our mode of production and work ethos offers benefits that industry can't, or doesn't care to.

The existence of automated machinery, that replicates craft processes, will not stop us from doing what we do, because we do it for different reasons. And yet, particularly at this point in time, it is a good question to ask: how would we like our practice to continue, once industrial automation kicks in? Will we become E-Texiles grandmothers, sewing LEDs onto t-shirts for our grandchildren while industry produces them in bulk? Will our grandchildren think of our creations as un-cool because they are crafted?

Our answer is that we would like to continue practicing our craft for many of the reasons people continue to practice it today, but to emphasize the potential for innovation and novelty, associated with a workmanship that is risky and geared towards quality. When our skills become devalued because machines can produce work faster, cheaper and "better", we will still enjoy the craft process. But instead of sitting back to become E-Textile grandmothers, perhaps competition from the automated machines will encourage us to move on. In accepting this challenge, as future master craftspeople, our aim is not to re-invent craft, but rather to re-invent ourselves as future master craftspeople. By talking openly and critically we hope to continuously find ways in which our practice can seek to express the advantages of man over machine.

In the remainder of this paper we discuss conventions, traditions and practices within the field of E-Textiles that support the kind of future craftsmanship we seek.

WHERE TO GO FROM HERE

In June 2011, The Swedish School of Textiles organized a week-long E-Textile summer camp with the theme of 'Future E-Textiles Master Craftsmanship.' [12] Eighteen practitioners from the field attended the camp, and actively participated in discussions, skill-shares and group projects. The camp was a platform for discussion about our current practice and about how we want to continue practicing our craft. We were concerned about finding ways of portraying and communicating our trade, that don't just focus on the common traits associated with craft, but also show a side to our practice that is interdisciplinary and tech-savvy.

From discussions that took place during the summer camp, and from our own experiences, we distilled a list of three core aspects, that we believe are key to supporting the kind of future craft practice we are aiming for:

1. Learning: acquire new skills, both knowledge (explicit) and know-how (tacit)
2. Community: engage with others, both online and offline
3. Exposure: share your results and study other people's skilled work

LEARNING

E-Textile practices involve both explicit and tacit knowledge. For example, circuit schematics or weaving patterns embody explicit knowledge, while learning how to solder and operate a weaving loom require tacit knowledge that comes from practice and experience.

When mastering one discipline, you need to learn both the explicit and tacit knowledge of the field. In E-Textiles practices, because of its interdisciplinary character, the practitioners are required to know multiple disciplines' both the explicit and the tacit knowledge. Often, one has to learn it outside of one's expertise. Currently many practitioners obtain this knowledge from books, online documentation or by attending educational courses and workshops.

E-Textiles itself is also producing its own knowledge, for example weaving Electro-Luminescent wire (EL-wire) into textiles, requires explicit knowledge of circuitry connections within woven structures, as well as tacit knowledge on how to choose the thread tensions when weaving the EL wire.

Example: How To Get What You Want

Since 2009 we have been documenting the materials, tools and techniques we use in our practice on our website titled 'How To Get What You Want.' [13] The site contains information regarding techniques for making sensors, actuators and a variety of circuitry, from conductive textiles. Most of these techniques are introduced with step by step tutorials that include a movie to best demonstrate the outcome of the application. The site follows the Open Source Hardware [14] definition, allowing people to freely use and modify our designs, as well as produce and publish new designs based on our work. Circuit schematics, source code and fabric patterns are made available for download in common file formats. The vendors of the materials used in our creations are also documented on our site, so that others can purchase the resources that they will need to replicate our designs.This database is not meant to be an encyclopedia of E-Textiles techniques, but rather a documentation of our trade, and one of the ways we pass on our knowledge.

COMMUNITY

Many practitioners in the field of E-textiles participate in the DIY community, by documenting their techniques online on various platforms such as Instructables [15] and Ravelry, [16] but also on their own blogs and websites. Some practitioners hold workshops or teach at educational institutes. These workshops and face-to-face meet-ups encourage collaborative learning and working models, fostering an attitude that thrives on sharing knowledge and skills openly. Physical meetings also foster discussions and healthy critiques of work, something which the anonymity of the Internet often lacks. DIY (Do-It-Yourself) or DIWO (Do-It-With-Others) communities serve as a platforms for exchanging both explicit and implicit tacit knowledge, motivating creative processes and encouraging collaborative work.

Example: Workshops

Since 2008 we have held over 20 workshops in many countries, hosting between 5 to 20 participants each time. The participants' background is various, from electronics beginner to experienced engineer to trained seamstress. During the workshops, we demonstrate or display our own technique on E-Textiles.

Participants are then asked to create their own projects using the introduced materials and techniques. Often these techniques are modified for their skills and applications creats new versions of it. These workshops provides a chance for participants to physically observe the processes and results that they can see in the online documentations. It is also an opportunity for them to get in touch with actual materials as well as with people with similar interests, serving as a place to start local communities among practitioners.

Example: Summer Camp

The E-Textiles Summer Camp gathered experts in the field to share and collaborate in intermediate-expert level. Participants were asked to share skills through hands-on workshops in which individuals shared E-Textiles techniques that they had developed and refined. The camp ended with a day of intense project work, in which participants split into groups based on their areas of expertise and interests (textiles, performance, craft...) to very rapidly brainstorm and realize a project that communicated some of the ideas discussed during the week. These discussions included questions of online vs. off-line documentation and community, open source issues, the level of expertise skills in collaborative works, finding ways to establish a community based on physical practice among distanced practitioners, ideas for new kinds of apprenticeships. Much was discussed and learned in this week and we hope to continue to organize similar opportunities for exchange in future.

EXPOSURE

Exposing ourselves to others work, by visiting exhibitions, fairs and conferences gives us a chance to study other people's skills and trades. Since E-Textile craft productions are most frequently shared and showcased online, there is very little opportunity for practitioners to study each other's work up-close and in real. Because of this, it is hard to establish a feeling for quality. By observing others work, as well as your own, we as craftspeople need to negotiate standards and nourish the skill to judge and distinguish 'good work'. The 'ability to judge' is crucial to developing critical standards for one's own practice.

Craftspeople in Medieval times traveled around during their apprenticeship called "journey man" to learn skills outside of their local community. Artist-in-residence programs allow practitioners to travel and collaborate with local communities. We could consider this as a modern apprenticeship model.

CONCLUSION

E-Textiles is a contemporary craft practiced across many disciplines. As E-Textiles craftspeople we envision that this craft will continue, even when automated machines are able to reproduce our work. We seek a "craft revolution", which associates craft with words such as progress, innovation and inventivenes. In this future society, we will create work that continues to be unique and rely on our individual skills, our human abilities to think independently and to care about and enjoy life.

To maintain the relevance of E-Textiles, passing on one's knowledge and trade, engaging with others, exchanging ideas and exposing yourself to the work of others is necessary. We need to keep our practice alive, but also insure that it grows to meet future challenges, that is why we talk about "future master craftspeople."

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THE MAGNETIC FIELD OF AUDIOVISUAL ART PRACTICES

Nermin Saybasili

The paper proposes the term *magnetic* - which I have coined - as an implement that invites us to re-think the artwork beyond its material presence and actual signification in digital culture. The discussion in the paper will be centred on the idea that audiovisual artwork can behave like a magnet by either pulling things and people towards itself as well as to each other or pushing them apart.

The digitally mediated world is a gigantic magnet that either pulls things and people towards each other or pushes them apart as an organising force within its magnetic field. In his book *Me++: The Cyborg Self and the Networked City*, William J. Mitchell points out that in the networked culture of the global world, neither our environments nor our bodies consist of single or contiguous enclosures. Rather they have become increasingly fragmented and dispersed. [1] If the world operates as a magnet for centralization, regulation and control, then the task for critics is to map or, even better, in a sense, to electrify other forces operating within dominant forces that generate social pressures. From this perspective, the paper proposes the term 'magnetic' —which I have coined— that is an implement inviting us to re-think audio-visual artwork as alternative electric currents and thus attract alternative forms of flows through mobility and/or social connectedness. Dealing with the element of voice and sound in installation works, I will argue that audiovisual artwork can behave like a magnet involving the mapping of the invisible, the temporal, the detachable, the connectible, the reversible, and the modifiable. By giving examples from certain pieces by visual and audio artists, I will focus on the magnetized and the magnetizable voice that awaits a place to attach to while acting and producing events by itself.

The Magnetic Voice

In the age of digital culture, artists develop a digital aesthetics that a certain shift happens from the eyes to the ears through the use of sound and voice opening up a new channel of sensation. Jacques Rancière puts sensation at the centre of artistic field. Rancière argues that what the artist does is to weave to-gether a new sensory fabric by wresting percepts and affects from the perceptions and affections that make up the fabric of ordinary experience. This task is political. He speaks of the community of sensa-tion which equating the 'individual' production of art with the sensory fabric of collective life. Sense here refers to both five senses and the sensual. Rancière defines this community an 'aesthetic commu-nity', a 'community of sense' that contains a certain combination of sense data: forms, words, spaces, rhythms and so on. [2] In relation to the use of voice in installations, I call this certain combination 'the magnetic.'

In our times, art is mostly produced and distributed digitally, and magnetism is inherent in digital cul-ture. The artists do not only use digital technologies as a tool for the creation of traditional art objects, such as photograph, print, music, film and so on, but they employ these technologies as its very own medium, being produced, stored, and presented exclusively in the digital format and making use of its interactive features. As being the force of attraction or repulsion that acts at a distance, magnetism is due to a magnetic field which is caused by moving electrically charged particles such as a magnet. In-spired by this operational mode of digital technologies, I aim to interrogate audiovisual art practices that exhibits strong magnetic field. Through the act of listening as well as looking, an audio-visual artwork

can take shape or function as being inclined toward affect and not just towards perceived meaning, content, logos or truth. It can offer an aesthetic experience that facilitates a form of consciousness, an intensity of feeling, an energy for action. The digital voice can produce an aesthetic effect which stands apart from the referential or informational function of language. Voice is there for expression, as Mladen Dolar, a voice theorist points out:

expression versus meaning, expression beyond meaning, expression which is more than meaning, yet expression which functions only in tension with meaning, for it needs the signifier as the limit to transcend and to reveal its beyond. [3]

Hearing a voice and listening to it marks the moment of which it starts to operate as magnet therefore facilitating events and situations, introducing dis/connections, mobilizing bodies, and appealing to senses.

Speaking in visual terms, the recognition of forms is precise. However, sound and voice complicates the vision. Not being subordinated itself to the vision, voice becomes another object in the installation or another element in the video. Dolar points out a major difference between the visible and the audible:

The visible world presents relative stability, permanence, distinctiveness, and a location at a distance; the audible presents fluidity, passing, a certain inchoate, amorphous character, and a lack of distance. Voice is elusive, always changing, becoming, elapsing, with unclear contours, as opposed to the permanence, solidity, durability of the seen. [4]

Voice is on the site of event, not of fixity of things or the visibility of beings. It is magnetic. By its nature, voice knows neither interior nor exterior. It is a heavy task to keep the voice at distant. One is constantly exposed, no distance can be maintained to it.

In his book *Audio-Vision: Sound on Screen*, Michel Chion uses the term 'magnetization' in order to discuss the ways in which the filmic image 'magnetizes' sound in the space. By 'magnetization', Chion means mental spatialization, that is the psychological process (in monaural film viewing) of locating a sound's source in the space of the image, no matter what the real point of origin of the sound in the viewing space is. [5] He explains his point by giving some examples:

… if under particular screening conditions the loudspeaker is not located behind the screen, but placed somewhere else in the auditorium or in an outdoor setting (e.g., at the drive-in), or if the soundtrack resonates in our head by means of earphones (watching a movie on an airplane), these sounds will be perceived no less as coming from the screen, in spite of the evidence our own senses. [6]

Chion further argues that sound coming from another point than the screen is 'magnetizable' only if the sound itself maintains a basic spatial stability. If it constantly moves back and forth among loudspeakers, the image will have a harder time absorbing it, and the sound takes on a centrifugal force of its own that resists visual 'attraction.' [7]

A sound-installation can produce spatial magnetization on its own, free from the image or vision as formulated by Chion. The magnetic field is also a topography that is invisible, but responsible for the most notable property of a magnet. Ayse Erkmen's nine-channel sound installation *Ghost* (2010) which was exhibited in Thyssen-Bornemisza Art Contemporary in Vienna is a journey into magnetizing situations

and their electrified effects in a very particular way. The exhibition building was formerly known as the Palais Erdödy Fürstenberg and located in Vienna's first district where Ludwig van Beethoven spent a few months in 1806. Beethoven dedicated a number of works to Countess Anna Maria Erdödy, including the musical New Year's greeting *Glück, Glück zum neuen Jahr*(1819), whose ancestor owned the palace in 1714 and had it expanded in the following years. Besides a web of speculations about the relationship between Beethoven and the countess, Erkmen dealt with the rumor that the ghost of a young girl lives at the palace. Thus she re-composed the *Glück, Glück zum neuen Jahr* for a single voice, a soprano. In the sound installation, the singing voice of the soprano could be heard from nine speakers installed at the illuminated ceiling of the palace room. The singing voice coming from nine different speakers had a magnetic presence and a magnetized affect. This is partly because this had a bodiless voice, an 'acous-matic' voice, to put it in Michael Chion's words. There was nothing to look in the bright gallery room ex-cept the speakers and light bulbs, but certainly there was something to listen. Being neither inside nor outside the voice of the soprano distributed in all nine speakers behaves like separate magnets each wandering around the room seeking a place to settle. *Ghost* stretches the relationship of voice to a cer-tain place and bodies. Enveloping the empty gallery room, the singing voices urged the audiences to move across the space to engage with immaterial histories, intangible realities, hidden places, specula-tive facts, lost stories, and repressed presences. By reducing the many-voices cannon to a single soprano voice and diffusing the musical fragment in the nine-channel speaker system, Erkmen introduced an original dispersion to the gallery space. Sound environment magnetized its visitors, their bodies, their senses and their minds. The ear of the audience detected the depth from a sound blend producing a sonic perspective. *Ghost* therefore led its audiences to move through its stark yet dense soundscapes. As Sean Cubitt has written:

… sound … must be approached, walked into, penetrated, and, in walking into it, as your body subtly moulds the acoustic around it, the sound will penetrate you. …an open soundscape is a world in which others exist as well as yourself. [8]

In a sound environment, we cannot perceive like that of the visual field of perception. In *Ghost* the audi-ence inevitably oscillated between one visualized situation and the other sensed one, between what we can see and what we can listen and feel. An 'aesthetic community' emerges as the installation creates its own auditory public culture of the digital. *Ghost* has required the 'performative act' of listening as well as looking, it has created its own audiences who are urged to engage with a relationship of power and possession, to participate in lodging crucial knowledge, to transmit this, to manufacture public opinion, and to re-compose the cultural material obtained in private ownership for the general public in the age of digital culture.

Installation as an sonorous event that lasted leaves us with a crucial question: "Is it possible to retain the voice in the age of digitalization?" The technology of voice recording and reproduction surely makes possible to capture the voice. However the voice has never been just a pledge of presence, but rather an indicator of an impossible presence where the claim for authenticity or uniqueness becomes impossi-ble.

Sound Object

Once Gilles Deleuze has remarked upon the fact that "the machine is always social before it is technical. There is always a social machine which selects or assigns the technical elements used." [9] Following this thought, we can suggest that digital technology is a product of digital culture, not the other way around.

This means that our digital worlds encompass the ways of thinking and doing that are embodied within that technology. This involves how we interact to produce that culture. In this context, 'the magnetic' refers to a particular connection between art and politics in the age of digital culture. In our times, visual artists use digital technologies to insert themselves into the network of social divisions, hierarchies and obligations in order to produce a counter culture of digitality. Amongst many, one of the strategies is to develop the politics of voice.

In January 1985, the General Directorate of the Turkish State Radio and Television Corporation (TRT) banned the use of 205 words on TV and radio broadcasts on the grounds that they did not comply with the general structure of the Turkish language. As the only broadcast institution both television and radio programmes were under the monopoly of TRT. In collaboration with MC Fuat, hip hop singer and song-writer, Asli Cavusoglu made a song entitled *191/205* (2010) by using 191 banned words found in TRT archives and newspapers. In the installation work with the same title, Asli Cavusoglu invited audiences to play this record in a gallery context. Through the mode of appropriation, old associations have been replaced with new meanings. Singing voice does not act as law or speak in the language of the logos or the power, as written by Paul D. Miller, aka DJ Spooky that Subliminal Kid, "languages evolve and learn to speak in new forms, new thoughts.' [10]

TRT General Director Tunca Toskay explained the motives behind the order in an interview with Hürriyet Newspaper on 30 January 1985 in these words: "Our aim is to prevent lingual division" and "to take the language used in the constitution as reference." The real aim was to erase the words mostly attached to the leftist thought and politics in favor of the right-wing nationalistic world view. Toskay's words reflect upon the policy of shaping people's taste with a paternalist approach and the hidden agenda of making the citizens apolitical systematically carried out after the military coup of 1980. The order mostly banned modern Turkish words and replaced them with words of Arabic and Persian origin. [11] Repealed within few months, the censorship was directly linked to the processes of social engineering and State repression.

Pitting the voice against the master signifiers, indeed that of the names of the father, *191/205* engages us with remix and DJ culture. The narrative structure in the song lyrics and the singing voice magnetizes memories of the past in order to give a counter-response to the present social, cultural, political and economical situations in the country as well as in the world such as racism, civil wars, unemployment, etc. The voice in the song pinpoints a dichotomy of the voice and the signifier. Signifier is that in language which can be replicated and thus enables speech. It is in that language which can be linguistically classified, pinned down and dissected into a web of differences. But the voice cannot necessarily contribute to signification. The signifier can be stained by the voice who speaks, who uses the language. [12] According to Dolar voice is always a sound object, not merely the bearer of signification. This is where the effort of poetry lies. He writes:

The signifier has a double nature: apart from its differential, signifying, sense-making properties it also produces erratic sound echoes, reverberations, sound contagions, similarities, the stuff that can be put to use in repetitions, rhythms and rhymes, the stuff that can unexpectedly produce another meaning, inside of what makes sense, signification beyond signification, although both are inextricably tied together. [13]

As an installation in the form of a music set, *191/205* is destined to wait for its performer. As Nicolas Bourriaud points out "the contemporary work of art does not position itself as the termination point of the 'creative process' (a 'finished product' to be contemplated) but as a site of navigation, a portal, a

generator of activities." [14] Similarly, emerging as a social form through participation, *191/205* maps out a magnetic field of its own.

<div style="background-color: #5bc5d8; color: white; padding: 5px;">The Acts of Voice</div>

The term 'magnetic' refers to a particular sort of potentiality that an audio-visual artwork can carry in itself. This potentiality refers to the co-existence of 'mobile elements' (objects, bodies, sounds, voices) that operate like magnets so as to produce a plural form and thus require another kind of material practice and spectator/listener.

Giorgio Agamben argues that in modern world societies have lost their gestures under the action of invisible powers. According to Agamben, art should belong to the realm of ethics and politics and not simply to that of aesthetics. [15] The philosopher inscribes gesture into the sphere of action clearly setting it apart from acting and making. "What characterizes gesture is that," writes Agamben, "in it nothing is being produced or acted, but rather something is being endured and supported." [16] Agamben therefore distinguishes gesture from representation that contains a sphere of means as addressing a goal and from a separate and superior sphere of gesture as a movement that has its end in itself. Instead Agamben points out that

[t]he gesture is the exhibition of a mediality: it is the process of making a means visible as such. It allows the emergence of the being-in-a-medium of human beings and thus it opens the ethical dimension for them. [17]

Elements in an audio-visual artwork can arrange themselves in a gesture. I am interested in the use of voices in artworks that exhibits gesture and not image. Voice is not simply ephemeral. It can act, it can produce effects in the world and for the world.

Istanbul-Amsterdam Audio Tour, a sound art project, inscribes itself into the city of Istanbul as it was relayed to human beings in gestures. Utilizing the medium of audio guide or guided tour, *Istanbul-Amsterdam Audio Tour* made the voice record not just a signifier, but an act. The audience put on the headphones and listened to the voice narrating, giving information or instructions on certain sites or buildings in the city. An act of listening facilitates a sound walk which is magnetic. *Ticket to Amsterdam* (2010) for instance was a 50-minute sonic journey over the waters of the Bosphorus by the sound artist Justin Bennett and theatre maker Renate Zentschnig. The artists invited its audience to use the inner-city ferry during the tour to create an analogy between the Bosphorus of Istanbul and the IJ river of Amsterdam. According to the instructions given by the voice of the guide, The Turkish and Dutch Leyla Cimen, the audience started the journey by taking the ferry in Karakoy and ended up somehow in Amsterdam. Cimen made links, contrasts and similarities between the two cities, and the audience listened to her interviewing Amsterdammers and Istanbulites commuting from one side to the other on a daily basis. After landing again at Karakoy the audience as performer had the chance to be a sonic tourist as s/he wanders along the streets of Amsterdam even though her/his body was in Istanbul and s/he walks on the streets of Karakoy. *Ticket to Amsterdam* aims at facilitating experiences, experiences that different from the ordinary, from the imposed, from the habitual.

I read *Istanbul-Amsterdam Audio Tour* as an interrogation in the field of the 'magnetic city', a mapping of magnetizing situations and their electrified effects. The 'magnetic' of which I am speaking is about shifting from space to place and from permanent to temporal through mobile elements that operate like

magnets. A digital record came into existence as sonic as well as visual and tangible events through different elements and various scales relating to or produced by the magnetism. Sound moves the mass of the body and is moved forward with it. As written by Sean Cubitt, "sound enters space not to imitate sculpture or architecture, but, through electronic webs, to weave a geographic art." [18] The 'magnetic' city is not a space for architecture, but a place for people. It is an intensive soundscape and geography made of multiple spaces generated by voices and bodies. Consequently, it moves with the activities that define it. The voice comes from some invisible interior brings out more than one would intend. The audience had the power to decide over the fate of the voice, its effect. The listener as walker could rule over its meaning, or turn a deaf ear. The digital voice took place magnetically.

To conclude, the use of digital voice in contemporary artworks offers an understanding of looking and listening as central to the process of inventive and creative interpretation of and the participation of the world in the age of digitalization.

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THE INTERACTIVE AND IMMERSIVE EXPERIENCES SHAPE THE NEW ARCHITECTURAL LANGUAGE

Teresita Scalco

This paper underlines how the hybrid relationships established among 3D and interactive installations offer sensorial explorations for a better understanding of architecture and the public space, by illustrating the works 'If building could talk…' by Wim Wenders and 'Sandbox' by Rafael Lozano-Hemmer.

Rafael Lozano Hemmer, Sandbox, Relational architecture 17, 2010. Glow Festival, santa Monica, USA. Photo by Antimodular Research.

"Freedom is participation." _Giorgio Gaber

In recent years, many artists, filmmakers and designers have studied the alliance between art, society and audience by employing new media and technology as innovative tools to rethink the use of public space and to reinvent new opportunities for experiencing and for a better understanding. Reflections on the idea of space and its collective awareness, that we have of it, can come from the contribution within the architectural research by exploring it with artistic and cinematographic languages and how they shape their narrative and the overcoming experience that we can live by walking through the artworks or installations that requires our active immersion with it. [1] This paper based on an ongoing research, started with the workshop in Exhibit Design, held at the Università Iuav di Venezia, aims to articulate how the embodiment of the interactive projections and 3D technologies enable artists, such as Rafael Lozano-Hemmer, to broadcast the environment we are living in a participatory way and film makers, such as Wim Wenders, to set new vision for architectural and landscapes scenes in exhibition space.

Often we forget that the exhibition space, such the Biennale, is more a laboratory, rather than a simple display, where interdisciplinary experiments can take place. In 2010 Kazumo Sejima, the Japanese director of the 12th International Architecture Exhibition 'People meet in architecture' of the Biennale in

Venice, invited Wim Wenders to interpreted her lyric building the Rolex Learning Center of the Ecole Polytechnique Fédérale in Lausanne (Switzerland) for the exhibition space at the Arsenale. For the German director the primary issue was to convey the strong feeling of the building, which perfectly resonates with the surrounding landscape, and secondly capture the openness and the sense of 'infinitum' of the center. So he found amusing the idea of experimenting 3D technology in an immersive installation, titled 'If building could talk…', in order to give the viewer the impression of being into the screen and to live the architectural experience of walking in it. [2] [3]

But in fact the building talks to us! Wenders guides us in a persuasive exploration of the space, into the architectural structures and the soul of the idea behind it. To use 3D technology appeared to be the most suitable way to translate the multiple curves of the building and the losing of orientation suggested by it, because curves generates (physical and intellectual) directions translated into a fluid shooting, where the fascinating survey on the relationship among space and time is narrated as a storytelling, whispered by Megan Gay's velvet voice: «Can you hear me? Places have voices. Buildings can talk, as you can hear. No, not all of them. But some need too. Some have chosen to remain silent. Some really want a constant dialogue with us ». In the silence, Thon Hanreich's music amplified the perception of the space, giving volume to it which can be only an interpretation of architecture within the exhibition space. Thus is the movement-image, where « objective and subjective images lose their distinction, but also their identification, in favour of a new circuit where they are wholly replaced or contaminate each other», as Deleuze stated, that extracted the essence of the place. [4] Without solution of continuity, the 12 minute film run in a continuous loop the same sequence of images, but with slight changes in the text and music, thus offering multiple sensorial perceptions to the spectator. For this reason Wenders has chosen to use digital technology as a tool for emphasizing, in order to make more effective the communication of the architectural experience based on interdisciplinary approach. Moreover this also met Sejima's curatorial aims to stimulate and create new thinking processes and new ways of understanding the world we are living in.

One of the reason why I have chosen Wim Wenders's installation at the Biennale was due to the fact that it was a 3D movie designed for an exhibition space, in other words a place of public cultural consumption, while on the other hand I would like to compare it with Rafael Lozano-Hemmer's installation-event 'Sandbox', in the Californian shore in Los Angeles, since in this case it takes place in an oudoor public sphere has a more political and social dimension.

'Sandbox' was a large-scale interactive installation created originally for Glow in 2010, which was an all night cultural experience that imagines the Santa Monica beach as a ludic agora for free access of a participatory and temporary artwork. The large-scale project consisted of two sandboxes: in one infrared surveillance cameras detected people walking on a certain 3,000-square foot stretch of so than it could be projected in the second sandbox and watch their actions magnified in large scale on the beach. « As participants reach out to touch these small ghosts, a camera detects their hands and relays them live to two of the world's brightest projectors, which hang from a boom lift and which project the hands over 8,000 square feet of beach. In this way people share three scales: the tiny sandbox images, the real human scale and the monstrous scale of special effects», describes the artist in his website. [5]

That is the reason why his work is as empowering as provocative.

A core element of the research by Rafael Lozano-Hemmer's thought is on designing spaces and dynamics for and of participation 'where a plurality of positions may emerge', in any case both examples integrate the observers/visitors with the digital image.

Furthermore, Lozano-Hemmer's work implies an invasion of the physical space, where the real body of the spectator turns into the moving image (simulacra) of the co-author of the performative interactive installation, since his research has always leaned, as said, to pursue a certain number of social issues.

More broadly he states that «technology is inevitable the language of globalisation […], it is inseparable from contemporary identity and it can be used as a way of criticizing from within some paradoxes of our culture.» [6]

For example it is interesting to put in practice that the technologies used for 'Relational architecture' installations mainly are the same ones used for the security system of control in order to identity and to punish, but by manipulating the use of them (such as the ominous infrared equipment or the video tracking system) with digital cinema projectors into amplified images, the sense of intimidation, fear and social disconnection is transformed instead into an intimate and a more playful relation with the public cultural arena, which in this case was the Santa Monica beach.

This leads to a final key question: does every one really want to participate in the cultural agora? Obviously no, but the interactivity experience in Lozano-Hemmer and the more contemplative immersion in viewing Wenders's movie are both examples of enriching opportunities to learn, generate new forms of attention and collaborative production of senses in our contemporary society.

In conclusion, what we can observe is that by participating in a collaborative manner with immersive experiences with the audience, both in an indoor exhibition space and outdoor public sphere, we can expand our own perceptions and widening our experiences; this ultimately leads to a broader understanding in life, a deeper awareness of freedom and hopefully to a re-design of our cultural landscape.

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IS AUGMENTED REALITY THE ULTIMATE MUSEUM APP? SOME STRATEGIC CONSIDERATIONS

Margriet Schavemaker & Hein Wils

In the past year, the innovative forms of augmented reality (AR) appearing on smartphones have proven to be exciting playgrounds for curators and museum educators. These AR tools offer users the possibility to deploy their phones as pocket-sized screens through which surrounding spaces become the stage for endless extra layers of information. What does this innovation mean for museums and their daily practice?

In the past year, the innovative forms of augmented reality (AR) appearing on smartphones have proven to be exciting playgrounds for curators and museum educators. These AR tools offer users the possibility to deploy their phones as pocket-sized screens through which surrounding spaces become the stage for endless extra layers of information. This visual collision of the real and the virtual – made possible by using GPS and a compass – could culminate in what we have seen in movies like *Minority Report* (2002), where Tom Cruise physically navigates through 3D data: a seamless interface between the body, the virtual and the real. Currently, however, AR technology (Layar or Junaio, for instance) is still a kind of experimental medium, as yet lacking the total immersion that science fiction promises. Moreover, its mediation through a tiny handheld screen poses several challenges to augmented storytelling. What, then, does this contemporary form of AR have to offer the museum today? Why would a museum want to develop augmented reality tours? What kind of user experience does it entail? Is it, in this day and age, the ultimate app? These questions will be addressed here by taking a closer look at the experiences of the Stedelijk Museum's AR project, *ARtours*, which explores a number of augmented reality applications in order to experiment with these new platforms in different contexts and with different kinds of art.[i]

Lieux de mémoire, space hacking & artistic platform

Taking a closer look at the deployment of AR by museums, it seems that the attraction of this new medium is often found in the act of returning cultural heritage to the streets where it was originally produced and/or that it depicts. As the apps of the Powerhouse Museum[ii] and the London Museum[iii] effectively illustrate, AR allows users to see photographs on their smartphones of old city views overlaid on the places that they were shot. Comparing a 'real' contemporary with an 'augmented' older view offers a moment of reflection on history, modernization and change.

The Netherlands Architecture Institute (NAI) included even more time dimensions in its unequaled application (UAR)[iv], as visitors are not only treated to former architectural drawings of the locations where one is positioned, but also to unrealized designs and future projects. The strategy, however, remains the same: using AR as a medium to layer the urban realm with a museological collection in order to compare its current outlook with that of other times and ages. In a sense it is using AR as a form of what Pierre Nora would describe as *lieux de mémoire*.

For a modern and contemporary art museum like the Stedelijk Museum in Amsterdam, this strategy for AR deployment is relevant in that the word 'Stedelijk' means 'municipal' and parts of the collection are produced by or related to the Amsterdam cityscape. However, layering the streets and canals with these local artworks has certainly not been the main reason for investing so much energy in the development of *ARtours*. First and foremost, the museum is known for its extensive international collection of art, photography and design, which itself asks for a different curatorial approach and visitor experience. Secondly, the Stedelijk Museum has been closed since 2004 due to an intense renovation of its original building and construction of a new wing. AR was therefore primarily embraced because of the possibilities it offers for exhibiting the collection, as the museum has lacked an analog venue in which to do so. In other words, in addition to *lieux de mémoire,* the Stedelijk opted for *space hacking*, a strategy in which augmented reality is used to present the collection in spaces with which the art has no relation whatsoever, but are simply used as a new stage.

We experimented with this strategy in the *ARtours* project entitled "ARtotheque".[v] The idea is simple: the Stedelijk Museum holds thousands of artworks in its collection, so why not lend copies to the general public via the medium of augmented reality so that people can place the artworks wherever they choose? The project location can be anywhere; we experimented at Lowlands (a Dutch music and arts festival with 50,000 visitors) and at the innovators' festival, PICNIC. Participation was relatively simple: the visitor could choose an artwork from a selection of 160 masterpieces, all printed on A4 cards, scan the QR code on the card and thus activate the "ARtotheque" (art loan) layer on the Layar platform. The visitor could then choose a position for the artwork, hang it and share it with all other works in the public "ARtotheque" layer.

As the Stedelijk Museum is also known for its contemporary art projects, another utilization of AR appeared relevant: augmented reality as an *artistic platform*. In the *ARtours* project entitled "Me at the Museum Square" *ARtours* experimented with this strategy by asking students from various Dutch art schools to design an augmented reality artwork to be virtually manifested on the large square adjacent to the museum.[vi]Stedelijk curators made a selection of the most promising ideas and together with students from the University of Amsterdam and the School for Interactive Media (project Medialab), the 3D 'ARtworks' were realized. Besides helping the project to get a better grip on the possibilities of Layar and the practical problems AR applications pose to users (too much sunlight, battery consumption etc.), another result of this project was the fact that several of the created artworks reflected upon the new medium.[vii] For instance, in one work audience members could virtually augment themselves with auras in various colors, which derives from the artist's idea that AR is, similar to auras, visible for some and for others not. Another artist placed a springboard next to the small pond on the museum square. The title of the work, 'The most fun you will never have', addressed the fact that, in augmented reality, the virtual is colliding with the real but not transforming into the real (in a material sense). It is this kind of self-reflexivity that helps us in coming to terms with AR's cultural significance.

Let's go inside

In the summer of 2010 the Stedelijk Museum got the old part of its building back. The renovation was almost finished and, although the additional wing was not yet ready, the museum could make a start with temporary exhibitions and public programs. For the *ARtours* project, this signified an interesting strategy shift to bring AR out of the streets and into the white cube.

As early as 2002 media theorist Lev Manovich claimed that, with augmented space,

museums and galleries as a whole could use their own unique asset – a physical space – to encourage the development of distinct new spatial forms of art and new spatial forms of the moving image. In this way, they can take a lead in testing out one part of the augmented space future…

Having stepped outside the picture frame into the white cube walls, floor, and the whole space, artists and curators should feel at home taking yet another step: treating this space as layers of data. This does not mean that the physical space becomes irrelevant; on the contrary, as the practice of [Janet] Cardiff …shows, it is through the interaction of the physical space and the data that some of the most amazing art of our time is being created.[viii]

The *ARtours* project selected for its first indoor *AR(t) project* artist Jan Rothuizen, known for his hand-drawn maps on paper.[ix] In the AR application Rothuizen's drawings are virtually appended to the spaces of the building to which they refer. Using a smartphone you can open the tour and follow Rothuizen's childhood memories of the museum throughout the gallery spaces. Also included are his references to the Stedelijk's renowned history and close observations of the institution made while spending a night in the building.

The result is a layering of the real with virtual information, bringing the objective outer world of material spaces into collision with the subjective inner world of conceptual memories and storytelling: a mapping of the museum inside the museum that echoes the psychogeographical maps produced in the 1960s by the French Situationists.

Of course the move from outside AR to inside was not that easy, as current technology (Layar) relies on GPS to attach the virtual to the real. GPS has difficulty in distinguishing vertical levels inside a building, thus additional interfaces are needed to delineate one's location inside the building. Since these methods of interface have not been perfected yet, we are pleased that AR providers are exploring new solutions to the problems of bringing the technology indoors. The *ARtours* project will experiment with these in the near future in collaboration with Fluxus artist Willem de Ridder, who is working with us on one of his 'Secret Exhibitions' in AR. Moreover, we are exploring possibilities of bringing a selection of the Stedelijk museum's famous exhibitions back into the building by means of AR, re-using the museum archives and documentary material.

Innovation & collaboration

Besides all these more practical and media-related strategies that readily illustrate how and why a museum might use smartphone-based augmented reality, there are more overarching reasons as well, of which 'innovation of audience participation' seems the most pivotal one. For the Stedelijk Museum this seems to fit a long-established tradition: the museum is said to be the first in the world to have created 'audio tours', in 1952.[x] Of course the radio broadcast technology used in that time was far from perfect and the experience was almost identical to a conventional guided tour (for instance, people were bound by the tour's time constraints and were not free to move around, being required to follow a linear story). However, as specialist in the field Loïc Tallon rightly makes known, this was not the point. What mattered most was that the audio tours of 1952 were launched by the Stedelijk at the same time that the ICOM conference was held in Amsterdam that year. Consequently, the entire museum world took notice of this new development and many immediately started to develop similar systems. Therefore Tallon concludes that

Above all, I believe that it was the innovation and potential embodied within the audio guide that best explains why the Stedelijk Museum 'invented' it. Whilst one could claim that what was achieved by the system could have been achieved through trained docents, this is too narrow a perspective. After all, this innovation went on to spawn what was arguably the most successful museum technology of the 20th century, and one of the most exciting of the early 21st century.[xi]

In 2011, 'innovation and potential' also seems to be the driving force for augmented reality applications. It is not about offering the most perfect technological solution and radical new user experiences. More-over, it is often hard to define differences with respect to existing multimedia tours. However, the po-tential for bridging the gap between the virtual and the real world in a single visual interface is a dream shared by many and thus a great stimulus for future innovation.

Innovation can only exist through collaboration. In 1952 the Stedelijk Museum created its audio tours with the renowned Dutch enterprise Philips. At present the Stedelijk works with several technological and design partners, such as Fabrique, 7scenes/De Waag, Tabworldmedia and Layar. Collaborations with educational partners (University of Amsterdam, Hogeschool van Amsterdam, art schools) and cultural organizations (Tate, Virtual Platform, ISEA, kennisland) also exist. These partners should not only receive full credit for the *ARtours* project, but should also be thanked for the innumerable innovations inside the Stedelijk organization they have triggered thus far and will continue to do so in the future: from funda-mental changes in museum technology (ubiquitous Wi-Fi access) to new takes on copyright issues; from changes in media awareness and the programming of our educational and curatorial departments to new policies on the future of audio tours in the museum; and so on. For a museum reinventing itself in the 21st century this is invaluable, and leads to the idea that a museum should always incorporate at least one innovative project like *ARtours* every other year.

Paratouring

Can we already draw some conclusions about the outcome of the first 1.5 years of the *ARtours* project? Findings that may help other museums to decide whether augmented reality can be their ultimate app? Insights that may fuel debate on the future of mobile technology in the museum?

Inspired by the "un-conference" concept, museum professionals at the industry conference, Museums and the Web, and elsewhere have for the past couple of years discussed the "untour", referring to the manifold possibilities in our current 2.0/3.0 phase where mobile tours can go beyond the traditional audio tour format.[xii]

The *ARtours* project defines another interesting development in the usage of mobile media inside the museum: the 'paratour'. The term 'para' refers to the extra information that normally accompanies the core text of a publication: the introduction, conclusion, notes and additional literature, often provided by the editor, which are collectively referred to as 'paratext'. They are the discursive elements that frame the text, positioning it through an extra layer of information.

Of course the traditional audio tour can itself be considered a 'paratext', as it frames art with an auxil-iary text. However, the *ARtours* project indicates that innovative museum tours, like augmented reality applications, become especially significant by way of extra communication tools and additional layers of information. Significantly, the tours elicit communication among the users. In order to use an AR tour,

generally one has to join forces, as not everyone possesses the appropriate smartphone, the user interface is still challenging for some, data traffic is not equivalent for all telecom providers, using the app tends to drain batteries quickly, etc. This turns the AR tour into a social event, something the Stedelijk Museum facilitates by organizing a public program and opening event every time a new project is launched.[xiii] This form of 'paratouring' among users exists not only in the analog world, but extends into the virtual one as well via social networking services like Facebook and Twitter. In addition, the *ARtours* project has opened the eyes of the museum to a ceaseless flow of professional 'paratouring' by museum and other mobile technology experts. The innovative mobile museum tour has an amazing, extended lifespan mediated through videos, PowerPoint presentations, lectures, Twitter feeds, blogs, conferences, round table discussions, expert meetings, wikis and remarkable press coverage. It may even be the case that the *ARtours* project has more followers on Twitter and via our blog than people who have actually experienced the AR tours themselves.

Of course one can denounce 'paratouring' - or, in terms of AR, 'pARatouring' – as a distraction from what the tour is really about, namely, mediating knowledge and enhancing visitor experience both inside and outside the museum. This is a risk, and we should take care that it does not obstruct the actual encounter with the museum, collection or exhibition. Still, we cherish the fact that a museum that has been in hiatus for over seven years is suddenly back in the spotlight![xiv] If this can happen in the world of mobile media, why not in other fields as well?

Concluding remarks

If we now return to the central question of this discussion - 'is augmented reality the ultimate museum app?' - we must conclude that, at first sight, it certainly is not: the technology is experimental, the user interface problematic and we are as yet very far from the ideal future of total immersion and seamless interfaces (as visualized in movies like *Minority Report*).

On the other hand, we have seen that AR can be significant for museums in many ways, both outside and inside the museum, as it:

- offers interesting collisions between virtual (digitized) heritage and real (analog) space;
- provides a new platform for artistic experimentation;
- is a perfect medium for museum innovation and collaboration; and,
- generates enormous amounts of communication, interpretation and contextualization (the so-called 'paratouring').

For the Stedelijk Museum, in its current 'temporary' phase within and without its building and in the process of reinventing its institutional identity, AR has proven to be the ultimate app! For other museums the best recommendation may be to consider all relevant strategies… and then engage in it anyway.

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ERROR IN APPARATUS AS AESTHETIC VALUE

ALEJANDRO SCHIANCHI

An error seems to be that which gets between the ideal being and the real being; the error appears to be a singularity, a Non-being that transforms and distorts the Being. Audiovisual techniques, technologies, devices and media try to suppress errors; however, an ideological and aesthetic possibility hides behind the use of errors.

Untitled, 2006, Alejandro Schianchi, Video Object, Copyright Alejandro Schianchi.

Introduction

An error, a failure, or an accident connotes something that is bad, wrong and inappropriate. The purpose of this work is to demonstrate the positive aspect of errors that take place in the artistic production achieved with audiovisual machines.

We will start by giving a more precise meaning to what we usually call "error". In order to do so, we will resort to its scientific definition, particularly in the fields of physics and mathematics: "difference between the measured or calculated value and the real value". This means there is a difference between the real obtained result and the prevision we had made and had thought as certain. At this point we will introduce an element which is important to highlight: the concept of error would be unconceivable without the idea of prevision. Previewing entails supposing, waiting, and, above all, "believing" — in terms of faith — that something is going to occur and is going to happen somehow. Only in this way the error is able to appear. If, for example, we do not expect anything in particular from an apparatus that produces images, any result will be satisfying. Moreover, we can set forth that in the field of the arts originality, unlike repetition, carries a different value. Every time art moves away from the normative pressure of academicism (evident in the vanguards of the 20th century), it will attach a positive sense to the difference explained as a shortfall by exact sciences.

If we talk about prevision and repetition, the concept of definition inevitably comes up; definitions are later transformed into classifications. Stability allows us to sort the elements that make up a system according to their characteristics. When we use a photographic camera in the usual way, we expect to obtain, after a series of processes, an image that is true to the one that was in front of the lens of the camera at the moment of exposure. If we obtain instead a splotch, we will infer that some kind of error occurred during the process, because the photographic camera (in its standard definition) does not produce abstract images, but rather reproduces objectively that which is captured by the lens.

Perfect Machines

The utopian view of an error-free machine finds it's origin within two spheres, science and religion.

We mentioned already the pejorative definition of an "error" in mathematics and physics, where the goal is clearly to eliminate errors, and where we find the impetus for the "Difference Engine No. 1". Designed by Charles Babbage, the Difference Engine No. 1, without the need for human intervention in its calculation process, is considered a precursor to modern day computers. The data is entered, the gears turn, and we obtain a result free from the common errors which would occur when using the mathematics tables of the time. On the other end, with the utilization of the clock by monks in the the VII century to schedule time for prayer, religion (western Judeo-Christian) found itself concerned with embedding meaning into machines. And as David F. Noble explained, the Middle Ages began to see these technological devices as a means to re-establish the divine order which governed in the lost paradise. One of the first records which demonstrates this relationship is the "Utrecht Psalter" where we can observe two armed groups, one allied with God and the other with the Devil. In the latter, we observe the use of stones in sharpening their swords, while the "divine" group utilizes grinding machines.

Technological progress becomes a virtue, and a quest for perfection in science and religion. A possibility to eliminate "errors", that built also a general quest that conduct most of modern society until today.

With the passing of time devices became more complex, and the ideal machine became an automatic system free of errors. The user simply turns it on and waits for it to produce what is expected. The engineer, programmer, or technician needs to foresee all the possibilities the automatic system may face, in order to minimize the margin of error during it's operation. For most of the users, this automation

turned the machine into a black box. However, an unexpected action is found hidden within its automatic operation, which leads to imagining scenarios of rebellion where machines turn against their creators.

Error in Art

Different from science and religion, the artistic vanguards of the XX century established that the exceptions to the rules and systematizations, the uncertainties, chances and "errors" and all those elements outside the scope of Art's classical conventions, could be included and used as another element of aesthetic creation.

The productions and considerations of Luigi Russollo and John Cage in music, Marcel Duchamp, Nam June Paik, and Wolf Vostell among others, do nothing more than continuing the error inclusion proposal in the artistic field and confronting the common uses of the technical devices around us.

These subversions of technology created even a stronger impact on the current massified "digital" supports environment, where errors try to be eliminated under a system of more than 50 different correction methods, which were highly advertised with the arrival of the "digital" supports.

In the sounds and digital images world, the cases of Yasunao Tone, Oval, Takeshi Murata, and JODI, among others gave rise to an aesthetic called "glitch" which paradoxically proposes the repetition of a certain sound or image as resulting from accidents and "unexpected" actions from the digital audiovisual devices.

Expanded Glitch

Nevertheless, we do not believe that the analysis of errors should be restricted to audiovisual devices, we think that errors are essential to the functioning of any system, therefore, we could analyse how error works in philosophical, scientific, social and economic systems. And encourage to take errors in the aesthetic field as a possibility to discover new elements of a work of Art.

A failure in an apparatus program often sends back a faulty image or a sound which cannot be otherwise conceived. Limits are blurred, and we are faced with the naked truth, without attires or pretenses. We receive data, waves, and exposed information according to an artificial mechanism which constantly defines itself in its errors.

This is what makes an error unique, revolutionary and beautiful, and there lies its value.

A short circuit in an appliance builds a new and unpredictable world that is embraced by the artistic field as one more aesthetic element.

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POWERING ECOLOGICAL FUTURES

Lea Schick & Anne Sophie Witzke

This article riffs off from Peter Sloterdijk's important concept of 'air-condition' and Bruno Latour's influential idea about 'ecologizing', which establish a theoretical framework to discuss the engagement of digital art in environmental problems. Looking at two projects – *Nuage Vert* by the duo HeHe and *Natural Fuse* by Haque Design – the article argues that digital art can articulate the complexity and ambiguities of an ecological future.

Left: *Natural Fuse* by Haque Design   Right: *Nauge Vert* by HeHe

Left: Natural Fuse by Haque. Right: Nuage Vert by HeHe

Left: *Natural Fuse* by Haque   Right: *Nuage Vert* by HeHe

Powering Ecological Futures

We are living in an era where air conditions and atmospheres enter our awareness and are made explicit. Through rising awareness of global warming and of how we modify our indoors and outdoors climates, it is clear that we must redesign the systems we use for air-conditioning different spheres of our planet's air. This includes our power supply systems. French sociologist Bruno Latour claims:

"As soon as artists, designers and architects are busying themselves with the light element [Air], we are going somewhere. From the philosophical point of view, Air will take the place of Earth as the 'fundamental element'" (2004)

By looking at two digital artworks, dealing with air conditions and electricity consumption, this article will use the ideas of Bruno Latour and German philosopher Peter Sloterdijk to discuss what role art may play in rethinking 'air-conditioning systems'.

AIR AS AN OBJECT OF DESIGN

During WWI, April 22, 1915, air lost its innocence when a toxic green cloud migrated from the Germans into the British camp in Ypres, transforming the air and environment into their worst enemy (Sloterdijk 2004, 89). According to Sloterdijk, this day marks the beginning of a new era of our anthropological history; an era in which air and atmosphere is made explicit. In his trilogy, *Sphären*, Sloterdijk describes our time as an age of greenhouses and climate control (2004). In order to comprehend the ecological crises and our being-in-the-world today, it is essential to understand how air and atmosphere has been made explicit. Air has moved from a passive background to the foreground of our attention. With the invention of 'air-conditioning systems' such as heating, ventilation, and light, humans have become masters of controlling air and atmospheres. Through these technological systems we can isolate ourselves from common air, conditioning our private spheres as we like. According to Sloterdijk, it is distinctive for current state of affairs that air is moving from being the invisible surrounding (Umwelt), something we take

for granted, to becoming an object of technology and something we can deliberately design. Hence air has become the center of political disputes:

"*Politics, from now on, will be a section of the technology of climate-control*" (Latour 2004b)

 Since CO2 emissions are linked to energy consumption, electricity supply systems counts as essential climate-control or air-condition technologies Sloterdijk 2009). With energy consumption not only conditioning our indoor climates (Sloterdijk 2004) but also our common atmosphere and environment in a rather unfortunate way, air-conditioning systems and their electrical power supplies find themselves in the midst of political disputes and redefinitions.

Various disciplines such as architecture, engineering, politics, and social science are working at full throttle to redesign our way of living. Each discipline plays an important role in outlining the contours of a range of social, political, and technical changes that point toward a more ecological future. Art and experimental design are also concerned with these challenges and contribute to the field with a special sensitivity towards the complexity and ambiguity of the problems. Through the last decade an increasing number of artists and designers have been working with energy visualization and digital technology, trying to make explicit what is still implicit to most of us. Using computer technology - with its expanding databases, interconnectedness and embeddedness – the artists and designers present and translate energy data into interactive and networked projects with the aim to direct the public's attention to issues of energy consumption and ecological problems. Through the following presentation of two digital art projects, *Nuage Vert* and *Natural Fuse*, we will discuss how art can participate in articulating an ecological future.

NUAGE VERT

Ninety-three years after and 2133 kilometers away from Ypres, the sky turned toxic green again. This time it was vapor emissions from the Salmisaari power plant in Helsinki that was illuminated with a high power green laser animation. During one week of February 2008 the citizens of Helsinki experienced a city-scale light installation beautifully enlightening the sky and reminded the inhabitants of their rising electricity consumption and it effects on our air conditions. The installation, *Nuage Vert* (Green Cloud), was produced by the artist duo HeHe, consisting of Helen Evans and Heiko Hansen, together with Helsingin Energia. The power plant provides electricity for a former industrial harbor redeveloped into a residential district with growing energy consumption. Using the data from the power plant, the laser drew an outline of a green cloud onto the real cloud itself. The green cloud changed size according to the residents' fluctuating electricity consumption. When the collective consumption was low the cloud grew larger, but shrunk when the electricity loads were high. Functioning as a public visualization of the local electricity level the residents were expected to respond to *Nuage Vert* by turning off electrical devises to increase the volume of the cloud (Holmes 2011, 53).

NATURAL FUSE

Another project that comments on our everyday use of electricity and carbon footprint is *Natural Fuse* conceived by the design studio, Haque Design. *Natural Fuse* is a hybrid artwork networking a series of distributed plants with energy consuming devises and participants via the Internet. Each participant gets a 'Natural Fuse' unit, which consists of a houseplant and a power socket. The amount of power

available to the socket is limited by the plant's capacity to offset the carbon footprint produced by the energy expended by the electrical device. If the appliance plugged into the socket draws more power than the plant offset itself, the unit will not power up (Haque et al. 2011, 65). However, all participating units are connected through the Internet. The units are able to share their capacity and determine how much excess capacity of carbon-offsetting is available within the community of units as a whole since not all *Natural Fuses* will be used at the same time. In this way the project is about energy conservation and also about structures of participation.

Instead of the usual on/off switch the sockets have a selfless/selfish switch. When the system is in self-less mode the energy consumption is well below the fixed quota and the unit will provide only enough power to not harm the community carbon footprint. In selfish-mode the owner of a plant can use as much energy as wished. However this mode might harm the community's collective carbon footprint and kill other plants. The fuse takes care of the plant through a remotely activated water-controlling sys-tem but the water system only works if there is enough energy left to use in the fuse. If the owner uses more energy than the system can offset the *Natural Fuse* system will start to randomly kill plants. Each plant has three 'lives' before a 'fuse kill' function is activated and a deadly vinegar shot is injected into the plant. Emails are sent both to the owner of the dead plant and the owner that sent a 'kill' signal.

MAKING AIR EXPLICIT THROUGH ELECTRICITY CONSUMPTION

Both *Natural Fuse* and especially *Nuage Vert* make explicit how air and CO2 emissions have become a fundamental concern in relation to power supply systems. In these two installations one can no longer talk about electricity consumption without taking into account how it affects our air-conditions and how we deal with CO2 emissions and pollution. By coloring and animating the chimney vapor, HeHe draws the public's attention to the smoke, which is often just an unnoticed part of the cityscape. The installa-tion also explicates how the air-conditioning in our private houses or spheres is not as isolated as we may think. Sloterdijk describes our society as 'foam' consisting of 'connected isolations' (Sloterdijk 2004, 568). Each bubble or 'sphere' is an isolation but the air-conditioning of one sphere always affects condi-tions of other spheres. All isolated air-conditioning systems are connected through their electricity use and affect each other. The green cloud artistically illustrates this and tit is made 'deadly' clear in *Natural Fuse*.

Nuage Vert is part of HeHe's series of artworks, *Poll Stream*, working with smoke, man-made clouds and energy use. Like Sloterdijk, HeHe questions the popular notion that weather is 'natural'. By visualizing the man-made aspect of weather HeHe "propose[s] climate as man-made phenomena and therefore a social-political space" (HeHe). Existing simultaneously as a visualization of the residents' participation and the ultimate aesthetization of pollution, *Nuage Vert* is a complex socio-political sign of both environ-mental effort as well as wasted energy.

STOP MODERNIZING, START ECOLOGIZING

Throughout Modernity air-conditioning infrastructures such as our power supply systems have been made invisible and imperceptible. Electricity use today is a passive one-way connection and only a few people pay any thought to how power plants are adjusting their production to our consumption. Both production and effects are completely detached from the use of electricity, just as individual household consumptions are totally independent of one another. The electricity system has been turned into what

Bruno Latour calls a 'Black Box', a system we don't need to know how works or how it is connected to the rest of the world (Latour 2007). Art projects like *Nuage Vert* and *Natural Fuse* attempt to open this black box and reveal the hidden structures of the energy system. In *Natural Fuse*, these structures are shown to be quite complex involving organic, electric and social systems. Energy consumption here is not controlled by production but it is directly connected to the offsetting available and the illusion of our power supply system as an autonomous back box system is shattered. Through the information technologies in the system the black box is opened up and its many attachments to the world is revealed. *Natural Fuse* highlights how the participants' decisions about being selfish or not have a direct impact on the other participants and organic actors in the energy community. If people cooperate on energy expenditure the plants thrive and everyone may use more energy but if they switch to selfish mode plants will die and diminish the network's electrical capacity. Here the electricity system is fully entangled with the energy community rather than being detached and autonomic as it is normally conceptualized.

The latter view on the electricity supply system is emblematic of what Latour describes as a modernization of the world. The modernizing way of constructing the world has been characterized by the approach:

"Go forward, break radically with the past and the consequences will take care of themselves!" (Latour 2008,3)

 Our built environment has been based on cold objectivity or matters-of-fact, as Latour calls it, and the purpose of our surroundings has been to provide us with progress and speed through smoothly working effective systems that we would never have to pay attention to. Modernization has been a project of emancipation and detachment. It has been all about freeing objects and designs from their various attachments and complex relations to, and effects on, the rest of the world. But this way of designing, says Latour, has turned out to be not only highly unsustainable but also quite a deception (2008), because 'we have never been modern' (1993). While we might have believed that we were emancipating and detaching, we have in reality been producing ever more hidden attachments and effects – such as the complex network in *Natural Fuse* suggests. Those ignored connections are today revealing themselves as rambunctious monsters, traveling around the planet and coming back to hunt us, such as climate change and energy shortage (Latour 2009, 7). Therefore, says Latour, if we want to deal with global warming we will have to stop pretend that we are modernizing and instead start 'ecologizing' (1998).

While modernizing was about emancipation and detachment, ecologizing is about drawing things together, about attachments and entanglements, and about a precautious attention to and explication of details (Latour 2007). By explicating the connections between electricity use and offset, *Natural Fuse* presents a complex conceptualization of energy systems where our usage is not only highly entangled in other people's consumption but also thoroughly attached to non-human actors such as the plants. The often unnoticed effects of our unrestricted use of power is drawn directly into the living room and made clear through the dying plants.

POLITICS OF ARTIFACTS

Latour criticizes Modernism and Humanism for focusing too much on human actors.

"To define humans is to define the envelopes, the life support systems, the Umwelt that make it possible for them to breathe. This is exactly what humanism has always missed." (Latour 2008, 8).

Humans can only be defined through the objects surrounding us and these non-human actors therefore have agency; or in Latour's words, 'artifacts have politics' (2004b). Both artworks portrayed here articulate a sensitivity towards the artifacts – what Latour calls the 'missing masses' (1992) - which constitute part of the power supply systems. When the black box, i.e. the power supply system, is opened up it becomes clear that it does not consist of cold materiality but that it has been designed. The black box is always a result of political discussion and it determines our use and therefore envelopes our being in the world. Artifacts go from being 'matters-of-fact' into becoming 'matters-of-concern'. Objects become 'things'; that is complex and contradictory assemblies of conflicting humans and non-humans (Latour 2007, 6; 2008, 7). When ecologizing, the non-human actors have to be given a voice in our political 'parliament of things' (Latour 2004b) and participate in the discussion of our collective lives (Sloterdijk 2004, 67).

"Democracy can only be conceived if it can freely transverse the now dismantled border between science and politics, in order to add a series of new voices to the discussion, voices that have been inaudible up to now [...] the voices of non-humans" (Latour 2004b,64).

To this purpose, we argue, art has a capacity to transverse the border and represent the entanglement of humans and non-humans. By giving voice to the various non-human actors of the system - e.g. plants, electricity devises, water systems - *Natural Fuse* and *Nuage Vert* are concrete manifestations of how power supply systems are not merelymatters-of-facts but always matters-of-concern and how they are deeply affected by political, environmental, and ethical issues. Both art projects in this way function as small laboratories, where artists and designers experiment with visions of new ecological futures and carefully try to redesign the complex connections between humans and non-humans.

CAREFULLY RADICAL, RADICALLY CAREFUL

Ecologizing is a slow process paying attention to the details and ways things are connected in hybrid networks or 'interconnected foam', to use Sloterdijk's term. Referring to Sloterdijk, Latour says that a redesign of our life support systems has to be 'radically careful and carefully radical.' The 'radical' here refers to the fact that we have to take non-human actors into consideration and the 'careful' referring to paying meticulous attention to how we design connections (Latour 2008, 8). We are still in the midst of articulating a new narrative for a more ecological future. However there are no easy shortcuts only detours. We can never be certain that we take the right direction; that we have chosen the right solution. A redesign of a more ecological energy system therefore needs to be open, reversible and adaptable. We argue that this is where art and experimental design can contribute.

As Usman Haque, Haque Design puts it:

"The point is that there is no 'easy energy future'. [...] It is often expressed that it is the task of designers to "make things simple for people" – which I find patronizing and counter-productive. If anything, it is the task of designers to show how **complex** *things are, and to help build tools for dealing with that complexity"* (Haque 2011, 86).

The *Natural Fuse* system is clearly not a implementable or desirable design solution but rather an explication of how complex a redesign of power supply system becomes when Co2 emissions, carbon offset, and structures of participation enters into our awareness. Instead of giving us easy answers it encourages us to discuss how it is possible to ecologize energy usage.

Through the aesthetic choices *Nuage Vert* also refuses straightforward answers. People are encouraged to 'feed' the cloud by turning off electricity devises: the less electricity usage the bigger and more beautiful the cloud becomes. However large amount of chimney vapor normally signifies the exact opposite of environmental friendliness so this equation might be puzzling to some. Furthermore, the illuminating acid green of the cloud gives associations to toxic wars and pollution just as green has become the iconic color of sustainability. *Nuage Vert* stays ambiguous and doesn't offer simple moralistic messages.

 Art is distinguished by a close relations to the time out of which it arises and by often taking the vanguard in sensing, recording and expressing the changes and conflicts lurking underneath the surface of society. Without giving a ready-to-go manual, *Nuage Vert* and *Natural Fuse* power a discussion of how we can rethink the future of energy consumption in a more carefully designed ecology with a attention to details and attachments. Both artworks formulate a new way of comprehending the world, which with homage to Latour, could be termed 'ecologization' where humans are no longer sole actors but part of a larger collective with our fellow species and neighboring artifacts.

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CONCEPTUAL RELATIONS: MUSICAL REPRESENTATIONS DO NOT NEED MUSIC THEORY

Sebastian Schmidt, Thomas Alexander Troge & Denis Lorrain

A theory using conceptual relations for musical design processes is proposed. It is suggested that, for non-musicians, musical representations mostly arise, while listening, through the process of abduction, including combinations of conceptual relations and influenced by emotional ratings.
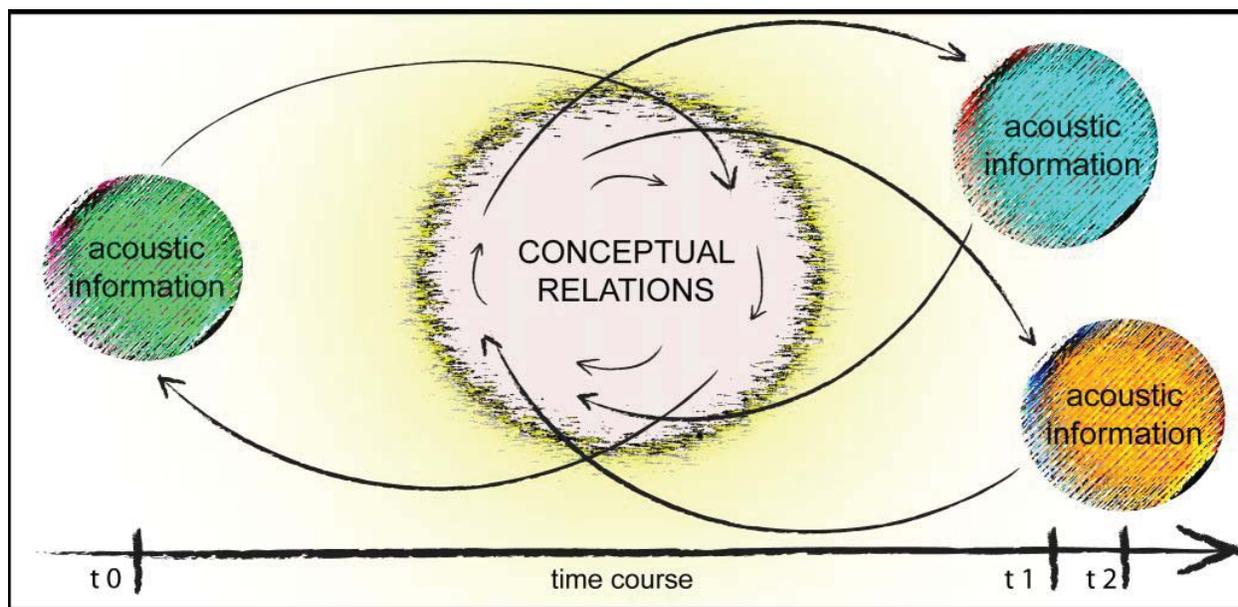
Relation between three acoustical information. Schmidt, Sebastian. [sic, ed]

INTRODUCTION

The German sociologist, musicologist and composer Theodor W. Adorno states about the musical listener:

"Its horizon is the concrete musical logic: one understands what one perceives in its course, but certainly not in a literal causal necessity. Location of this logic is the technique; the listener who is introduced in music theory conceptualizes individual elements, of what is heard, most immediately as technical, and in technical categories, revealed much of the meaning." [1]

This statement first implies that the construction process depends on explicit learned musical logic. Secondly that, in order to understand musical processes, listeners have to develop categories of individual sound elements. Thirdly, that many musical meanings are revealed only after having learned musical logic.

But, on the other side, music can offer different grounds and levels of understanding. In this way, musical thought does not follow the rules of formal logic normally.

 "People use their implicit understanding of how the world works to understand structures, rather than the formal principles of logic." [2]

From this point of view, musical meaning certainly depends on musical learning processes, such as musical logic, but the implicit understanding of how the world works is an important argument for an extended view on musical construction.

From fundamental concepts such as top to bottom, left to right, every one develops ever-expanding concepts of how the world works. In addition, Gilles Fauconnier and Mark Turner have shown that, during the connection of various concepts, such as is constantly performed during musical construction, room always exist for many different possible lines of elaboration.

However, assessment and recognition of elements or processes, whether conscious or unconscious, are also caused by emotional states. Therefore,

 "It appears likely that emotion and cognition are two sides of the same coin of elaboration." [3]

Consequently, to discover and understand the virtual relations between sounds, or, that is to say, build their significance, emotional states must be involved.

When musicians, or non-musicians, describe parts of music as sad, happy, elated, and so on, they are referring to emotional states. Such states are the products of complex processes, and imply that elements and sound structures were recognized, rated and related to each other.

However, although both musicians and non-musicians develop emotional states during the course of listening, only the musicians have access to explicit learned musical logic. Hence, it is important to investigate how listeners lacking this musical logic distinguish emotional states during the course of listening to music.

"The human being conceptualizes and classifies the experience of the 'inner as well as the outer world' because envisaging and choosing occur primarily in terms of such classes, to wit in case classes of emotions or cognitive categories." [4]

These classification and categorization of information processes are a general mental operation of human beings. The first reason for this, in a psychological sense, is that it is necessary to foresee the probability of coming events, whether the behavior of people, or of musical patterns. David Huron proposed, for example, to classify expectation emotions in five psychological systems. Secondly, psychological behavior addresses different biological problems aiming at adapting the behavior to changes in the environment.

From this point of view, we propose that musical representations are constructed as a combination of conceptual relations between classes or categories. And this construction is performed during classification or categorization, caused by unconscious and conscious ratings of possible relations. Such is the

functionality of the nervous system. The nervous system can only process patterns: pattern comparison allows the creation of different classes, and of their relations to each other.

WORKING OF THE NERVOUS SYSTEM IN RELATION THE MEMORY

Categorization is not only a psychological organization of the environment, but is already created during the information processing in the nervous system.

Human beings compare and relate information processes by using memory. Memory influences how we decide when groups of events end, and other groups begin, and how these events are conceptually related. It also allows everyone to comprehend sequences of events in their totality, and to build expectations about what will happen next.

From the current physiological perspective, memory is the ability of nerve cells in the brain to alter the strength and number of their interconnections in ways that span over time. However, memory is not a monadic entity, but is understood as a subdivided system that depends on content and time. It is carried out by different neural networks, which process acquisition, storage, consolidation and deposition in very different structure combinations. Therefore, memory processes are functional rather than structural.

CATEGORIZATION IN THE AUDITORY MEMORY FROM THE COGNITIVE PERSPECTIVE

"In the auditory memory, the inner ear converts sounds into trains of nerve impulses that represent the frequency and amplitude of individual acoustical vibrations." [5]

This information is usually stored less than a second in the auditory ultra-short-term memory, and is not categorized in any way, but persists as continuous sensory data. Jamshed J. Bharucha discovered 1999 that many specialized groups of neurons extract individual acoustical features such as pitch, overtone structure, etc. from the continuous data of ultra-short-term memory.

"During the subsequent process, these features are bound together with different simultaneous features, and correlated into single auditory events." [6]

Gerald M. Edelman deduces that feature extraction and perceptual binding reduce the large mass of sensory information, and elaborate a perceptual categorization. Certain perceptual events activate conceptual relations in those parts of the long-term memory that have been activated by similar events in the past.

"This can take place in a conscious or unconscious way. But most of the content of long-term memory is unconscious and forms an activation context for current awareness." [7]

This context, or conceptual relation between single auditory events and the past, takes the form of expectations and other related knowledge that can influence the direction taken by current consciousness.

Some information from the long-term memory reaches consciousness by the highest state of perceptual activation. Therefore, current awareness can consist in a vivid perceptual categorization and conceptual categorization arisen from long-term memory.

Information that has just been in the focus of conscious awareness may then persist as short-term memory, where it is no longer in consciousness, but will be held ready for recall. This recall availability lasts only about 3-5 seconds (sometimes longer) on the average, unless the information is rehearsed, that is, recycled through the process of conscious awareness.

At this point, there seems to exist a difference in the construction process between musicians and non-musicians. For instance, musicians have access to previously learned sound schemata, and may group sounds according to those. Because of the limitation of 7 ± 2 actively held chunks in the short-term memory, non-musicians can not group certain chunks in a pre-learned superior musical schema. Their musical 'schema-driven-grouping' is thus limited, and the relationships constructed over longer time spans appear to be fewer and less pregnant than for musicians. However, explicit schema-driven-grouping is only one path to musical construction: it is also possible to relate sounds and tension-release patterns in music, without naming them explicitly.

For both, musicians or not, if information are novel in some way or, to be more precise, if conceptual relations between sounds build a novel significance, then this novelty joins other conceptual categories in the long-term memory.

As items are compared, however, an important factor also depends on the emotional process of evaluation. Emotion also dictates why the perceptual activation selects certain particular information from long-term memory.

CATEGORIZATION AS A PROZESS OF MEMORISATION FROM THE PERSPECTIVE OF EMOTION

From an accepted perspective:

"Individual states, or categories of emotional behavior, are appropriate functions, or responses to changes in the environment that have worked over the course of evolution." [8]

LeDeux distinguishes two kinds of response to stimuli, namely 'Congenital trigger' and 'Learned trigger'.

"The first is an evaluation mechanism, given to us via evolution, designed to detect a particular pattern and trigger reactions that function to prepare an organism for changes in the environment. The evaluation mechanism can also learn from stimuli and often function in connection with the congenital trigger from which the reactions are expected. These are called learned triggers." [9]

Unconscious or conscious expectation processes are fundamental requirements for human survival. Human behavior is continuously guided and optimized by anticipatory responses. But,

"The expectations we form while listening to music have no obvious implications for survival, even though a certain degree of arousal, such as tension generated by anticipated events, is basic to musical functionality." [10]

Arousal alone is not the result of emotion. The physiological effects of arousal may occur during and after music listening, but the result is not the emotional response.

For LeDeux, emotional experience caused by listening to music is a 'Learned trigger'.

 "In addition, in George Mandler's (1984) view, held also by Leonard B. Meyer (1956), incongruities between expected and actual events lead not only to arousal response, but also to a cognitive reevaluation of the stimuli. It is the combination of arousal and cognitive activity that leads to an emotional experience." [11]

 That point is important because, conscious or unconscious classification, explicitly named or not, tend to undermine and weaken emotional response. Therefore, we can say, in the case of non-musicians and of musicians also, the memory helps to compare perceptual and conceptual information, to store and retrieve classes and categories derived and reduced from pattern. But how information are related to each other, during the course of listening, also depends on individual emotional ratings of possible relations to what will happen next, and could emerge in the consciousness as emotional states.

CONDITIONS AND FUNCTIONALITY OF CONCEPTUAL RELATIONS BETWEEN SOUNDS

Starting from the basic function of memory for human beings, which is to be prepared for anticipated events, listeners mostly evolve musical representations through a process of abduction – there are also situations in which musicians and non-musicians cannot focus on music. Therefore, it seems possible, under certain circumstances, for listeners to hear music in a stream of consciousness mode.

Abduction means that acoustical information, in the first step of reasoning, generates a hypothesis about a probable musical concept, in the form of a prediction referring to a certain expectation horizon. The possible consequences of this hypothetical concept can be determined deductively, and its musical elements searched inductively. Regarding the process of perceptual categorization in the auditory memory, it is likely that, already in these early processes, the nervous system tends to create a hypothesis about what will happen next. This happens because certain perceptual events activate conceptual relations, in those parts of the long-term memory, which were activated by similar events in the past, and/or were already conceptualized in relation to other events. That is an important analysis, in the sense that conceptual relations assign a present identity to acoustic information because of individual experience. They do not possess a priori a static identity. In addition, a constructed present identity is a product of various conceptual relations – based on models of cause & effect, prediction, space, time, role, identity, analogy, change, role, property, category – which, depending on their weighting, could produce different avatars of a same musical identity or concept.

The Figure 1 shows an abduction process during the course of listening. That is to say a process of conceptual relations, in the scope of current awareness, between three perceptual and conceptually categorized acoustical information activated from the long-term memory. A certain degree of physiological conditions is assumed, such as arousal and tension.

At time t 0, the acoustical information receives a present identity, through the process of memorization and retrieval. This identity construction, explicitly named or not, provides the basis of a hypothesis about the plausible musical concept. Depending on their musical experience and on their current individual constitution, non-musicians and musicians alike create a mix of different conceptual relations, in

the form of a deductive analysis aiming at anticipating the identity of some future acoustical information. That mixture produces emotional states and, for instance, could include relations of similarity, cause & effect, time, role, property, category, or explicit musical schema-driven-grouping with possible events in the future.

During this stage of inductive search, it is possible, both for non-musicians and musicians, that the acoustic information heard at t 1 and/or t 2 change the mixture of conceptual relations to previous acoustical information, in the sense that the anticipated concept becomes less likely, or unrealized. This means that perceptual and conceptual categorized acoustical information, activated from the long-term memory, send their present identity to the mixture of conceptual relations, and initiate a new abduction process, which could change physiological conditions such as tension or arousal, musical concepts and/or emotional states.

In terms of musical perception of time, the conditions outlined above, and the functionality of the musical construction are important for an extended perspective. Musical time is not composed of a density of differentiable events, but results from the succession, and possible repetitions, of abduction processes.

CONCLUSION

With the resources of modern science, we have tried to show in this paper that classification and categorization of information processes is a general mental operation in human beings. Hence, we suggested, non-musicians also have the ability to rate, separate and group individual sound events in relation to musical representations. Those representations can be different from those of trained musicians, as regards their structure, time span, and effect.

Our main point was to sketch an initial draft of a new musical theory, based on mixture of conceptual relations, which, in a process of abduction, assign their dynamic identity to acoustical information. In addition, such relations are responsible for musical concepts and emotional states arisen while listening to music, and for the musical perception of time.

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RESPONSIVE ILLUMINATED ARCHITECTURE

Christian Schneider & Stefan Müller Arisona

This paper presents and discusses two academic projects that employ 2D and 3D projection mapping techniques that respond to real-time environmental sensors or interactive user input. We briefly summarise the technical background and then focus on implications of using these techniques in the context of architecture education.

Projected Realities installation: Projection onto 20x20x5cm plaster model.

Introduction

Illumination of buildings with projectors or media facades has become a popular means of visual communication: in the art context, many festivals and curators around the world exhibit pieces, such as (Lonzano-Hemmer, 2008), and a growing number of applications can be observed in the commercial context (Starcom Amsterdam, 2010). As technology advances, the scale of illuminated surfaces increases, the visual perception of objects can be altered in real-time, and the use of sensors or smart phones enables the interaction between visuals and the environment. Parameters, such as temperature, movement or gestures drive the visuals and allow people to perceive their body and the environment in a new way.

In this paper, we present two academic projects, "Sensitive Tapestry" (Wipfli and Schneider, 2008) and "Projected Realities" (Schneider, 2009), which aimed at integrating above techniques into the architecture curriculum and at leveraging the architect's knowledge for a more seamless integration of interaction and visualisation. The goal of both projects was to create a novel experience that arises from architecture augmented with digital information, and from architecture that acts a user interface to reveal information about the building, its occupants and its environment.

Technical Background

The foundation of both projects is formed by a mapped projection that is overlaid on an existing structure, such as a façade or a 3D object. One of the main challenges is the proper calibration of the projected image with the static surface. Currently, a practical approach employs interactive assignment of dedicated virtual points to real points in space, and allows for precise calibration within a few minutes. From there, the camera and projection parameters can be calculated using the methods described by Bimber and Raskar (2005, Section 5.2 and Appendix A). In our approach, we avoided computational surface estimation by using a 3D surface that was parametrically known in advance. For example, for Projected Realities, we used a plaster model of ca. 20x20x5cm, with a parametric surface given by

$f(x, y) = 10.2 * \sin(0.04 * x) + 10.2 * \cos(0.04 * y)$.

Once calibration is completed, the objects can easily be augmented with content using standard 3D drawing techniques, e.g. using OpenGL. In our context, we used the Processing environment due to its low entry requirements for non-programming experts. The rendering core is then enhanced with real-time sensor input: In the case of the Sensitive Tapestry, we used a thermal imager manufactured by Testo AG. The imager delivers a video signal containing thermal information. The signal was processed in different ways using image-processing methods, and was either directly mapped and projected or used for additional extraction of features that were used for drawing of specific features.

Realisation within the Architecture Curriculum

Both projects, the Sensitive Tapestry and the Projected Realities were carried out as elective courses for undergraduate students at the Department of Architecture at ETH Zurich. The goal of the courses was to explore the possibilities of projected illusions, both from a technical as well as an architectural viewpoint, and especially in the combination of these two.

The technical implications are quite obvious: First, students are confronted with the difficult task of adjusting a projected image to a physical surface, a task that seems straightforward at first, but can not be properly achieved by just playing around. Thus, it requires a good understanding of projection setups, virtual camera parameters, and how techniques as described above are applied. Second, hardware issues and limitations of both sensing and projection devices need to be understood; for example even current high quality projectors have considerable colour issues when in bad lighting conditions. Third, the understanding needs to be transferred into real code, which must integrate different subsystems and operate in real-time – a non-trivial task for architecture students, but at task that turns out very rewarding as soon as first visible results are achieved.

From an architecture perspective, the main goal is to expand the basic understanding of a static built structure with function and dynamic behaviour: How can these usually invisible, but inherently important properties be made visible? How can they be communicated? And in particular how can connections between structure, function and behaviour be made visually accessible? Addressing these questions requires studying relationships within various specialisations within architecture, e.g. between building design and building technology. This helps obtaining a more complete picture of the many facets today's modern buildings are comprised of. Ultimately, such an experience can be fed back into the concrete applications in the design process and may also result in considerations for future directions of building design.

The deeper study and understanding of architectural relationships also quickly results in a dedicated exploration of artistic possibilities. We believe that such a combination allows for the creation of artworks that goes beyond mere technical demonstrations of the possibilities of 3D projection mapping as it is often demonstrated. The inclusion of architectural knowledge allows for the emergence of visual content that does not misuse built structure as a mere projection surface, but augments a structure with usually invisible features, that in turn are supported by this structure. Therefore using these techniques aims towards convergence of the physical and the virtual by focussing on the connections between the two.

Conclusions and Future Work

The two courses received very positive echo, and were very satisfying in terms of student dedication and results. In particular, the opportunity to present the works to a broader audience in public space resulted in an additional boost.

For future work, we currently see two areas: First, it would be useful to establish a coding framework that incorporates the basic projection mapping and calibration functionality, and allows the students to focus on either experimenting with more advanced mapping techniques or on actual content and on more complex interaction techniques. Second, we consider tapping into building information systems and using this information directly to feed it into the projected content.

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WAR & ART IN THE SCREENIC ERA

Adam Schrag

Using the work of Joseph DeLappe, Anne-Marie Schleiner, Wafaa Bilal, and others as "objects to think with," this paper draws on images from both military weapons systems and digital media artists to sketch a critical phenomenology of the surface at the intersection of human sensoria and technological media in the context of war.

Screen War

The U.S. military has been testing a new surveillance system – ominously named Gorgon Stare – that can track and transmit real-time movement across an entire town. [1] The system consists of a spherical array of nine cameras attached to the belly of an aerial drone. Each $17.5 million pod ways 1100 pounds and shoots at two frames-per-second at half–meter resolution, creating live three-dimensional geo-intelligence of an area. What it currently lacks in frame rate it makes up for in coverage. It utilizes tagging and other metadata in conjunction with ESPN-like instant replay software to organize different views and disperse them to various screens such as the tablets of soldiers on the ground and the centralized databases of Air Force analysts. The goal of this technology is to supplement the perceptual limitations of physical battlespace with a corresponding dynamic screen-based representation. Even though the system has thus far proved buggy and unreliable, its very existence reveals a long-enduring military fantasy of total vision – to integrate and suture the optical world and the screen world in order to create a more perfect, totalizing picture.

Such a system is rooted in a first-person screen subjectivity that exposes, dominates, and annihilates its 'other' while limiting its own exposure. It is a disembodied point-of-view that sees but cannot be seen, that targets but cannot be targeted, that shoots but cannot be shot. More Sauron than Gorgon, this omniscient eye that can see everything – that spies, targets, and shoots – is a cyborg construct of human and machine operations situated within the larger screen ecology of war. It is but one screen cluster within the imbricated screen-space of war that includes the weaponized screens of targeting and surveillance, the news screens of information and entertainment, and the video-game screens of fantasy and training. The screen has become a domain of war – a key battlespace of its own, distinct from but inseparably interfaced with 'real' battlespaces of war where target acquisition, televisual news spectacle, and video game graphics intersect and entangle.

Examples of the screenic entanglement of war and media technologies are not difficult to locate: the handheld footage provided by embedded television reporters shares the same intense proximity to battle as that of soldiers' homemade YouTube videos, which in turn recreate the perspective of first-person shooter video games (in several YouTube videos of patrol missions, for example, soldiers have explicitly recreated the first-person video game perspective by attaching their digital camcorders to their helmets). [2] [3] A more disturbing overlap, perhaps, can be found in the visual similarities between the "AC-130 Gunship" level in the video game *Call of Duty*, for example, and the Wikileak-ed "Collateral Murder" footage taken from the onboard targeting screen of a U.S. Apache attack helicopter from a

2007 mission over Baghdad. [4] In *Call of Duty*, players acquire and destroy targets from an aerial per-
spective. Likewise, in the Wikileaks video we witness, through a similar onboard targeting screen, the
slaying of about a dozen people including two Reuters news employees with the Apache's 30-millimeter
cannons. The game and the footage share the same black-and-white, cross-haired perspective and the
squelchy audio of seemingly casual radio communication by the pilots and gunners as they carry out
their destruction. Furthermore, they share a mode of vision structured by the same military fantasy of
weaponized vision. Of course, despite their aesthetic similarity, they are not the same. Equating the
game and Apache footage both trivializes war ("it's just like a game") and trumps up the game ("it's just
like war"). There is, after all, a significant difference between war-like games and game-like wars – one is
ostensibly for fun and the other for death. Rather, the video game and the Apache share a screenic kin-
ship; they live in the same media ecology. Game-makers strive for the most intense version of war's re-
ality in their games while war-makers strive for the game's reality in war. This aesthetic and ideological
kinship, and the ways that we address it and are addressed by it, is the focus of this paper.

Screenic Media Ecology

The screen, in all of these contexts, is more than a surface of representation; it belongs to and creates
the event. Under these medial conditions, the distinctions erode between the screens on which war is
waged and the screens on which it is witnessed. For example, the "Collateral Murder" video serves as
not only potential proof of a crime, but is also the very screen through which the crime took place. Simi-
larly, the infamous digital snapshots of the abuses at Abu Ghraib served simultaneously as both a record
of and an implement of torture. The virtual screen world in these cases is indelibly linked to – and deter-
minant of – events in the 'actual' world. During the first Gulf War, Paul Virilio located a succinct picture
of this interplay between the screen and the world in the form of stealth warplanes like the F117a: they
are war objects designed not only with consideration for their physical presence in flight but also with
consideration for their screen presence (or lack of one). [5] They are designed to stay both in the air and
off the screen.

In all these cases the boundaries between war fantasies and war acts, between information and propa-
ganda, between document and spectacle come under question. Military technologies like Gorgon Stare
and others raise important questions about the phenomenology of the war screen. How do we address
this transmedial screen phenomena? What are the consequences of this evermore distant and robotic
weaponry? What is the nature of virtual war or netwar in relation to the notion of a lived, embodied
world? What are the modes of protest or resistance to a war machine increasingly comprised of au-
tonomous robotic systems and cyborg constructs? Do drone operators dream of electric sheep?

How do we address these entangled screens of war? And how do we respond to the address of the
screen? These are questions of an ecological nature. The phrase 'media ecology,' though perhaps
overdetermined, is, as Matthew Fuller elaborates in *Media Ecologies*, a concept that perhaps best de-
scribes the complex, layered, "multiple relations of media dimensionality" that structures our "life in
media" (including our wars in media). [6] The interpenetrated nature of the screen world, especially in
the context of war, requires an ecological concept of the surface, what one might, in the spirit of Fuller,
Félix Guattari, and others, call 'the screenic' – a transmedial, ethico-aesthetic concept referring to the
transformation of complex medial, technological, bodily, and social operations into a surface of perceiv-
able events. More than specific media technologies, the screenic addresses the interpenetration of bod-
ies, machines, and images of war across various junctures of media convergence and divergence. Fur-
thermore, it addresses the integration and disintegration of human sensoria within the expanding nexus

of screen networks spanning from television to the handheld devices and all the targets, targeters, and spectators interfaced therein. The screenic, then, is a kind of ecology of the surface where we address and are addressed by a host of technocorporeal and technosensory concerns, where the screen can serve as a site of weaponization (through surveillance, targeting, and tele-control), of record (through documentary and journalism) and of resistance (through hacktivism, art, and other tactical interventions).

Screenic Interventions

How then do artists transform the virtual milieu of war into a mode of resistance? Some artists have responded to the militarized screen by disconnecting from it. In other words, they engage the screens and digital objects of war by transposing them to decidedly more durable substrates. They defamiliarize the screen by resituating its images elsewhere. They are screen-displacers. Conversely, other artists, hackers, modders, and activists attempt to think about (and with) war media by penetrating its screen space, if only fleetingly. Rather than reframe the screen in another context, these artists interface with the screenic and, as Rita Raley argues in *Tactical Media*, seek out ways to "evolve the virtual effects of war into a mode of resistance." [7] They are screen-modifiers.

Screen-displacers seek a sustained, un-flickering response to the war screen as we can see in several artists' responses to the digital snapshots of abuse at Abu Ghraib: Richard Serra's crude charcoal sketch of the man on box at Abu Ghraib with "STOP BUSH" scrawled on it like a hurried piece of graffiti or a cave painting; Susan Crile's delicate chalk and pastel renderings of the Abu Ghraib photographs where light white lines and vast negative space are punctured by the dramatic bold colors of an interrogator's black gloves or a prisoner's green hood; Fernando Botero's painted recreations of the Abu Ghraib photographs, where his comically rotund figures take on a moral and emotional weight in their excess; Martha Rosler's reboot of her Vietnam era collages *Bringing the War Home*, where conflict zones, comfort zones, and consumption zones collide when, for example, American soldiers are pasted into the idyllic domestic space of a magazine-ad living room; and, lastly, Jenny Holzer's *Redaction Paintings*, which make a public spectacle of various redacted government documents related to torture, detainment, and the "war on terror." Each of these works creates an intervention that, rather than entering the screen frame through cyber art practices, reframes the screen in a different milieu. They are objects that think about the screen by displacing it.

The practices of digital artists, on the other hand, have sought a more embedded approach that addresses, reframes, and thinks through (and with) emerging militarized modes of perception. Such tactical art practices seek to interfere with, disrupt, or otherwise interface with the screens of war. Rather than displace the screenic, they place themselves within it. Over the last decade, artists like Joseph DeLappe, Anne-Marie Schleiner, and Wafaa Bilal have experimented with the tactic of video game intervention, which utilizes game space to disrupt, if only fleetingly, our acquiescence to the screenic space of war.

In *dead-in-iraq* (2006), DeLappe entered the online first-person shooter *America's Army*, a tax-payer-funded recruiting and PR tool for the U.S. Army. [8] As a neutral non-participant, rather than play the game, DeLappe, under the screen name "dead-in-iraq," proceeded to type the names of dead American soldiers in the game's chat box. If his avatar was killed he would resume typing upon regeneration. Over the course of the project, DeLappe logged the name, rank, service branch, and date of death of over

4000 American casualties of the Iraq War. Some of the players that encountered *dead-in-iraq* were indifferent, some were curious observers, and others went so far as to protect his avatar. Many of the players who encountered DeLappe's project within the game, however, became upset or defensive. To them, *dead-in-iraq* was not only breaking the social contract of the game by not playing, but he was also politicizing their fun. By interrupting the game with the names of the dead, he momentarily punctured a riskless and regenerative military fantasy.

In *Velvet-Strike* (2002), Schleiner, along with Joan Leandre and Brody Condon, created an intervention in the game *Counter-Strike*, a mod of the popular first-person shooter *Half-Life*. [9] Instead of the usual "spray paints" players use to tag territories or mark kills within the game, *Velvet-Strike* invited players to create and use spray paints with often humorous or provocative counter-military messages including a soldier and an insurgent kissing. Like *dead-in-iraq*, *Velvet-Strike* garnered interest in the press and in some corners of the art world, but many players within the game's online community were upset with the intervention into their game. Rather than see *Velvet-Strike* as a challenge to the burgeoning post-9/11 militarized discourse, they saw it as an attack aimed directly at the game itself.

In *Virtual Jihadi* (2008), the Iraqi-born artist Wafaa Bilal modified the game *The Night of Bush Capturing*, an Al-Qaeda-made mod of the popular *Quest for Saddam*. [10] In the original *Quest*, players fight stereotypically mustachioed Iraqis with the ultimate goal of killing Saddam Hussein. The Al-Qaeda mod reverses the premise, making the goal to kill George W. Bush. For his intervention, Bilal placed an avatar of himself as a suicide bomber in Al Qaeda's mod of the game. The work drew controversy and the original exhibition at Rensselaer Polytechnic Institute in Troy, New York was shut down by the school's administrators. Those who opposed the exhibition saw Bilal's work as pro-terrorist project and failed to see it as nuanced attempt to create an alternative narrative through a hybrid of autobiographical details and the game's narrative. Bilal's stated goal was to investigate the inherent racism within Western media depictions of the Arab world and the conditions under which terrorist recruitment becomes an option. In general, Bilal's work has involved challenging Western modes of watching 21st-century war. Bilal's work involves modifying both skin and screen by implanting his body into technologically mediated environments and, conversely, implanting technologies (surgically) into his body: in *Domestic Tension* (2007) (aka "Shoot an Iraqi") Bilal created a web-based installation in which participants could login and shoot a remote-controlled paintball gun at him; *…and Counting* (2010), was a 24-hour tattoo project in which dots of visible and invisible (UV) inks on his back represented American and Iraqi dead respectively; and, most recently, in *3rdi* (2011), Bilal has constructed a cyborg experiment in which a camera that is surgically implanted in the back of his head, beams images to a museum in Doha, Qatar.

Each of these artists addresses the medial entanglements of the screenic by creating a glitch – an ephemeral moment of interference – that attempts to temporarily disrupt the accepted screen world and, in doing so, disrupt the ideology that underwrites it. By engaging video-game interfaces and interactions, surveillance technologies, robotics, mass media, internet cultures, and social networks, such art practices construct situations that fleetingly expose the screenic entanglement of bodies and media technologies within digitally mediated visual environments. The interventions are aimed less at the games themselves and more at the perceptive practices that structure the waging and witnessing of modern war. These interventions invite a critical dissonance that allows us to not only see the game, but more importantly to see ourselves gaming in the context of virtual war.

As Rita Raley has observed, such interventions are inherently temporary, ephemeral, and aleatory. "Tactical media," she says, "signifies the intervention and disruption of a dominant semiotic regime, the tem-

porary creation of a situation in which signs, messages, and narratives are set into play and critical thinking becomes possible." [11] They are tactical, not strategic, because their outcomes are uncontrollable and unpredictable. Their most elucidatory moments can arise out of accident and failure. They are rooted in contingency. They are timely, but they do not last; all that remains are secondary objects such as screenshots, videos, photographs, and bits of code. What, then, do these tactical media interventions accomplish? Are they part of real political change or just fleeting commentary? Are they a mode of resistance or a gesture toward resistance? What kind of action is cyber intervention?

For Laughs, For Lulz

In a recent *New Yorker* essay, titled "For Laughs," about the conceptual artist Francis Alÿs, Peter Schjeldahl writes, "Most artists are still what artists have always been: people who make things. But the past half century has seen an increase, in number and in prestige, of artists as conceptual performers: people who chiefly do things, whatever their auxiliary output of pictures and objects." [12] Of course, "making" and "doing" are not as mutually exclusive as Schjeldahl suggests here, but his distinction does point to two different kinds of art objects: for makers, the object, itself, is the work and for doers, the remaining objects are a record of the work, not the work itself. Artists such as DeLappe, Schleiner, and Bilal are, at the end of the day, like Alÿs, doers insofar as their work is more event than thing. The work is lost save for a trail of text, code, screenshots, and clips. This kind of "doing" is what gives tactical media art its temporary, ephemeral, and aleatory qualities – the qualities of laughter and mischief.

The themes that DeLappe, Schleiner, and Bilal tackle are often serious and somber – not "for laughs" – but the nature of their work is mischievous. They break the rules of the game and create little glitches in the screen world. At about the same time that Schjeldahl published "For Laughs," a network of hackers calling themselves Lulz Security, or LulzSec, carried out a series of short-lived, but highly publicized hacks that exploited and exposed security loopholes on several high-value sites including the U.S. Congress and the C.I.A. LulzSec portrayed themselves as a band of merry hacksters who, like Alÿs, did it "for the laughs," or in their case "for the lulz." Lulz – which is modified internet-speak for LOLs or "laughs out loud" – in addition to laughter, also connotes the perhaps more radical idea of "lulls," a break in the flow of things. If there is no way outside of the techno-military screen world, perhaps the lulls and lulz of tactical media intervention become a gesture of resistance that, though it cannot break the frame, does manage, for a moment, to crack the surface. Somewhere between Alÿs and LulzSec, the screenic interventions of artists like Delappe, Schleiner, and Bilal seek ways to penetrate the weaponized surface – to create lulls in its illusive continuity, to be the wilier, regenerative Prometheus in the face of the Gorgon's stare.

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INTERACTIVE TECHNOTEXTILES - THE HYBRID BETWEEN TEXTILES AND TECHNOLOGY

Bettina Schülke

Ultra Smart Textiles are the latest generation of Smart Textiles, which can sense, react and adopt themselves to environmental conditions or stimuli from mechanical, thermal, chemical, electrical or magnetic sources. Thus the participatory audience experience is significantly heightened, "pushing the boundaries", compared to models created with earlier technologies.

Introduction

Much has been discussed about Smart Fabrics lately. This rapidly growing field   offers a huge range of research opportunities and new areas for investigations. These materials with incorporated technological elements enable the fabrics to transform into interactive interfaces. While numerous research opportunities as well as innovative method development by artists are offered in this field, it has to be noted that the goal of research is towards a pragmatic outcome closely linked to industry. The artist in this specific field serves as a conduit for knowledge transfer. A significant amount of astonishing results are already generated. Nevertheless several questions remain unanswered and need further explorations.

While basic research in this specific area has already been undertaken for more then ten years, recent developments present novel technical possibilities that are beginning to redefine textiles as a unique multidisciplinary field of innovation. Novel technology combined with one of the oldest traditions, the production of textiles, facilitates astonishing results on many different levels. Several papers already discussed applications of wearable's and fashion technology. To a lesser degree artists were looking into new possibilities of using Smart Textile materials as interactive surfaces by including these materials in site-specific installations. While Intelligent Textiles are nowadays still more connected with fashion or wearable's, health, sport or military use, there are huge possibilities for an artistic approach connected to site specific and interactive works. In the gadget or fashion field the technological tools are often separated from the textile material, yet unique developments for embedded technology inside the fabric are already being investigated offering new potentials. Observations show very clearly that a lot of research is still needed. How can these materials be used to create meaningful representations? How can the sensory aspect be further developed? How can the practical use of Smart Fabrics be widely promoted beyond the fashion and sports industry? This paper will focus on how the use of Intelligent Fabrics can be integrated more effectively in artworks that explore artistic and technical opportunities to enable new aesthetic perspectives.

The Hybrid Between Textiles and Technology

At the beginning I would like to introduce and define a few basic terms. The first generation, which could only sense the environmental conditions or stimulus, was called Passive Smart Textiles. The second generation, Active Smart Textiles, has both actuators and sensors. The actuators act upon the detected signal either directly or from a central control unit. Active Smart Textiles are shape memory,

chameleonic, water-resistant, vapor permeable and absorbing (hydrophilic/non porous), heat storage, thermo regulated and heat evolving materials. Ultra Smart Textiles are the latest generation, which can sense, react and adopt themselves to environmental conditions or stimuli. A very Intelligent Textile essentially consists of a unit that works like the brain with cognition, reasoning and activating capacities.

The production of Ultra Smart Textiles became reality as a result of a propitious coming together of traditional textiles and scientific disciplines such as the science of materials, structural mechanics, sensor technology, advanced detection-technology processes, communication artificial intelligence or biology. Integrating technology into textiles goes far beyond then just attaching electronics or devices underneath the surface. It has to be distinct whether the technology is attached or imbedded to the textiles.

Possible technical solutions for combining electronics with textiles are:

- Attached
- Embedded
- Woven into the textile
- Integrated into fibers

It can be observed that there is a tendency technology and electronics especially in the area of fashion design, performance and gadgets still quite often is separated or hidden under the surface of the textile material, where in other fields like for example in medical, sport or industrial textiles, remarkable developments take place in material science itself. While in early forms of wearable's sensors or gadgets were embedded between layers of textiles, stitched or crudely fed through seams, they where often described as interactive but needed the wearer to trigger various interfaces manually. Meanwhile embedded fibers can be equipped with cameras, microphones, speakers or sensors, which consequently leads to an improvement of interactive solutions and new possibilities for intelligent garments. Major research in this field was investigated lately at MIT, (Massachusetts Institute of Technology), for military use. Cameras or microphones embedded into textiles cannot only store information on computer circuits; they can also transmit and receive data by an external signal. [1] Today this technology first developed for the US military finds its way to subtle surveillance or sporting applications. Electronic modules are becoming rapidly smaller, lighter and more flexible, which consequently provides a better adoption to fibers and the soft tactile textile material. Attributes like "smarter", "reactive", "stronger", "faster", lighter", characterize these sleek fibers and materials. Remarkable developments are currently taking place in the improvement and engineering of fibers and material science, like for examples in the area of nanotechnology, sustainability, conductive fibers, glass fibers, luminescent textiles or woven interfaces.

Traditionally textiles used to be a "dead material", once manufactured they did not change the visual appearance of the surface anymore. As Piila Saksela [2] points out, " whatever material you are confronted with, it is already dead- the flax has been cut, the lamb shorn and silkworm has offered up its silk. All these diverse materials need new life breathed into them, they need be recreated in a new form."

Through the integration of various novel applications, materials like conductive fibers, electronic elements and PCMs (Phase Change Materials) fabrics develop the capability to communicate with their surrounding. Additional integrated sensory technology enables textiles interactive qualities. While PCM´s, some printing techniques or advanced coatings are rather applied on the textiles surface, there shows a clear tendency for new solutions which are already integrated in the weaving process.

Besides material science advancement, technical solutions cover the wide- ranging field of textile manufacturing applications. Digital Jacquard looms can translate digital data into woven surfaces. Ink-jet printing machines are able to transform digital information to large-scale formats printed on fabrics. Other digital machines allow for the developing of new processes for knitting and embroidery. Converting technically or chemically enriched fibers into intelligent materials combined with improved manufacturing applications push artists' and designers' ideas and their projects far beyond a traditionally use of textiles.

Developing an intelligent fabric mostly requires a team of professionals like textile engineers, researchers and technicians. Without support from a professional lab or institute it is nearly impossible to develop an Ultra Smart Textile. The artist's position moves towards the intersection between textile research, material science, the production of ideas and content, design, industry and the art scene. A critical analysis of electrically enriched textiles shows clearly the complexity of the improvement of Intelligent Textiles. This might also be one of the reasons why these kinds of materials are still nowadays rather rarely used in artistic installations. A much wider field of application is linked towards industrial products. Textile companies realized that there is a big potential to collaborate with artists in the readjustment process of developing experimental applications for intelligent materials. Leading textile companies on the European market are aware that the production of Smart Textiles can help them to strengthen there position on the market compared to low prize productions from the Asian market. Still many investigations in this area are rather prototypes then commercial interesting products. Nevertheless, companies are in the need to create unique and outstanding products and that's the fusion link to "unnecessary research". A playful and highly experimental approach of artistic projects can close the gap between a strictly commercial thinking and spectacular ideas and novel investigations.

Interactive Intelligent Textiles in Contemporary Art

It can be observed that an increasing amount of artists are integrating textiles in their art-works of late. While textile art frequently was coated with attributes like handicraft or decorative art, electronically enhanced or interactive intelligent fabrics generate fresh contents and aesthetics.

- Where are difficulties and challenges using Intelligent Textiles?
- What are the limitations?
- How can fibers react more interactively?
- What are future parameters of developments in this area?

While seeking for answers to these and other related questions, I would like to introduce some examples of already developed projects in the following, keeping in mind it is outside the scope of this paper to discuss various projects in detail, consequently only a few examples will be mentioned:

The engagement and interaction with the viewer can take place on several levels. Equally multifaceted are the directions of applications which can range from physical bodily engagement, motion responsive environment to emotional sensing and sound till via environmental data transfer or visualization.

Zane Berzina, [3] an artist and researcher born in Lativa and based in London, created in her project called *"E-static Shadows", an artistic translation of electrostatics that manifests the potential of harvesting energy from immediate surroundings. In this technically highly advanced two-year research project she collaborated with an international team of electrical engineers and material scientists to link new

technologies and smart materials with more traditional textiles approaches. Berzina explains, "that the electronic textile acts as a static mirror responding to the usually invisible charges generated by people interacting with materials and making them visible. Equipped with LED lights, transistors and woven electronic circuits seamlessly integrated into the electronic structure, the installation is able to create transient shadows on the textile display in areas which detect a presence of electrostatic fields feeding on the changes created by viewers and objects." In addition, Berzina points out, "This installation simultaneously acts as a simple sonic instrument in response to the presence and intensity of charges and human proximity".

The Slow Furl Project, [4] a collaboration between Mette Ramsgard Thomsen and Karin Bech of the Center for Interactive Technology and Architecture in Copenhagen and the University of Brighton, combines textile technology with the emerging field of robotics. For this large-scale installation a custom-made soft textile skin was woven with conductive copper fibers. Robotic textile membranes function as sensory materials that can be programmed to interact with the potential for movement. This installation creates a playful environment interacting in slow motion with the viewers once entering the space. A mechanical system triggered through the touch of two parts of fabrics, initiate the change of the structures surface and shape. This project aims to explore the notion of flow.

Ligorano/Reese Collaboration [5] have been perfecting during the past years a new media work they call *"Fiber Optic Tapestry"*. In their description, "future tapestries will take the form of woven maps to show the appearance and disappearance of information from around the world; woven portraits, and use the individual´s Internet reading and self-metrics to create a picture of them; and a disaster tapestry that overloads and ultimately fails". This textile-real-time animation is an abstract data visualization that continually updates as data changes. Information from Twitter and other data sources display color, light and pattern onto woven fiber optic panels using RGB LEDs. The computer controlled custom-made lightening system displays information on the fiber optic panels, which are woven on a handloom. These textiles created with contemporary communication materials and processes redefine the role of a tapestry. Ligorano and Reese explain, "In European culture medieval tapestries tell narratives and in the 21st century we find our stories threaded and networked throughout the web. The Fiber Optic Tapestry is an art form about networking, communication and society. It is like weaving information."

The TITV Greiz, a German based Institute for Special Textiles and Flexible Materials is one of Europe's leading textile research centers. Two of their current research projects are based on the integration of LED technology into textiles. The "TexoLED Project" [6] investigates the integration of stiff OLEDs in spacer warp knitting. OLEDs are organic light emitting diodes in which the emissive electroluminescent layer is a film of organic compounds, which emit light responses to an electric current. The advantage of this technology is the combination of organic LEDs with electronic circuits made of synthetic materials that create fully flexible displays that are almost able to arbitrarily bend, fold or curl. The aim of this method is ether to print electric circuits on the back of the fabric or implement conductive threads in the weaving process. However, this process can turn fabrics into flexible displays.

From Fiber Art to Intelligent Textiles

What is commonly known as fiber art has a longstanding background in the history of art. In the late 1950´s and early 1960´s a new generation of artists started experimenting with a variety of new aesthetics combined with old textile techniques. One of the first mentioned electronically enhanced garments

as artistic expression dates back to 1956. The Japanese artist Atsuko Tanaka [7] created for her performances the "Electronic Dress". Flashing multicolored lights were embedded in textile. Many developments in this area have happened ever since then. Today numerous Intelligent Textiles are developed with integrated light sources like LEDs, luminescent fibers, light-wires or light-emitting fabrics woven with optic fiber.

Profitable applications might ask for different standards then artistic applications of intelligent textiles. But exactly through this synergy spectacular ideas might appear. They can be at the first glace useless for commercial interests, maybe even inefficient or just simple humorous, play-and joyful, but can turn out as the base for adopted further developments or generate new products.

In industrial production technical solutions need to fulfill certain requirements or standards, mostly in terms of international norms or production conditions. Contrary to the normal practices of industrial protocol, artistic projects do have much higher levels of freedom to experiment or create very unique and playful solutions specifically developed for a certain artwork. Nevertheless there are several companies or institutions that collaborate with artists and invest a huge amount of their budget for the research in these new areas. One of them is Philips Design Probes. [8] The program of this private research organization based in the Netherlands is dedicated to "far-future" research of combining textiles and wearable's with sensory intelligence. Sheer limitless applications of digital technology explore, extend and enhance the human body´s ability to sense. Though their program is rather connected with commercial interests, nevertheless novel investigations in terms of sensory intelligence are explored in this research center.

Textiles and Interactivity

Textiles provide certain qualities no other materials can offer. When it comes to design there are nearly no restrictions in terms of shape, size and scale. They easily can become an integrated part of the environment and can be applied in two or three dimensionality. An enormous flexibility characterizes this material. When working with layers, surfaces can interact and create more complex compositions with depth of field. They are light in weight and predestined for mobility and easy to transport. The play between color, brightness and matte-ness, surface, line and the texture of the threads enable a unique creation of structures and surfaces. A haptic or sensuousness appearance of textiles often evokes the desire of touch and feel. Consequently these attributes allow playful applications combined with interactive or smart solutions.

New frontiers of perception and interaction are created by current technology. The comprehensive spectrum of innovative spatial and interactive work reveals how technology is fundamentally changing the use of textiles in artistic projects. Touch, engagement, exploration and intervention are just a few attributes that describe main sources of inspiration characterizing interactive applications for intelligent textiles. Artists and media designers are increasingly creating objects that communicate and installations are brought to life with the help of responsive low-and high-tech technology. Compared to models created with earlier technologies the question arises how specifically the use of intelligent textiles can be more effectively integrated in interactive or site-specific artworks.

- How can the participatory audience's experience be significantly heightened?
- How can the support of artistic projects push the development of Smart Textiles further?

Conclusion

The enormous complexity of many of the multidisciplinary research projects in this area involves mostly a whole range of specialists and experts with varying backgrounds. Without proper funding or the support of institutions, labs or industrial companies, it still remains difficult for the individual artist to work in this field. However, it can be observed that already a whole range of exciting projects was recently realized. Critical analysis illustrate clearly that it has to be distinguished between a commercial use of intelligent textiles and an artistic approach. Nevertheless in this specific field, a multidisciplinary collaboration of various disciplines may prove indispensable. It has to be noted that the goal of research is towards a pragmatic outcome closely linked to industry. The artist in this specific field serves as a conduit for knowledge transfer. Artistic projects with intelligent fabrics do have the potential to push new investigations in this field far beyond there conventional limits.

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DESIGN OF AN INTERACTIVE CULTURAL HERITAGE EXPERIENCE: THE HISTORICAL ORCHESTRA

Ferhat Şen & Reha Dişçioğlu

In this paper, we describe the design and implementation of the Historical Orchestra Project, with an emphasis on digital technology. The project is a digital cultural heritage experience that combines art, computing and digital technology. The Historical Orchestra is an interactive installation that is aimed at creating an engaging museum experience by its interactive quality and designed for use with an ancient Turkish illustrated manuscript.

Fig 1. Historical Orchestra installation setup as shown in Media Lab Demoday, 2011, Copyright Ferhat Sen.
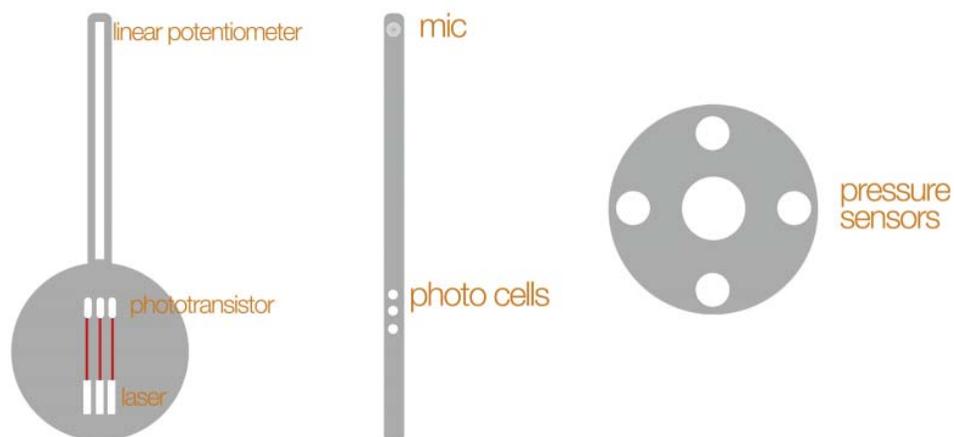
Fig 2. The Sensor Structure of the Digital Instrument, 2011, Copyright Ferhat Sen.

Introduction

The use of digital and electronic media implies a change in the conception of museums and the relationship between the artifacts and the visitors of the museum. In the traditional conception of museums, the artifacts are displayed in spaces under the necessary preservation conditions. Usually being behind glass protection, the artifacts cannot truly be sensed and observed by the visitors, neither by touch nor by looking closer. For example, some artifacts, like illustrated manuscripts, cannot be viewed completely since only one page of the book can be displayed at a time. Moreover, the information displays are often presented as a text next to the artifact, which is not offering an engaging experience. The lack of interactivity that results in the lack of visitor engagement is a major problem of this conception of museums.

In the context of cultural heritage, the use of digital and electronic media cultural heritage can provide new possibilities for visitors and heritage institutions to help them further appreciate the culturally valuable items in the collections. Digital media tools can enable us to create an interaction-based engaging experience through which the educational value can be conveyed. We argue that a multi-sensory experience inviting visitors to actively participate rather than passively see can contribute to conveying the educational value. An answer to the question of how to involve interactive media for an engaging and educational cultural heritage experience, we designed the Historical Orchestra Project by considering the specific qualities of the artifact in question. In this paper we present the design phases, from concept development to implementation, of an interactive audio/visual cultural heritage experience based on a page-couple from an illustrated manuscript.

THE ARTIFACT

Being a significant Turkish manuscript, Surname-i Hümayun (The Book of Imperial Celebration) was written and illustrated between 1583 and 1588 in Istanbul, Turkey. It is a documentation of a 52 day celebration organized by Sultan Murad III for the circumcision celebration of his son, Sehzade Mehmed, in 1582. The text is written in 16th century Turkish and uses Arabic script that follows a right to left layout. Similar to the text, the two-page illustrations also follow the right-to-left layout, where the illustration on the left page is the continuation of the one on the right page (Atasoy 1997, 32).

Comprised of 432 pages of text and 472 pages of illustration, the manuscript presents events and activities which took place during the celebration. In each illustration pair, a different group of artists and craftsmen are depicted in slightly different templates of the Hippodrome Square and Ibrahim Pasha Palace in Istanbul. Among these illustrations, we have selected the one illustrating the procession of musicians shown in Fig. 1.

THE INSTALLATION

The materials needed for the Historical Orchestra installation include one custom-made projection screens, and digital instruments. The selected illustration pair from the manuscript is projected onto two separate projection screens. The image is divided onto two screens in order to reflect the page structure of a book, since the original artifact is a book. In front of the screens, two desks are placed for putting the digital instruments on, and for hiding the irrelevant technological details from the visitors. On the

floor, in front of each instrument, a red circular rug is placed, designating where the visitor should stand. Two speakers are placed near the projection screens for the sonic feedback.

THE INTERACTION

When a visitor stands on the circular carpet in front of a tangible instrument, the system initializes and a corresponding animated musician appears on the screen. When the visitor begins playing the real instrument, the animation corresponds by appearing to play the same instrument on the screen, enacting a scene as on the original page of the manuscript artifact. In addition to the visual feedback, the visitor also receives sonic feedback when s/he plays an instrument. For example if a user plays the ney, s/he hears the sound of the ney playing the note s/he intended. The audience in the balcony and the Sultan on the top left are also interactive. The increase in the number of real players increases the audience in the scene. If there is only one user playing an instrument, a small audience appears on the balcony. When a second user joins, the audience increases on the balcony. After a third user joins, the audience on the ground floor as well as the sultan on the left-most balcony attends to see the performance of the musicians. When all users step off of the carpet, the musicians and the audience disappear.

Concept Development

HISTORICAL DRUMMER

Based on this selected artifact, the first concept was the Historical Drummer, which was an interactive installation that the visitor interacts with through a frame drum. The drum player in the illustration animates and starts to play a simple rhythm, and asks the user to accompany him. When the user starts to play, a human-sized cardboard puppet of the belly dancer in the illustration starts to dance to the beats of the drum created by the visitor. As the user continues to play the drum, other band members start playing to the song, and an audience appears on the projected walls of the installation space.

This concept was presented to two different audiences to see how it is received by different people. The first group was a culturally diverse audience, composed of ten masters degree level art and design students. The second was a group of six Turkish-origin masters and/or doctoral degree level students at different universities from around the world, from various backgrounds, and related to cultural issues. The received feedback showed certain common patterns as well as different point of views which helped us to re-conceptualize the project. Both audiences found it engaging and informative to a certain degree and offered suggestions for improving the interactivity. However, the method was not approved in the same way by the two groups. The first audience did not report any concerns about the perspective we had in the cultural context. Whereas, the second audience found the foundation that the concept was based on as not politically correct. The major criticism was regarding the selection of the dancer as the only interactive element in the installation. It is argued that the image of "dancer" is one of the most stereotypical elements in orientalism.

HISTORICAL ORCHESTRA

Taking into consideration the feedback we received, we decided to build an interdisciplinary team and re-design the concept. The previous design team, which was composed of designers only, was enhanced

with additional members who were also relevant to the project but through a broader range of perspectives. The final team comprised of an oud player, a frame drum player, a ney blower, and a Turkish literature researcher, along with interaction designers and a sound designer.

The resulting concept, the Historical Orchestra, is also an interactive installation based on the same artifact. Instead of one instrument and the real-sized cardboard dancer, it utilizes three tangible musical interfaces and gives real-time visual narrative feedback on screen. The sensor-based musical interfaces enable three users to play three instruments simultaneously. The visuals are based on the event depicted in the manuscript, i.e. the procession of the musicians. The illustration is interactively animated according to the actions of the visitor with the instruments (Şen and Díaz 2011).

Analysis of the Actual Instruments

The first step of the design process of the musical interface was the analysis of the actual instruments in terms of their affordance and intrinsic difficulties. Due to technical limitations, we selected three of the musicians and their instruments as the basis for the musical interfaces. The selected instruments are the Şehrud (Large Oud), the Ney (Reed Flute), and the Zilli Def (Tambourine) (Atasoy 1997, 13-17).

The Şehrud is a large form of the oud, which has been used in Turkish classical music and seen frequently in music-related scenes at illustrated manuscripts. It is a plucked string instrument with a fretless short neck and a round back. It has 5 string groups on the fret board where the player presses onto the string with his/her finger. The strings are plucked around the center of the round back with a plectrum.

The Ney (Reed Flute) is the major woodwind instrument used in Turkish classical music. It is made of a single piece of reed and has to have nine joints/segments that are ideally of equal length, regardless of the length of the ney. The length may vary according to the tuning. A ney has seven holes on it; six at the front for the fingers, one at the back for the thumb. The mouthpiece (başpare), which is located on the first joint is also known as the sound box of the ney, where the lips are placed and breath is blown. The ney is held by two hands in such a way that the fingers can cover the holes, and the upper end is supported by resting on the lips The ney is played by blowing into the mouthpiece at a certain angle with a trained lip placement which novices have hard times in even making sound.

The Zilli Def (Tambourine), a member of percussive instrument family, is a frame drum with cymbals located along the circumference of the frame. It is formed by a skin stretched over a circular frame. The diameter of the frame may vary from about 20 to 50 centimeters. The cymbals are placed in pairs to produce a sound at each tap of the Zilli Def, and four to five pairs of cymbals are used. It is a relatively intuitive act to make music with this instrument; however, creating a rhythm that is within the context of this illustration requires some knowledge which again impossible for novice users to have.

Sensor Structure and Mapping Strategies of the Digital Instruments

Like the acoustic version, the Digital Oud is formed with a neck and a round back having three laser strings, and a fret-board based on a linear potentiometer. On the round back, three low-power, approximately 0.45 mW, lasers are aligned in such a way that each laser points at a photo-transistor (Sparkfun Official Website, 2005). The laser/photo-transistor couple serves as an on/off switch representing the

gesture of a string pluck on the actual instrument. When a user touches the laser, the photo-transistor detects it due to the change in light striking on the sensor. On the neck is placed the touch-based linear potentiometer, which is used to detect the position of the user's finger on the fret-board as shown in fig. 2.

Various mapping strategies are employed for the sensor data coming from the photo-transistor and the linear potentiometer. The data coming from the photo-transistor is either 1 or 0, denoting whether the string is plucked or not. Each photo-transistor is mapped to a different octave in the scale serving as an octave selector. The data received from the linear potentiometer changes between the range of 0 and 1, depending on where the user's finger is. The length of the potentiometer is quantized into ten segments, where each segment represents a base note. Based on this note and on the octave selector, three harmonic notes are generated and played in random times with different random seeds.

Although the Digital Ney looks like the original ney, it is in fact a reduced version with a mouthpiece and only three holes corresponding to three notes. Under each hole, a photo-resistor is embedded to detect the openness of a hole. A microphone is placed into the inner part of the mouthpiece to receive the sound data when user blows.

The digital ney requires a real-time signal processing before the mapping could be done. In order to differentiate a blow from speech, the audio signal received from the microphone has to be processed. Using a bandpass filter (bp~), which passes certain frequencies and attenuates the others, we managed to filter out only the frequencies corresponding to a human blow. This enabled us to use the visitor's blow as the trigger to play the note. The note plays as long as the visitor blows. After being able to separate the blow, we also measured the amplitude of the signal and mapped the amplitude to the volume out of the instrument. In other words, the more powerful the blow is, the higher the volume of the note is. In order not to complicate the instrument, the digital version has only three holes and corresponding three notes. Each of the three holes is mapped to one corresponding note on the real instrument.

The Digital Tambourine has a circular frame and a drum skin over it. Five pressure sensors are placed under the drum skin to receive the input of where the user hits. The hit data from the user input triggers the drum samples. Each pressure sensor triggers different drum samples enabling the visitors to create rhythm by using basic rhythmic structures of Turkish classical music.

The Design Environment

The design environment has two main components: hardware and software. A Macintosh computer with a Mac OS X operating system, various sensors, and Arduino microcontrollers are used as hardware. Arduino, an open-source programmable microcontroller, enabled us to send sensor data to the computer via a USB input/output interface (Arduino 2011).

The software that we used for programming the real-time interaction, signal processing, and playing music is Pure Data (PD), which is a real-time graphical programming environment for audio, video, and graphical processing (Pure Data 2011). An external library called FluidSynth, which is a real-time software synthesizer based on the SoundFont technology, is used to generate the sounds of the instruments. The software that makes the real-time animation possible is Animata, which is a real-time animation software, designed to create interactive cut-out animations (Animata 2011).

Communication from hardware to software took place with Arduino through the USB interface. In order to read and transfer the sensor data from Arduino to a PD environment, communication was necessary between the sensor data and PD. First, an open-source firmware, Firmata, is installed to an Arduino microcontroller thus creating the necessary set of subroutines to use. Then, an open-source PD patch, Pduino, enables the PD to control all features of Arduino with Firmata firmware, including reading the sensor data.

In addition to the communication between the hardware and the software, software-to-software communication was also necessary. The communication line between PD environment and Animata software was the Open Sound Control (OSC) messaging. OSC is a protocol for communication among computers, sound synthesizers, and other multimedia devices.

Conclusion

In this paper we have presented a case study for creating an interaction-based engaging experience as a supplement to a cultural heritage artifact for enhancing the museum visit. By starting with a historical artifact, a 16th century Turkish illustrated manuscript, our case study is an interactive audio/visual installation utilizing three digital musical instruments and giving audiovisual narrative feedback in the form of interactive animation and sound. The actual instruments that are depicted in the illustration were a blueprint in designing the digital instruments. We argue that the experience emanating from the interaction of the visitors with the digital application contributes significantly to the dissemination of the educational value. This study shows how a museum visit can be enhanced by using interactive experiences considering the specific qualities of the artifact in question.

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ART<>SCIENCE: AN ONTOLOGY

Timothy J. Senior & Florian Wiencek

With an increasing diversity in how traditional artistic and scientific practices are being brought together to generate new forms of expression and/or inquiry, the question of how to characterize such cross-over work is raised. To address this, we are developing an ontology and a process model that take into account the nature of project work, the processes by which they are created and the reception contexts through which they are disseminated.

Historically, notions of art and science have fluctuated in the degree of their [in]compatibility. With the re-emergence of art as a tool through which knowledge drawn from the biological sciences is being explored, unexpected relationships between traditional scientific and artistic practices are beginning to materialize. Beyond the incorporation of scientific imagery into works of art, the increasing commercialization of biological-research technologies now gives artists access to new methods and materials in their pursuit of artistic form and expression. [1] From transgenic chimeras to 'semi-living' constructions, artists are producing works that transcend the boundaries of these two cultures of inquiry; their works are scientific in formulation but express ideas and beliefs that extend far beyond the realms of scientific inquiry and interpretation. Scientific work, also, is open to cross-disciplinary influences in the adoption of artistic methods to frame and present scientific data and in the selection and rendering of research-derived imagery for gallery contexts. The notion of the 'performative' in science as a methodological tool for exploring behavior in simulated biological and mathematical systems also represents a striking new direction in this regard, [2] suggestive of a more mutually symbiotic relationship in which user interaction has simultaneous artistic and scientific merit.

With the crossing of boundaries at the levels of conception, methodology, publication and reception, the body of such 'cross-over' projects within the arts and sciences is becoming increasingly diverse. Towards generating a better understanding of how the interaction between artistic and scientific practices is shaping the creation of these projects we are currently adopting an ontological and process modeling approach. Through an ontological framework, i.e., a systematic account of a domain of discourse through the explicit description of its objects and the describable relations amongst them, [3] we aim to generate a formal representational vocabulary that bridges these two traditions of practice allowing us to model knowledge in the domain of art-science cross-over work. By combining this systematic account of these projects with a process model outlining the key stages of production, a much richer account of this knowledge domain can be created.

Our combined system is being developed from the perspective that all projects, whether cross-over in nature or more traditionally situated within a practice, constitute a form of inquiry through which new meaning can be derived from the queried subject. By approaching the description of processes underlying project creation in more fundamental terms of action types in relation to entities, i.e., through perspectives that are independent of the traditions in which they are used, a common framework for describing and comparing project types can be generated. By describing action types that are either common or exclusive to traditional artistic and scientific practices in these terms, a clearer picture of how

cross-over works navigate between different practices as a function of the creation process can be attained. Indeed, by categorizing projects not as single entities but as multi-faceted products of processual activities, a more nuanced description of projects is possible. The rest of this paper will be dedicated to briefly outlining our conception of this ontological framework and process model.

The ontology component of our work will build upon V2_'s Capturing Unstable Media Conceptual Model (CMCM), [4] designed to accommodate the documentation of electronic art projects in which a project is more broadly defined as "the entire, distinct process of a well-defined activity," [5] such as a scientific research project or artistic project, and its well-defined and distinct temporal outcomes as would be shown, for example, in an exhibition or publication. We consider V2_'s view on the nature of projects, and their mode of documentation, as highly suitable for the basis of our current work. With its flexibility in accommodating multiple authors, different project-formats and mediating between the influence of diverse artistic and technological practices, it serves well the cross-over projects that we address here. We are currently broadening the scope of this ontology to better accommodate projects of more traditional artistic or scientific origin, thereby supporting comparisons between project types. In addition, we are adapting CMCM to work with Basic Formal Ontology (BFO), [6] an upper-level ontology framework that more rigorously distinguishes between entities that continue or persist through time (termed 'continuants') and the events or processes in which they participate (termed 'occurrents'). This framework permits us to further categorize processes both in terms of their real-world components and their practice-independent, operational character, such as the degree to which they are input specific, reproducible and algorithmic in nature.

The process model component of our work defines the key stages in the creation of a project from conception through to project outcome, constituting a standardized framework across projects within which the ontology is organized and expressed. The model is envisioned as a series of key processing stages bridged by entities serving input and/or output roles. The starting point of the model is an instance of, for example, a material or digital entity, termed the 'Source'. The first stage, termed 'Handling' receives this entity as input and denotes those processes required to make explicit (i.e. perceivable) Source characteristics that are to be communicated through the project outcome. This may involve a re-contextualization of the Source or a more interventionist strategy in which the Source is itself altered. The output of this stage, the 'Handled Entity' is in turn the input for the second processing stage termed 'Capture', in which this entity is translated into a form that can directly participate in a project outcome, the 'Captured Entity'. Again we differentiate between context-level translation, in which the explicit form itself is re-contextualized as the Captured Entity, and form-level translation in which a change in its material nature occurs. The final processing stage, termed 'Dissemination', denotes the preparation of the Captured Entity for a specific dissemination form, the 'Disseminated Entity'. This final entity will have a reception context that reflects particular aspects of the full process through which it was created, a context that is also outlined via the ontology. Note that the multiple rounds of the process model are permitted in which either the Captured or Disseminated Entity can serve as Source, thus recognizing that in cross-over work materials may be engaged that originated in other projects.

As a simple illustration of some of these key terms, consider their application to a project utilizing a DNA sequencing methodology. The project would concern the sequence of nucleotides constituting a DNA molecule in a cell sample (Source); the actions required to prepare, operate and visualize the DNA sequencing reactions (Handling), producing an experimental outcome (Handled Entity); the use of digital photography and image-treatment methods (Capture) to make a record (Captured Entity) of the Handled Entity; finally, the actions undertaken in Dissemination to present that record as a Disseminated

Entity in a scientific or artistic reception context, an example of the latter being Gary Schneider's 'Genetic Self-Portrait' of 1997–8. A scientific reception context may constitute a peer-reviewed journal with detailed descriptions of key methodologies performed in the creation of the Disseminated Entity. A gallery context, in its contrasting approach to dissemination, will promote different types of engagement with the entity. It is a more systematic and detailed account of these differences in reception context that we hope to capture in our work.

Summary

In summary we are developing an ontology and a process model to address the domain of art/science cross-over projects, taking into account the nature of project work, the processes by which they arise and the contexts in which they are interpreted. In doing so, we hope to give an account of these works that may aid both the creation of innovative art projects and promote new ways of communicating and exploring knowledge from the biological sciences.

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I, ROBOT: RETHINKING JACK BURNHAM'S SYSTEMS ESTHETICS

Margaret Seymour

In the 1960's and 70's, American art critic Jack Burnham shifted the emphasis away from artefacts – fixed, static objects - and towards the idea of networks and systems. This paper examines Burnham's 'systems esthetics' and tests his ideas against recent 'robotic' works by four Australian artists. Not all of these artists use cutting edge technology but each artist seeks to do more than simply imitate life.

What if you could bring a sculpture to life? The story of a sculpture that comes to life is one of western culture's oldest myths. From Ovid's Pygmalion to the making of the Golem from clay in Jewish folklore, the creation of life from inanimate matter has been a persistent fantasy. However since 1948 and the publishing of Norbert Wiener's book *Cybernetics: or control and communication in the animal and the machine,* [1] there has been strong interest in artificial life processes. One approach focuses on developing intelligent machines – machines that can regulate their own behaviour and more recently, 'learn' new behaviours.

Artists have taken a critical interest in interactive and intelligent machines. Early work in this area was promoted in exhibitions like *Cybernetic Serendipity* at the Institute of Contemporary Art, London in 1968 and in Jack Burnham's book *Beyond modern sculpture: the effects of science and technology on the sculpture of this century.* [2] Jack Burnham was an American artist, art historian and art critic. He was initially drawn to vitalistic art – for example the works of Henry Moore, Constantin Brancusi and Jean Arp – but by 1968 when he published his book *Beyond modern sculpture*, Burnham was championing a new type of art, one that would combine "machines with the qualities of living matter." [3] Tracing the development from what he saw as early proto-automata though to kinetic and robotic art of the 1960s, Burnham agues that the machine is the future of art and of sculpture in particular. For Burnham, cybernetics provides the key to this future. He describes Norbert Wiener's book on cybernetics as "the scientific inception of a dream which had haunted the makers of automata all through the ages – that of creating mechanical analogues to the nervous systems of animals, and through this gradually effecting some level of intelligence in the machine." [4]

Burnham was one of the first to acknowledge this new direction in art. He described sculptors in the 60's moving away from making artefacts – fixed, static objects – and instead building 'systems'. These systems were not simple repeated cycles, but were altered according to feedback loops through which the system becomes self-regulating. Moving beyond a formalist critique of machine aesthetics, Burnham helped establish the foundations for future research at the intersection of art and science. However his insistence on the mimetic nature of art is based on very traditional notions. In *Beyond modern sculpture* Burnham argues that sculptors in the past had to content themselves with life-like but static representations of human or animal figures. In contrast Burnham sees technology as heralding a critical transition for the whole of the human species – substituting organic life with sophisticated forms of synthetic life. He believes art has a key role to play in this transition. In doing so he places art in the service of technology, giving sculpture a new goal – that of creating a blueprint for "our destination as a post-human species." [5] In this paper I examine the work of four contemporary Australian artists to see in what ways they either adopt or challenge Burnham's thesis about the necessary goal of art.

Mari Velonaki's interactive work *Fish-Bird Circle B – Movement C* was made collaboratively with scientists David Rye, Steve Scheding and Steven Williams at the Australian Centre for Field Robotics, University of Sydney. The work was inspired by the story of a fish and a bird that fall in love but are unable to get together because of their differences. *Fish-Bird* consists of two computer-controlled custom-made wheelchairs, which are programmed to respond in complex and subtle ways to each other and to viewers. The wheelchairs navigate the exhibition space and periodically produce written messages thereby simulating dialogic exchange between each other and between human and machine. The first prototype of *Fish-Bird* was presented at Ars Electronica in 2004 as part of the *Unnatural Selection – Australian Media Art* exhibition. At this stage the motion control of the wheelchairs was relatively simple. As the project progressed detailed motion tracking and more refined behaviours were added.

I saw *Fish-Bird* in 2008 at the Campbelltown Arts Centre where it was exhibited as part of the *Mirror States* exhibition curated by Kathy Cleland and Lizzie Muller. By this stage complex behavioural patterns linked to the seven days of the week had been added along with "artificial 'emotional' states that describe how each robot 'feels' about itself, about the other robot, and about the participants in the installation space." [6] I had traveled to Campbelltown to take part in a symposium held in conjunction with the exhibition. In a quiet moment between sessions I ventured over to the *Fish-Bird* installation. The space was empty apart from two wheelchairs located in the centre of the room. The floor was littered with small pieces of paper. As I entered the space the wheelchairs separated, each moving to an opposite corner of the room. I stood still. After a few minutes one of the wheelchairs moved toward me and ejected a printed message that dropped at my feet. 'Deconstruct any notion of central consciousness', it read.

Fish-Bird, with its 'emotional states' assigned to each wheelchair, takes concepts associated with human behaviour and applies them to machines. This translation of concepts from one field to another also works in reverse. Just as machines of the past provided metaphors for understanding the human body and human subjectivity (think of Leonardo Da Vinci's cross-sections and exploded diagrams of the human body and their analogous relation to mechanical inventions of his time), computers are changing the way we think about ourselves. The language of cybernetics for example has provided new ways of thinking about human action, interaction and subjectivity. Concepts like 'feedback' have gained ubiquity. Interaction is now seen to be everywhere. The idea of feedback has shifted attention away from individualism, which highlighted a non-circular cause and effect way of understanding things. Instead of imagining that we exist independently of others and independently of chance events occurring in the environment, we now think in terms of networks, systems and programs. While some people feel this undermines our humanity, others like Donna Haraway see great promise in rethinking our relationship with machines.

Machines today are very different from the hulking monsters of the industrial age. Our laptops computers and mobile phones are portable user-friendly devices. Donna Haraway describes them as being "made of sunshine …all light and clean because they are nothing but signals, electromagnetic waves, a section of a spectrum." [7] Because we are intimately enmeshed with our machines Haraway argues that today we are all cyborgs, "theorized and fabricated hybrids of machines and organisms." [8] If we agree with Haraway, this is not a bad thing. The cyborg, part machine/part organism opens up the question of how bodies are formed in particular historical situations. The body is not seen as 'natural' but rather as simultaneously symbolically, biologically and socially produced. Velonaki's work, like Haraway's cyborg, encourages us to question some of the binary oppositions –human/machine, intelligent/programmed – that have traditionally structured ideas of the self in western societies.

In contrast to the technical sophistication of Velonaki's *Fish-Bird*, Simon Yates' artworks are lo-tech, hand-made replicas of outmoded or improbable machines. He has created walking sculptural figures, which are constructed with a lightweight armature and covered with tissue paper. Suspended beneath helium balloons, these motorized figures take small steps to propel themselves around the room. In a work entitled *Rhabdomancy,* which was exhibited in the *New09* exhibition at the Australian Centre for Contemporary Art in Melbourne, Yates created life-size versions of himself and writer Vanessa Berry. Unlike Velonaki's custom-built wheelchairs, Yates' work has a DIY aesthetic. His figures are carefully put together using simple materials. Again, contrasting with the complex range of responses evident in Velonaki's *Fish-Bird*, Yates' motorized figures are decidedly unresponsive. Oblivious to each other and to curious spectators they instead seem completely absorbed in the task at hand – staying upright and moving slowly forward. A more recent work by Yates, modelled on the robot Maria from Fritz Lang's 1927 film *Metropolis,* was shown in the exhibition *Awfully Wonderful: Science Fiction in Contemporary Art.* Curated by Bec Dean and Lizzie Muller for Performance Space, the exhibition was presented in the foyer of Carriageworks, an art centre housed in the old Eveleigh Rail Yards in Sydney. The papery fragility of *Metropolis Robot (Futura),* which was buoyed up beneath gold helium balloons, lent the figure a spectral aspect. It seemed as if the ghost of the robot Maria had returned to walk the cavernous halls of the building, itself a repurposed industrial site with many of its original features still intact.

Yates' work might at first glance appear to be the antithesis of *Fish-Bird*. His low-tech robots are vastly different from Velonaki's cutting edge computer programmed wheelchairs. The figurative form of Yates' work also contrasts with Velonaki's nonfigurative approach, which instead suggests the absence of the body. While the physical components of Yates' work are very simple – helium balloons support the weight of the robot while a small motor operating a cam causes first one leg and the other to step forward – both Velonaki's and Yates' robots evoke a sense of wonder. In Yates' work this is partly because of the fragility of the robots. Everything is in perfect balance. Should one element fail, the walking robot's progress would cease. In *Rhabdomancy,* Yates has created body doubles or avatars of himself and Vanessa Berry that occupy real space. Unlike static sculptural portraits that fix a likeness for all time, Yates highlights his robots' frailty.

Wade Marynowsky has, in a different sense than Yates, also made avatars – physical avatars he can inhabit. In his work *The Discreet Charm Of The Bourgeoisie Robot*, exhibited at The Institute of Contemporary Art Newtown (ICAN) in 2008, Marynowsky presented a robot wearing a hoop skirt and topped with a perspex dome 'head'. Recalling the automatons of the 18th and 19th centuries as well as the science fiction robots called daleks from the well-known TV series *Dr Who*, Marynowsky's 'bourgeoisie robot' is operated telematically over the internet. Marynowsky says of this work, the "charming robot avatar waits for visitors to enter the space and then converses with them in a polite and pleasant manner." [9] Dressed in a black tunic with a white lace collar, the robot seemed friendly and eager to please. Without the dalek-like head and the speed with which it could spin on its axis to track an unsuspecting viewer, the robot might have appeared benign. However an uncomfortable feeling persisted. With the battle cry 'EXTERMINATE!!!' would it suddenly reveal more sinister motives?

Marynowsky's more recent work *The Hosts: A Masquerade of Improvising Automatons,* exhibited at Performance Space in Sydney in 2009, comprises five robots dressed in elaborate costumes. Each robot represents a different character or personality – for example 'the cowgirl' and 'the princess'. Together they roam around like guests at a masquerade ball and periodically emit strange vocalizations or spin giddily on one spot. Taking on board Japanese roboticist Masahiro Mori's theory of the uncanny valley (1970), that if robots are too life-like they cause us to recoil, Marynowsky doesn't aim for human likeness. Like his earlier 'bourgeoisie robot', each 'host' wears a hoop skirt which provides space for, but also hides,

the mechanical and electronic components. Each robot is also crowned with a dalek-like domed head from which shines a beam of light or alternatively two bright blue or red 'eyes'.

Implied in the sub-title, the theme of the masquerade or disguise is central to this work. Marynowsky is interested in the point at which one thing flips over to become the opposite – an uncanny moment when the familiar becomes strange. *The Hosts* perform this crossing over on many levels. They are at the same time a figure and a machine as well as male and female – Marynowsky describes them as trans-gendered. The robots are also 'hosts' in more ways than one – as organizers of the party perhaps but also because they harbor another entity or parasite in the form of the computer program or programmer.

While Marynowsky has given each of his robots an individual 'character' which is expressed in their costume, he deliberately avoids using realistic human forms. Instead he humorously gives us a double serving of mimicry. Marynowsky's robots are daleks cross-dressing as 18th century automata – machines that mimic other earlier machines made to mimic humans. This self-reflexive aspect of Marynowsky's work playfully mocks the Faustian goal Burnham assigns to artists. Instead Marynowsky is interested in society's fascination with robots and our ambivalent responses to them.

My own work *Angelica* (2008) is hardly a robot. *Angelica* does not have any moving mechanical parts or feedback systems. Instead it is a three-dimensional work that resembles a modified factory chair. Two LCD screen are incorporated into the metal frame of the chair. One screen replaces the seat of the chair and the other becomes the backrest. Two moving images are displayed on the screens. One shows the exterior of the body and the other is an MRI scan showing the body's interior. The images on the screens are in a constant state of transformation. A fluid line sweeps across the surface – peeling back the exterior of the body to reveal the interior. The transition resembles a digital wipe. However instead of being created on the computer, the effect was made by casting a shadow over two projected images and filming the result. The back and forth motion of the shadow is similar to the movement of a scanner converting analogue into digital information.

I made the work after spending time in hospital where I underwent a series of tests.Hooked up to various diagnostic machines I was reminded of Donna Haraway's comment that today "machines are disturbingly lively, and we ourselves frighteningly inert. [10] The machines beeped and crackled as they probed and scanned. In contrast I had to lie still and wait for the results. When I was discharged I was given copies of the scan images. To me they appeared strangely robotic. It was as if the scanner had transformed my body into another machine – one with distinct muscle groups which when rendered in black and white took on the metallic sheen of a robot.

In *Angelica* I am interested in the shift from analogue to machine vision and also in cultural representations of women and technology, particularly in science fiction films. These films often reveal a deep-seated anxiety associated with robots which is played out in narratives of mastery and slavery. For example, Fritz Lang's 1927 film *Metropolis* [11] presents a dystopian vision of the future where technology has enslaved the workers. Women, represented by the real and false Marias, are depicted as either angels or whores. Embodied in the figure of the false Maria, who when captured and burnt at the stake resumes her robot form, both women and technology are represented as a threat to life. The message is that, like women, technology may be seductive but it is also out-of-control.

Ridley Scott's 1982 film *Blade Runner* [12] presents a much more nuanced investigation of the relationship between the human and the non-human. Rather than *Metropolis*' tale of good versus evil, the narrative in *Blade Runner* turns around the theme of doubt – how can you tell a replicant from a human when each has memories? When the replicant Rachel asks Deckard if he has ever taken the Voight-Kampff empathy test she throws the question back onto him – how does he know that he isn't also a replicant? The ontological doubt arising from the increasingly blurred boundary between human and machine marks the distance travelled between representations of robots in *Metropolis* and in *Blade Runner.*

Instead of Burnham's idea that artists are preparing a blueprint for a post-human species, blurring the boundaries between humans and machines might be a better way to understand the works of the artists I have discussed. This blurring is a two way street. While machines have become more intelligent there is also the possibility that humans might recognize they are not always masters of rationality. In his book *Tarrying with the Negative: Kant, Hegel, and the critique of ideology* cultural critic and theorist Slavoj Zizek poses the question 'Do computers think?' He argues that even though it is clear that the computer in some sense only simulates thought, yet "*how does the total simulation of thought differ from real thought?*" [13] Zizek's answer is to reverse the metaphor and instead of seeing the computer as a model of the human brain, to see the brain as a "computer made of flesh and blood." [14] By extension a robot is not an artificial man, rather man is a 'natural robot'. Writing from a Lacanian perspective, Zizek uses this reversed metaphor to underscore his ideas about the split subject, who can never fully know him or herself and for whom "*something must remain unthought.*" [15]

I have argued that contrary to Burnham's thesis, many artists do not aim to recreate life. Some explore our persistent fascination with machines while others perform a de-naturing of the body, showing that the boundaries between human and non-human are not clear-cut. The question is not whether our machines are alive but in what ways we, like our machines, are hybrid creatures - a blend of natural and artificial, intelligent and programmed. Seen from this perspective, robots remind us there is nothing essential about humans. Instead we are formed in particular historical and social contexts. Acknowledging this might as Haraway argues, give us the best chance of developing new forms of subjectivity, which conscious of our kinship with other animals and machines do not simply repeat patterns of domination and control.

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IMPROVING THE INFORMATION SOCIETY THROUGH AWARENESS OF LANGUAGES

Alan N. Shapiro

On a planetary scale, the quality of communication, work, cross-cultural empathy, scientific and business development, health care, and leisure-time experience in the information society has been limited by the way that English has been adapted as the global language.

On a planetary scale, the quality of communication, work, cross-cultural empathy, scientific and business development, health care, and leisure-time experience in the information society has been limited by the specific way in which English has been adapted as the global language. It is important to have at least one global language (Spanish and Mandarin Chinese are also candidates for this status), but it is also urgent that other languages be recognized and respected, and that the entire multi-lingual situation of the network society and the era of globalization be pragmatically treated with more awareness. The trend has been towards the unconscious creation of hybrids of English and a national language. We instead need to work towards restoring the separate autonomous integrity of both English and the national language. I will consider three areas, and present two empirical examples in each area. I will make concrete suggestions for improvements to the language situation in the context of case studies. First, in software development in the IT industry, in non-English speaking countries, the quality of communication among programmers and other IT experts has been affected by the reality of hybrid language situations. I will mention the examples of the software industry in Germany and Italy. Second, in museums, the same question of English-and-national-language duality with respect to the presentation of museum objects and artefacts (both to physically present and online-remote-virtual visitors) requires serious attention. I will discuss the examples of some prominent museums in Germany and Italy. Third, I will consider how communication in online social media like Facebook, Twitter, virtual world simulations, and chat rooms is affected by the global use of loosely structured English and netspeak. I will propose measures to upgrade social experience and interaction through the educational amelioration of the English in circulation, an expanded role for national and local languages, and an appreciation of the value of colloquialisms, slang, acronyms, emoticons, and other "digital culture" socio-linguistic practices.

Everyone on the planet who is not a native speaker of English is in some way disconnected from full participation in the information society. Even the top academic media and technology thinkers, who spend their days and nights informing themselves in real-time about all the latest developments in the online world, are faced with significant language obstacles in trying to disseminate their ideas – through books, articles, blogs, chats, facebook discussion threads - if their English is not at the level of native speakers. Should I go and live in Los Angeles, USA or Sydney, Australia for a few years to improve my English? Should I write in English with mistakes - or perhaps in my native German, Dutch, or Italian - and then have someone translate it? Or should I run it through Google Translate and then edit it? If these dilemmas are the case for digital citizens at the highest level of understanding, then just imagine how difficult the situation really is for "ordinary people" whose native language is not English. Or, to turn the observation around into a more positive formulation: imagine a future - a more advanced stage of the information society - where the reality of the world's many languages has been thought about and handled

in a more intelligent way. Imagine the economic and cultural productivity that will be unleashed when a more subtle system is put into place that enables everyone to express themselves.

Sociologists have given different names to the society that is the successor to the industrial society of the production of physical goods. This brave new world has been called the post-industrial society, the post-modern society, the knowledge society, the network society, the telematic society, the information society. The information society shifts the center of economic and cultural activity in late capitalism off-center to the handling of information. Beyond its restricted mathematical meaning, or its technical meaning as signs or signals in information science messaging, information more generally, in the sociology of work and culture, is about abstraction and complexity. Success in work-slash-business and in culture depends on the mastery of representation and communication. But a huge and crucial mistake has been made so far in our society-wide understanding of what information is. So far information has been conceived without any sensitivity to or appreciation of language and languages. Information has been regarded as being like numbers, an ordered sequence of symbols, bits and bytes of data, a change in state of an object-oriented system, transparent signifieds only, without the signifiers that shape the meanings, a bunch of facts on file, the transmission or contents of messages while ignoring the media – language itself – that structures the messages at the most intricate detailed level. Information has been recognized only in the British analytical-rationalist-empiricist-logical positivist way, as pure language-less thought in a networked brain of The Global Village, without reflection on language, and this has truly massive and limiting consequences. Consider the dialogue between Number Six and Number Two that opens each episode of the great 1960s British BBC television show *The Prisoner*, created, written, directed by, and starring Patrick McGoohan:

Number Six: Where am I?
Number Two: In The Village. (**Marshall McLuhan's Global Village**)

Number Six: What do you want?
Number Two: Information. (**The Information Society**)

Number Six: Which side are you on?
Number Two: That would be telling. We want information, information, information…

Number Six: You won't get it.
Number Two: By hook or by crook we will.

Number Six: Who are you?
Number Two: The new Number Two.

Number Six: Who is Number One?
Number Two: You are Number Six. (**alternatively: You are, Number Six**)

Number Six: I am not a number. I am a free man.
Number Two: Ha, ha, ha, ha, ha, ha, ha, ha….

I think that there should be three global languages: English, Spanish, and Chinese. This would be a strong basis for a more sophisticated system. Other regional and local languages should play important roles within their territories and for each individual person who chooses to express herself in a particular

idiom. Having only one global language (English) immediately establishes systemically a crude binary oppositional hierarchy between the haves and the have-nots, between the one global language which is above the bar of separation and all the regional and local languages which are below. Having three global languages (English, Spanish, and Chinese) - which are not themselves involved in a relationship of strict equality with each other - establishes the basis for a system of relationships which are, in their structure, beyond the binary oppositional structure of one term of the relationship being strictly above the other term. One of the global languages may be somewhat more important than a certain regional or local language, but there is a built-in limit to how much more important than the other it is. Having three languages instead of one at the apex of the language system of the global information society triggers a cascading effect throughout the system of the unfolding of more complex patterns and mutually reciprocal relations. The entire multi-lingual situation of the information society should be treated with more awareness. So far we are sleep-walking in unconsciousness with the imposition of English in a simplified rather than well-thought-through way. We need to restore the separate autonomous integrity of English, the national language, and a normalized hybrid vernacular.

The accelerated propagation of global digital technology and global media culture has brought with it the accelerated predominance of English. The result is a two-tiered system, with English as the master code. This system no longer entails a relationship of domination of one of the system's elements by the other. It is rather a relationship of virus-like infiltration by the stronger element of the weaker. Taking the situation of German as an example, there is an implosion stemming from the epidemic proliferation of English terms in the interior of the German language. When a German speaker talks in an advertisement, movie, TV program, or on the Internet, she sprinkles her utterances liberally with English words. When a German speaker talks about business management, computer software, digital technology, telecommunications, financial markets, fashion, music, sports, shopping, consumer objects, or "personalized" emotions (Ich habe ein Happy Feeling), she supplements her speech with substitute or designer words taken from English. English words are used in the German language in any domain where the speaker wishes to enhance the prestige of her discourse by holding up a sign of globalized professional, technical, or consumer knowledge. But since the word is outside its living English context, and is not integral to any German context, it is like a fish out of both waters in a hybrid language called Denglisch.

The first case study that I will consider while making concrete suggestions for improvements to the language situation of the information society is software development companies in the IT industry in non-English speaking countries. My two empirical examples will be the software industry in Germany and Italy. I have worked on many software development projects in Europe and the USA, and I have observed the quality of communication among programmers and other IT experts being affected by the reality of hybrid language situations. Currently, I am working on a language internationalization project in Germany, and I am seeking to expand this area into part of a business that I hope will grow into what I call a radical technology company. I call the business that I am in: humanities informatics or Computer Science 2.0. Our slogan is: "Upgrade Information Technology with real knowledge from the arts, sciences, and humanities."

One of the most important professional aspects of software development is documentation. Written documents support the design phase of a project, the analysis of the functional-business area, the conceptualization of the software architecture, the technical implementation, and the operation and maintenance of the running system after it goes live and into production. It is very important to the success of projects that the documents written by one programmer or technology expert be useable and understandable for the subsequent readers of the document. Otherwise, there is very little point in the document having been written at all. Programmers and people involved with computing in German-speaking

countries are very attracted by the English language, which is seen as being the "native language" of information technology. So they tend to write documents which are principally written in German, but which use a lot of conceptual and technical terms taken from English (sometimes applied incorrectly), including acronyms. The result is documents written in a mixed hybrid language which is not especially comprehensible to readers. I think that what we need to do is to restore a high-quality original German version of documents, and, in addition, have a high-quality English version, and then have a third version which is hybrid, but also work on some sort of codification and standardization of the hybrid language. Many young people in our society want to become doctors, lawyers, and computer engineers, but I believe that there is a lot of potential and very interesting work to be done in humanities informatics, such as in this language internationalization business area. Our goal is also to upgrade the language in which information technology is discussed to a qualitatively richer and more sophisticated language in the humanities sense.

Another language that I speak well is Italian. I have especially enjoyed reading great Italian novelists like Italo Svevo, Leonardo Sciascia, Italo Calvino, and Carlo Emilio Gadda in the original Italian, and even partly in local dialects. It is in some ways painful to imagine the beautiful Italian language getting corrupted by the infusion of English and hybrid IT terminology into its heart. At the University of Pisa, where computer science was first introduced to Italy in 1969, there is an academic programme in English-Italian translation studies, designed to train language specialists in professional domains like law, economics, IT, software localization, environment, energy, bio-medical and pharmaceutical industries, meeting the standards of the curriculum of the European Master's in Translation, as established by the Director General of Translations of the European Commission. But take a close look at the English-language Wikipedia article on the University of Pisa. It contains sentences whose relationship to English can only be described as accidental: "The Computer Science course at University of Pisa was the first one in the area to be activated in the whole Italy, during the 1960s." Activated? "After the second world war the University of Pisa returned to the avant-garde in many fields of knowledge." Which avant-garde would that be? The artistic avant-garde? The futurists? The dadaists and surrealists? The best in computer science and the best in translation studies together at the same university. Wow! But the Pisa University administration seems to be neither aware of the importance of Wikipedia in the information society nor of the English-language skills available to it within its own faculties.

I believe that the scope of the academic field of translation studies should be greatly expanded to include subjects and goals concerning language in the information society like those that I have discussed here. Italy has been suffering badly from the global financial and economic crisis which began in 2008. The computer industry has been hit particularly hard. An Italian vice-president of Microsoft recently stated that he believes that 40,000 jobs are in danger of being lost in the IT sector in Italy. Perhaps one way out of the crisis would be to start projects having to do with language awareness.

Museums are another area where the question of English-and-national-language duality with respect to the presentation of museum objects (both to physically present and online visitors) requires attention. I recently visited the Berlin Wall Museum and the Film and Television Museum in Berlin. At both of these museums, texts that accompany exhibitions are in both German and English. I noticed that the quality of the English-language texts is rather mediocre, with German-influenced sentence structure, mistakes in historical usage of terms, and difficult to comprehend phrases. Yet I have been told by several individuals that these museums would not be interested in spending more than a little money on getting these translations right. The original German texts may have problems as well (so it seemed to me); some of the difficulties in the English texts may be derived from ambivalencies in the German ones. I apologize for not having the time in these 20 minutes allotted to me to present specific examples. I need to revisit

those two Berlin museums and take detailed notes. At a famous art museum at the Piazza del Duomo in Milan I noticed similarly problematic English texts, although there seemed to be an inconsistent mixture of translations done by both native and non-native speakers of English.

As I reach the end of writing my own text – the paper serving as the basis for my talk at ISEA2011 in Istanbul on language and the information society – I realize that I will not have time to immediately keep my promise to discuss how communication in online social media is affected by the global use of loosely structured English and netspeak. I intend to keep this promise someday, but I will have to defer its fulfillment for now. I will say that I believe that the quality of online social experience and interaction could benefit from some real improvements in education in the schools in self-expression via language, and some real love for the English language and other languages. And what is the value of colloquialisms and slang? They are an important object of socio-linguistic inquiry. And what are we to make of all those acronyms and emoticons? LOL! Smile please!

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NORTH, INTERRUPTED

Leslie Sharpe

"North, Interrupted" discusses artists' use of both online data and data or research materials gathered from place to create works related to the Canadian North, indicating specifc information related to climate change or human activity that impact the inhabitants and spaces of the North.

Figure 1. Polar Bear Space 1, Leslie Sharpe, 2009.

Figure 2. Proximities in Google Earth.

Figure 3. Oil, Caribou, Polar Bear layers in Google Earth.

North, Interrupted

I looked down at the lines from the window of a Twin Otter – etched onto the mountaintops cradling the Firth River I could see traces of caribou heading towards calving grounds –crisscrossing paths over places I could only see through a distant window.

I tried to find the lines later, on a close-up view in *Google Earth*. Longing to replicate the experience of flying between mountains where I could almost touch those paths, I hoped that I could zoom in closer, but I was lost in a mass of unmarked pixel-peaks, seemingly unexplored for those who wish to map it online.

In this view of *Google Earth*, Northern Yukon is a place dotted with minimal human experience and one can only imagine the existence of the animals and humans who move across that landscape. But those who build satellites seldom have the knowledge or needs of the North's inhabitants in mind, not unlike previous interlopers throughout history. (To wit: the 52 radar stations known as the 'DEW-line' built by the US Military during the Cold War in the Canadian Arctic were designed to protect Southerners from any Soviet missiles headed towards America, and then disassembled to leave only skeletons of unusable equipment and toxins for the locals to deal with.)

Any trace of animal or human existence and their northern experiences would have to be revealed by adding layers not evident in the satellite image, but added by the global web community (who may or may not be north).

I imported my own location – of my little tent in Ivvavik National Park, and when I imported layers related to the surrounding area, I found the other evidence I sought, in lines of animals moving through the Arctic as they are tracked via telemetry, made by radio-collared animals such as Polar Bears tracked by *World Wildlife Foundation* on *Google Earth*, or the Porcupine Caribou, whose movements in Canada and Alaska are tracked as they unknowingly disregard human political borders.

Animal lines of movement created through telemetry reveal passage and habitat of animals, and along with other data, make clear why climate change and human development in the north have an impact on things we may not see or understand from the south. These lines are a form of data that bring direct experiences such as movement or weather data into systems and knowledge that can be folded into the multiple crisscrossing lines and ideas of 'north.'

Along with my own real experiences of the Canadian Arctic and SubArctic, I have been following these lines, such as the lines made by Polar Bear 3 or by several Porcupine Caribou, then interpreting and utilizing this animal movement data in various ways where one aim is to strip some of the romantic and colonizing views of north —views prolonged by both outsiders and insiders. These lines have found their way into my images and installations, as well as instruction works for choreographed performance which will take place when the snow hits northern Alberta this winter.

Fig. 1. Polar Bear Space 1, Leslie Sharpe, 2009.

In some images for this work, I try to assert the habitat of the animal as a geopolitical space – a nation of sorts — so that the range of a single polar bear is a force that might itself be a contender in the latest

battle for Arctic sovereignty. One can imagine Sarah Palin looking out her window and 'seeing' this as a foreign force to contend with.

I have encountered real caribou in real places (e.g., Victoria Island, NU/NWT, Fogo Island), but I have known 'Iola' and other caribou longer through following their movements online. I have been following 'Iola' along with Arnaq, Lucky, Bertha and other radio-collared caribou, as well as polar bears to create artworks from their tracked movements, and to understand how those movements are affected by changes in the arctic. Occasionally the line of movement of a tracked caribou stops when the collared animal has stopped transmitting. When a radio-collared caribou disappears in this tracking system, we don't know whether the disappearance is evidence of battery breakdown – or evidence of their mortality. We only know they are no longer there as a virtual presence.

The mystery of their disappearance is fitting for the temporality, mutability, and disembodiment of online identities – the caribou is no longer transmitting, but she could reappear, and we begin to understand her as a series of dots, as movement, and her range as a data-line or subset of an intertwined virtual and real system of distanced awareness of North.

During an artist's residency in a remote area of the Canadian Yukon's Ivvavik National Park, I happened upon a chilling site while following an old placer mining trail. The site was a spot in the woods where a large blanket of caribou fur coated the earth. There were no bones in sight. The physical evidence made clear that this was a 'kill' site, where one caribou met a frenzied demise in a pack of wolves. I wondered about my online caribou 'friend' 'Lucky,' the online caribou who may not have been so lucky, and her eerie telemetric disappearance when the collar stopped transmitting. I wondered whether the brutality evident in the broad scattering of fur was similar to her last moments, or whether her collar battery had just stopped working. I hope Lucky's name was fitting. But through the discovery of that kill site in Ivvavik, Lucky and the other transmitting caribou were no longer merely avatars or samples of data for me. They were now linked my field data set— a real-world research system gathered through non-technological methods, such as gathering caribou hair, walking in their tracks, recording sounds, or casting animal scat.

While I was in Ivvavik, I also transmitted and recorded my own locations and movements, using a SPOT locator and GPS as part of an ongoing project to place my own lines of movement in the Canadian North within other human and animal lines of North. While flying out of Ivvavik, the trace of animal scat and paths beneath my feet grew distant until the lines and land below disappeared from my view.

Once I got home, I downloaded my SPOT transmissions and GPS locations, and fed them into *Google Earth*. I inserted myself in the virtual landscape that represents Ivvavik on *Google Earth*, re-imagining walking over their paths as my own lines crossed where animals have been. And then I tried to find routes of animals in that area as I *turned the on World Wildlife Foundation Polar Bear tracking layer*. (Fig. 1. Proximities)

I wanted to see where the animal lines of movement were while I was in Ivvavik. Information about caribou movements is no longer delivered live, to discourage the research from being used by hunters, and I knew that in summer the polar bears would not be inland as I had been, but along the coast. We really had not been so close to each other, yet in a zoomed-out view, their lines seem seem close to my solitary 'tent' marker in a seemingly barren landscape. But the North has a myriad of presences and relationships that are not always seen by those who are not there. I opened more layers to see what else

might be in my line of movement if I were to imagine my location on the map as a short stop in the migration of a caribou. *I turned on more layers.*

Fig. 2 Oil, Caribou, Polar Bear layers.

Immediately visible in the layers imported from the *Sierra Club*'s data on oil development in the North Slope of Alaska is the amount of human presence that impedes upon movements of animals in the north. The large X areas represent caribou habitat area in this view, however the actual area according to the Porcupine Caribou Management Board is much wider. Numerous studies have shown that caribou movements are affected by human presence, so we can reason that caribou migration patterns towards calving grounds on the north slopes of Alaska and Yukon may shift as a result of increased oil and mining exploration. Not evident in the map are the other shifts that will impact the movements and habitats of animals in the north – shifts created by climate change, which along with human activity will alter the north as we have known it.

In my contribution to the book *Far Field: Digital Culture, Climate Change and the North*, I detail ways in which 'ideas of north' and our cultural representations must shift as a result of climate change and human activity (such as mineral exploration, increased shipping with more open water, and military activities as northern governments try to assert sovereignty).

In that essay, I mention maps of animal and human presence in Lancaster Sound in Nunavut that were created from traditional knowledge contributed by Inuit who live in that region. "In the 1970s this area was mapped out for animal and human use (Inuit hunting and ship traffic, as well as early oil and gas exploration in the region). Inuit from the region provided valuable information about animal presence and hunting, and recently their traditional knowledge in the form of archival recordings and hand-drawn maps were digitized to produce a map showing lines of traditional Inuit land-use in the area. This map showing historical use proved invaluable in the recent blocking of seismic mapping in Lancaster Sound and in the establishment of a new Canadian National Park whose borders are now being defined by these traditional lines." These maps have not only defined an area for protection from drilling rigs, (although not from commercial shipping), they have contributed to a new understanding of north that diverges from colonial maps – a view of north that reflects knowledge of insiders and recognizes the importance of their knowledge as data.

It is tempting for those who live at a distance or visit only on occasion to see the north through the lenses that are accessible, especially online information like animal tracking data. And while accessing this and other information, such as sea-ice data or weather maps is helpful to understand threats to the North, we only show one aspect of north this way, a north represented through an outsider's remote access to knowledge of place. This kind of interpretation can be valuable, and when included with data or narratives from those who live there or through one's own direct experience of place, a new idea and representation of north may develop.

My travels and personal histories growing up in Northern Canada combined with my ongoing research online and in *University of Alberta's Circumpolar Institute*, have pushed me to create works in a range of media that attempt to temper or subvert my own romantic histories and experiences of north. I have been devising works that combine spectacular imagery I have taken up north of polar bear carcasses, sea-ice, fragile northern landscapes, and decaying toxic human mining or dew- line sites with information strips that are meant to add 'layers' of information that can help us read into other aspects of what

that imagery might be of. An image of sea-ice when exhibited is shown with information on what ecologies and animals are supported by the ice, such as the marine animals who breed and live on and under the ice, so that further sea-ice decline implies an impending doom also for what we do not see in the image. In *Far Field*, I describe it as follows:

"... data-sets of knowledge can form new ways of reading images that would otherwise function as spectacle through the knowing--lens of systems awareness. For instance, *we don't see the animals, but we know:* they are never far from ice. Walrus, seals, and polar bears use sea ice for courtship and mating, resting, giving birth and denning, and stalking and hunting for food. Below sea ice, narwhals also have a close relationship to it — using dense pack ice for wintering grounds, following ice, finding fish to eat, hiding from killer whales, and sometimes being trapped in fast ice."

Other images are exhibited with related data such as presence of toxins at DEW-line sites, former mining sites, and melting glaciers, or historic data about human traffic on the Northwest passage. These images provide extraneous related data such as toxins that are present at DEW-line sites, former mining sites, and melting glaciers, or historic data about human presence along the Northwest passage. The photos were taken either on artists residencies or while traveling in the Arctic and could easily be replicated by many tourists passing through the north. In these images, data and indexing interrupts the spectacle or romanticism of the image and allows us to see the images in data-sets that are intended to interrupt neo-colonialist views of north that are repeatedly presented in even contemporary works that celebrate the sublime while sublime creatures and environments of the north are threatened.

Watching tracked animals continuously online and occasionally in real northern landscapes encountering them or their traces in paths, carcasses, or evidence like hair and fur has made me feel somewhat closer to animals of the north. How can I represent them in a way that also conveys the difficulties they face as we continue to impose on their habitats or as their habitats change due to climate change?

While I have been working on images and sculpture related to this, it has lacked the kind of physical and material experience I wish to translate data into. As a result, I have been devising several patterns and instruction pieces for choreographed movements – the first was used for installation works that implied shifting sea ice, but the new ones attempt an empathic understanding through replicating aspects of animal and human movement, and how those movements have been or could be hindered.

This work, titled "North, Interrupted" is a set of instructions for performative movements and activities through and across ice and snow that will be placed online this winter as part of a participatory performance work. Individuals in northern and southern climates will be invited to participate in a performance where we reproduce the lines of movement of several caribou and bears I have followed, with occasional interruptions that represent encounters with predators, extreme weather that reduces access to food or creates other impediments, and encounters with human-created interruptions such as seismic activity, oil spills, or pipelines. A second set of movements relates to human presence in the north, from early explorers to recent tourists, to those who live there.

This work intentionally is fed by both technological and non-technological systems of information and knowledge, and inspired by early conceptual practices, but even more by experiences of north, my own and others as a means of expressing space and place, and contemporary politics of north.

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2. ibid.

ART AND PLAY IN INTERACTIVE PROJECTIONS: THREE CASES

Geoffrey Shea, Michael Longford & Elaine Biddiss

We examine how three art-related projection projects approached issues of viewer participation, interactivity, user input and artistic expression differently. Each project presented video projections to a non-specialist audience with software controlled interactivity. One objective was to create an ambient play experience in a public space – something without a beginning or an end that participants could join and leave casually.
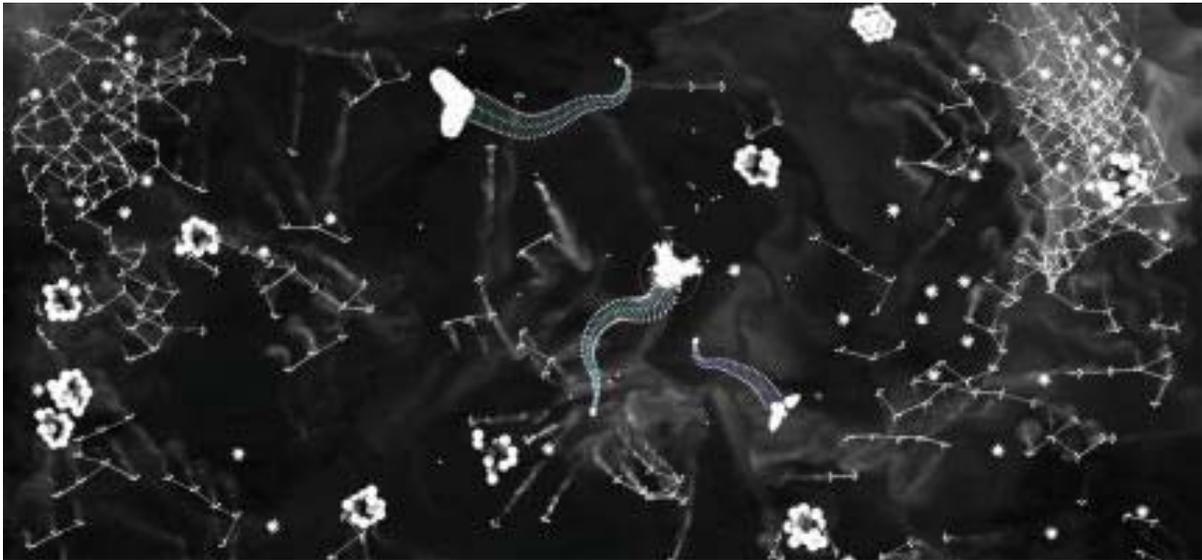
Fig. 1. Tentacles, 2011, interactive video projection, R. King, M. Longford, G. Shea. Image: R. King.

Fig. 2. Trio, 2010, interactive video projection, Geoffrey Shea. Photo: G. Shea.

Fig. 3. Viewers interacting with Tentacles, 2009. Photo: Geoffrey Shea.

Terms of Engagement

The three interactive video projects presented here were led by the authors and emerged from an academic research context. The projects started with different assumptions about the user, different communication goals and different production and collaboration strategies. Although they share some features with simulations, they all avoid standard gaming conventions; there are no levels, no overt objectives, no winners or losers.Additionally, the core requirements of each project were linked to the contexts they emerged from: experience design, art practice and healthcare delivery.

In each of these three productions, *Tentacles*, *Trio* and *The Art of Waiting*, the viewer is encouraged to participate in unstructured play. As with every interactive experience (and in fact, most other things in life) there is the initial satisfaction resulting from simply figuring out how one's decisions, gestures and actions cause reactions and create effects in the surrounding environment.

Tentacles is a large public projection with game-like user controls accessible through an iPhone. [1] In *Tentacles*, launching the app on your phone instantiates your creature on the screen. The main control interface on the phone allows you to move your creature around in the projected space. Some things you encounter make you bigger and some make you smaller. You might find yourself the sole inhabitant of this watery world, or you might share it with other players standing nearby. But what you do beyond that is up to you. We observed that some players try to grow their creature by directing it towards nourishing bits floating around, only to find that the bigger they become the more sluggishly they react to the controls. Others entangle with their peers, either affectionately or aggressively, thrusting themselves about like virtual egos. Finally, there are players who seem to delight in simply moving around on the screen, perhaps dancing, flirting or simply pleasing onlookers with their grace and style. This spontaneous performance could be the form of action which most connects the player with their creature. Proudly aware that they are watching their own avatars, we have often observed players with their free hand outstretched towards the screen, pointing out their movements to their human friends, but also appearing to want to touch their creature, in a way reminiscent of Michelangelo's image of God reaching to Adam in the Sistine Chapel.

Trio is an interactive video art installation displaying three folk musicians playing a song together. Viewers using mobile phones can switch between different musicians to create alternate arrangements of the song. In *Trio*, like *Tentacles*, there is much happening on the screen before the viewer even chooses to interact. Three large projected musicians sway gently as they strum and pluck their country music song. A prominently displayed phone number encourages people to engage by dialling in, but with little explanation of what they might expect to happen next. Unlike *Tentacles* however, *Trio* presents a dense layer of detailed instructions once the viewer has logged in. Prompted by a long rambling poem on the other end of the phone line, the viewer learns they can control the images by substituting one musician for another:

"Press 1 to reach out to Iriz. Press 2 to connect with Steven. Press 3 to tickle Diego. 1 for bass; 2 for uke; 3 for squeezebox, 4 for zither, 5 for slower, 6 for faster, 7 for heaven, 8 for eleven, 9 if you want to call Golan Levin, 0 for naught, 0 for naught…" [2]

At first the parameters seem straightforward: substitute one musician for another by pushing the buttons on your phone. But beyond that, the rules are invented by the players. Some might try to press the right button sequence to put together an all-girl band. Or a bearded band. Or create a grunge version of the ensemble. At the same time other players in the crowd are thwarting your plans because they have their own agendas. The loose structure of the play interaction encourages this sort of spontaneous improvisation and ad hoc gameplay. Whatever value the content had for the viewer is supplanted by the thrill of empowerment over the interaction.

In the third project, *The Art of Waiting* fused the productive impulses of the designers with those of the players. [3] A group of university art and design students worked with researchers at a children's rehabilitation hospital to produce interactive experiences for a large-screen projection in a clinic waiting area. The requirements were unusual. A nine square-meter area with an array of 100 densely packed pressure sensors in the floor created an input sensor that would be equally accessible to children with motor impairments including those using wheelchairs and assistive devices. Even parents and attendants could engage from their seats at the periphery of the area by reaching a toe in and touching the floor.

The designers of this interactive environment had therapeutic goals in mind. [4] In order to calm children before potentially stressful medical appointments and to empower mobility restricted children, the interactions needed to reward slow or static behaviours as much or more than energetic behaviours. Collaborative or social actions were also considered desirable. And since many visits involved more than one period in the waiting area, persistence within the interactive experience would create a sense of familiarity and comfort for children returning 30–40 minutes later.

The third year art and design students created two fully functional interactions which addressed these demands. One depicted a sloped grid of 100 squares, each corresponding to one of the in-floor sensors. A player pausing on a sensor would cause a virtual plant to begin growing on that spot on the screen. Moving to another sensor would cause the original plant to shrink and start another one growing. But if a player stayed long enough in one spot, their plant would become more permanent, persisting over a period of time proportional to the time spent creating it. Slowly moving across all of the sensors would create a virtual forest and several players working together could come closer to achieving maximum density.

As with the previous examples, the richness of the imagery suggests that the 'game' is fully fashioned and that one simply has to discern the rules. But once again, the activity ends up encouraging unstructured play, and social rules of engagement are negotiated in real time among the participants.

User Control – Input Paradigms

While all three of these installations share a common presentation form – a single projected video image controlled by software – they each use different techniques and strategies for collecting input from the users. *Tentacles* and *Trio* use handheld devices and *The Art of Waiting* uses environmental sensors.

Tentacles was originally designed to be controlled with an iPhone or iPod Touch and was later extended to include the iPad and Android devices. The application presents a graphic interface that reflects the images projected on the large screen. Users drag their fingers across their touch screens to steer their creatures around in the projection. The further they move from the centre of their handheld screen the faster their creature moves. There is visual feedback on the small screen to indicate direction and speed.

In addition to the visuals, however, there are sound components which go further to link the large screen to the small screen of the device. A background soundtrack plays in conjunction with the large image, augmented by smaller musical elements which play asynchronously on each user's device. When you engage, your handheld unit springs to life, emitting sounds which intersect with the musical soundscape, calling to and enveloping passersby and proliferating as more people join in. At this point players and non-players become acutely aware that the creatures on the large screen represent participants who are in the crowd all around them. The multiple sound sources, like the multiple participants holding their small devices, combine to form one single social entity, which is only partially revealed on the main visual and aural display in front of them.

The custom device application for *Tentacles* is meant to extend the experience from the large screen to the small screen and to afford control features specifically designed for this interaction. In contrast, *Trio* uses the familiar paradigm of a phone call directed to an automated response system. Pre-recorded messages prompt uses to input their control choices by pressing the number keys on their phones. While hardly intuitive, this form of interaction is so familiar to anyone who has ever tried phoning a company or institution that users quickly move on and begin exploring how their choices affect the projected images. Separate from the longwinded recorded message, patterns correlated to the user's input begin to emerge. The leftmost musician on the screen can be swapped with two others by using the leftmost buttons on the keypad: 1, 4 and 7. The centre musician is controlled with the centre keys: 2, 5 and 8. And the right with the right: 3, 6 and 9. This discovery frees the user from having to try to understand the complex verbal instructions. Additionally, the one anomalous key: 0 turns out to create a short, stuttering effect as though pressing it came close to crashing the system.

The decision to use the simplest phone interface was based on several considerations. First was the techno-social fact that not everyone has chosen to invest in a touch screen phone and their data subscriber plans (about $80/month in Canada). Second, the imagery in the work features a cultural celebration that is somewhat out of sync with contemporary media culture – i.e. folksy, amateur musicians – and seemed incongruous with a slick, technical presentation. Finally, the separation of the recorded message from its functional value allowed it to take on its own poetic role within the overall experience. Once users figured things out and became engaged with controlling and altering the large public images,

and once they had shared the experience with friends and strangers, they would often return to the spoken text on the phone, as though to a little private performance in their ear. As with Tentacles, Trio uses the handheld device to create a small scale, private experience within the larger shared public interaction.

So many interactive installations rely on sensor input (rather than device control) that it is not uncommon to have young people walking up to a screen and start waving their arms around expecting it to respond. *The Art of Waiting* chose to use in-floor sensors for user input for reasons related to the specifics of the user group. The installation is to be installed in the clinic waiting area of a children's rehab hospital. Users of the waiting area range in age from infants to 18-year-olds. Many have physical or cognitive disabilities and most are waiting with their parents or an attendant for a medical examination, treatment or diagnosis. The goal of the project was to create an interaction that would be accessible to almost all users of the space, and that would be a calming activity in a potentially stressful situation. [5] Relatively few of the users were likely to have cell phones or other devices. Switches and touch screens were considered too inaccessible to users with limited motor abilities and also created risks associated with infection or contamination. Motion sensors typically use some kind of camera which was considered inappropriate for a sensitive medical facility. The floor sensors were chosen as the most accessible means of input, regardless of ability. A grid of one hundred 30-centimetre square tiles is installed under a carpet in an area bordered by chairs. With this configuration, every visitor to the space is automatically providing input to the system. Even a passive engagement – merely being present – causes actions and transformations to take place on the projection screen.

Scale = Public = Shared = Social

The interplay of scale in the first two installations – the small screen in the palm of one's hand contrasted with the large public screen on the facade of a building – parallels other central human experiences. The intimacy of touch, for example, is contrasted by the dominance of projected, broadcast visual stimuli, while the screen – the sign –forms a kind of text waiting to be read. Your personal space simultaneously shrinks and expands as the tiny gestures you make with your fingers are magnified for all to see. Public and private stand in stark contrast, highlighting dichotomies like wireless and wired, perception and cognition, knowing and being.

Operating from within the crowd, viewers or players had the opportunity to step onto the stage of the projected environment – to display themselves in action, engaged with other virtual beings. Movements, gestures and displays become part of this spontaneous public performance, suggestive of the activity on a dance floor, where typical rules about decorum, reservation, engagement with strangers and physical contact are suspended. Each private, gestural experience is amplified publicly as a by-product of being within a crowd.

Taking action in public in this way constitutes one layer in the creation of community. Our behaviours and others' meld to generate simultaneous effects, creating a joint awareness that forms the cornerstone of our collectivity.

In all three installations play is presented as a free-form, creative activity – a childlike enthrallment with exploration, skill-learning and sharing. The scale and location of the displays encourages parallel play and the growing awareness of the activities of other players nearby. The public nature of the experience

creates the opportunity for ambient performance, where other players' awareness of you subtly influences and rewards your behaviour. Finally, these factors combine with the ambiguous structures and activities built into each project to encourage social play and collaboration in an emerging, shared activity.

Games – or rules-based play – emerge later in life and become the standard in the adult world. But the works presented here offer a simpler experience to their users – one that is direct and immediate.

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VISUALISING INVISIBLE NETWORKS AS COLLABORATIVE ARTS PRACTICE

Pip Shea

This paper examines approaches to the visualisation of 'invisible' communications networks. It situates network visualisation as a critical design exercise, and explores how community artists might use such a practice to develop telematic art projects – works that use communications networks as their medium. The paper's hypotheses are grounded in the Australian community media arts field, but could be applied to other collaborative contexts.
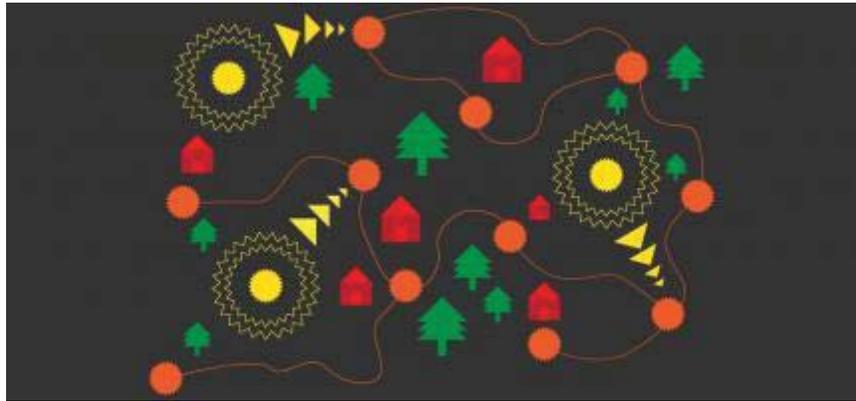
Figure 1: creative visualisation of a mesh WiFi network.
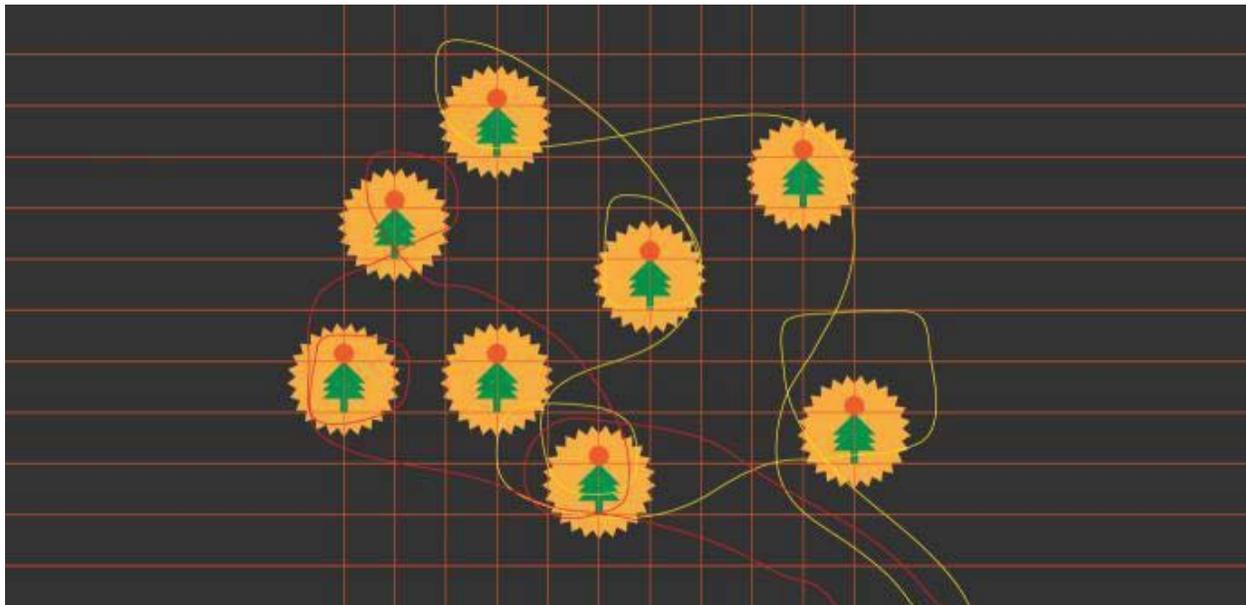
Figure 2: visualisation of anticipated movement through a WiFi installation.
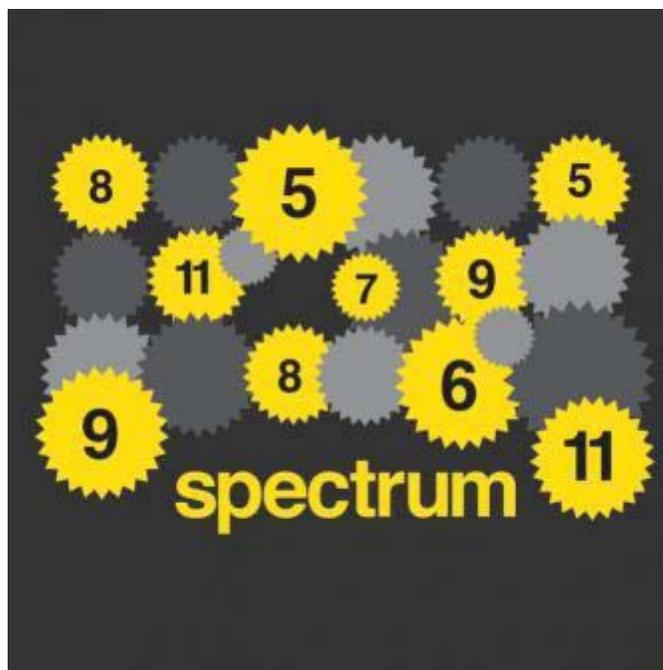
Figure 3: visual response to the wireless spectrum.

The Community Media Arts Context

Community arts and development has traditionally been considered a collaborative creative pursuit. In Australia, the field has occupied various positions on the activist, cultural and welfare spectrums since the 1960s. It has been considered an avenue for political activism, cultural democracy, self-determination, civic engagement, capacity building, community collaboration, empowering the marginalised and skill building.

The founding community arts practitioners rejected the notion that creative practice was for the pursuit of high art and the exclusive domain of the professional artist. The field's mandate was to reframe art as a practice available to anyone, and to reconfigure arts policy to support such activities (Hawkins 1992). Practitioners communicated this idea through the term 'cultural democracy', emphasising the decentralisation of the means of cultural production. Although the notion of 'cultural democracy' has traditionally framed community arts and cultural development practice, I would argue the term 'building agency' better describes the community media arts field's current agenda.

My notion of building agency, in a community media arts context, involves using creative practices to nurture people's capacity to act in the world. One approach to this scenario involves helping participants gain a better sense of their personal ethics, by engaging them in creative practices that raise their awareness of the dynamics of everyday situations. This heightened sense of one's own boundaries creates opportunities for self-reflexivity, and could move the individual beyond merely having agency, towards more considered, conscious action.

The everyday situation this paper is concerned with is participation in digital communication networks, an activity that is defining the current cultural moment – the networked moment. This networked moment presents both a new source of power and knowledge and a new site of privilege and inequality – a spectrum of effects that manifest as a result of network actors. The premise of the paper builds on this dynamic, and proposes that visualisation may be used to uncover and reveal these actors and hence the power relations among them.

Critical Network Participation

This paper's consideration that CMA practices should nurture people's critical literacy around everyday situations, moves beyond the dominant mode of addressing new media participants – from those who use networks, to those who understand networks. In doing so, it challenges 'storytelling' as the dominant mode of CMA practice – a dominance that emerged due to low-cost video production tools becoming widely available in the mid-nineties, which led to a contingent of film-makers becoming involved in community arts projects – a contestation of the status quo similar to Hecks' (1985) questioning of the acceptance of community arts folk aesthetics in the 1980s. So as CMA in Australia realigns its logics to the networked moment, nurturing capacities to critically navigate communications networks, should be become part of the remit of practitioners.

Network users are faced with an evolving set of signs, protocols and pragmatics that affect navigation and participation. Often these functions "operate at a level that is anonymous" or invisible, which "makes them difficult to grasp" (Galloway and Thacker 2007, 5). Anonymous network actors represent forms of control that include interfaces, processes, software, and hardware – selecting, adding, withholding, displaying, channeling, shaping, disregarding and deleting (Barzilai-Nahon 2008). These protocols are inescapably related to power, meaning questions relating to participant agency naturally become a concern of the community media artist.

Building network agency is inextricably linked to developing an awareness of network structures and dynamics; and this exploration begins with the consideration that technological development is not an autonomous occurrence, but rather a social, nonlinear process. The interplay between technology and culture is situated in relationships – both human and technological – whose complexities can be understood by considering their "articulations and assemblages" (Slack and Wise 2005, 109). Articulation and assemblage looks to the web of connections contributing to the technology and its impact on society. The cause and effect binary is replaced with an appreciation of the matrix of actors, non-actors and liminal spaces that impact societal change.

Visualising 'Invisible' Networks

Visualisation techniques range from abstract representations to more analytical cartographic approaches. They are an increasingly popular method of framing information and are used to encourage the practice of connection-making. The approach I am suggesting for the community arts context falls towards the abstract end of the network visualisation spectrum – a fair distance from data-driven network visualisation, which is based on network theory and mathematics.

By rendering the matrix of actors in networks 'visible' through visualisation, we can begin to map connections, flows and blockages. We begin to form a picture of the social and technical forces at play. The objective of visualising 'invisible' networks is to interpret the articulations and assemblages of networks, exposing participants to the idea that "the very notion of a network is in conflict with the desire to gain an overview" (Mackenzie 2010, 9). It is also to expose the binary nature of networks – that they operate on the logic of inclusion/exclusion and that they are both self-configurable and programmed (Castells 2009). These objectives respond to Ascott's essay *Gesamtdatenwerk* (1989), where he describes the process of "making the invisible visible" as "the great challenge of late twentieth century art" (Ascott 2003, 222).

Visualising communications networks may also help decipher emergent nodes of connection or significance. This process of projection may help anticipate the potentiality of a network. Take the case of wireless networks. MacKenzie proposes that "wirelessness, affects how people arrive, depart, and inhabit places" (2010, 5). Becoming more conscious of these invisible dynamics could increase people's sense of how "their wireless devices are expanding and multiplying relations, overflowing existing infrastructures and environments and realigning senses of personhood at many junctures and on different scales" (2010, 12).

Working with visualisation techniques to highlight the power dynamics with networks may also help community media arts participants develop critical visual skills. These might include tools for the production and analysis of visuals, such as information design or the registering of embedded ideologies within visual material.

Network Visualisation as Telematic Art Process

This paper supports telematic art as an approach for community media artists, and offers network visualisation as a preliminary (critical) design task for the creation of telematic art. Network visualisation activities may provide a critical entry point for the design of telematic art projects, as participants begin the artistic process by engaging with the structures and dynamics of networks. This approach is designed to provoke, inspire and question fundamental assumptions about the role technology plays in everyday life.

The term 'telematic art' was introduced in 1978 by Roy Ascott, whose creative work and writing had a significant influence on early artistic explorations of networks, including experiments with video and satellites in live performances; and, collaborative story-making using computer networks. The term is still used to describe artworks that use communications networks as 'material', but such projects are also referred to as 'networked art'. I have chosen the term telematic art as I feel it situates communications networks as a medium of the work.

Speculative Design Proposal: *WiBuy*

Critical Design, popularised by Anthony Dunne and Fiona Raby, takes a critical theory approach to design, and uses speculative design proposals to challenge assumptions we have regarding the products

we use. This paper draws on notions of Critical Design, to offer a speculative design scenario through which to explore its themes. It also looks to critical design to provide a framework for combining the aesthetics and ethics of network visualisation, allowing community artists and participants to explore what Anne Galloway, drawing on Latour, describes as "matters of concern rather than matters of fact." Critical Design pulls focus on how the design process arranges relations between things, ideas, people and places, and in turn, triggers a critique of communications networks, building awareness of anonymous network actors.

The speculative community media arts project I am proposing, titled *WiBuy*, will be a ten-week workshop series followed by a public outcome that will form part of a day-long community festival. The work will use a temporary mesh WiFi network, WiFi enabled mobile phones and mapping software to devise an outdoor, locative media installation.

The project draws on the practice of geocaching – an orienteering activity that involves hiding and seeking out 'caches' in publicly accessible places. People use mobile devices and other navigation techniques to find the 'caches', which are often small containers that contain a logbook or historical information about the corresponding site. *WiBuy's* caches will be a digital download of a tutorial on how to make something. The nature of these do-it-yourself (DIY) activities, decided by project participants, range from making cakes solely from raw ingredients, to building your own bicycle from bamboo. Each digital 'cache' is assigned to a particular WiFi router, which means that people have to move around the festival site to gather them all.

An important aspect of this locative media project is the mesh wireless local area network (WLAN). Mesh networks enable WLANs that cover large distances. Their topology is distributed, meaning the architecture is decentralized and connections form in an ad hoc way through 'repeaters' that spread the wireless signal. Mesh networks also make it easy to share excess bandwidth with the network – this can be thought of as similar to putting electrical energy 'back in to the grid'. At the initial project workshop, the CMA practitioner might begin by guiding the participants through visual explorations of the dynamics of mesh networks, and their associated signals and dynamics. Figure 1 is an example of a mesh network visualisation – the yellow dots show the main nodes that have a direct connection to the Internet, and the orange dots respresent the mesh repeaters that share bandwidth. The CMA practitioner would be careful to remind participants at various stages of the project that the network visualisations they create are only conceptual explorations of network dynamics, and are not fully representative.

There are a myriad of ways for the CMA practitioner to get participants thinking about and visualising networks. Figure 2 is an example of how visualisation techniques could be used to anticipate the movement of people through *WiBuy*; and figure 3 is a visual response to thinking about the wireless spectrum, where the yellow starbursts represent active channels. The type of mobile device and software people would be using to access the digital download could be used as subject matter for a network visualisation. CMA practitioners might also draw on Dunne and Raby's metaphor of the spectrum as a "nervous system" (2001, 18). This would provide an entry point for understanding 'hertzian space' as a real landscape (Dunne and Raby 2001).

Conclusion

By using network visualisation techniques in telematic community art projects, participants have the opportunity to unveil the actors within networks. This process is applied with the aim of increasing critical participation in communications networks. Critical network participation builds from a heightened consciousness around the articulations and assemblages of networks, and has the potential to improve connection-making abilities. This encouragement of visualisation practices around communication networks may also develop critical design skills around the production and analysis of visual material.

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OBJECT GEOGRAPHY: THE INTERNET OF THINGS

Duncan Shingleton

This paper investigates how objects in the Internet of Things, endowed with informational clouds, could create a new layer of complex relationships that were previously not visible in our networks. Consequently it allows us to rethink our understanding of the structure and agency of a network, by examining the pattern of interactions represented by how people to people, people to things, and things themselves are connected to one another.

The emerging phenomenon known as the Internet of Things (IOT) refers to the technical and cultural shift anticipated as society moves towards a ubiquitous form of computing that facilitates the connection of everyday objects and devices to all kinds of networks. The analog bar code that has for so long been a dumb, encrypted reference to a shop's inventory system will be superseded by an open platform in which every object manufactured will be traceable from producer to distributor, and potentially every single person who comes into contact with it following its purchase. Furthermore, every object that comes close to another object and is within range of a reader could also be logged on a database and used to find correlations between owners and applications.

The Internet of Things creates a link between concrete objects and abstract data, producing a hybrid of physical and electronic spaces that enables communication and interaction between people and things, and things themselves. It is an all-encompassing framework to reflect on and design towards more digital connectivity, a system that is local and global, accessible in real-time from any location. Through item based tagging and identification, the Internet of Things will take ubiquitous computing – anytime and anywhere communications – to the next step in networking: 'anything communications'. However the Internet of Things is at risk of simply becoming a platform whose primary benefit is to offer improved indexing and tracking of manufactured consumer goods from cradle to grave. Therefore this paper aims to re-contextualise the Internet of Things, and explore theory relating to the attachment of data to an object, and as a result the role objects might have in our networks.

THE IOT AND INFORMATIONAL SHADOWS

The significance of Internet of Things is that through technologies like RFID and 2D barcodes, it offers a low-impact way to 'import' physical objects into the data-sphere and endow them with an informational shadow (Greenfield, 2006). As the Internet grows, will we see it encompass more and more elements of the real world, as "ordinary objects, from coffee cups to raincoats to the paint on the walls, would be reconsidered as sites for the sensing and processing of information…where ubiquitous means not merely in every place, but also in everything" (Greenfield, 2006). The Internet of Things leads us into a new era of ubiquity, where the 'users' of the Internet could be counted in billions and where humans may become the minority as generators and receivers of traffic, and instead most of the traffic could flow between devices and all kinds of 'things'. Radio Frequency Identification (RFID) is seen as being a key enabler in the Internet of Things due to its ease of distribution, low cost, technological simplicity and is therefore a logical candidate for bottom-up tracking and tracing of things, and the ways in which

things move around. As a pull technology, the RFID reader emits energy so that a tag provides its unique number, identifying itself. In combination with the Electronic Product Code, the next generation of production identification that identifies objects in the supply chain, it becomes possible via an Object Name Server to map the object to a IPv6 address in a database, and through Physical Markup Language represent data about that object. This means you can track a bottle in your room, provided there is a reader in your door, floor or building, and through a simple web query it can be accessed via the web, for example from Tokyo (Rob van Kranenburg, The Internet of Things: A critique of ambient technology and the all-seeing network of RFID, Amsterdam: Institute of Network Cultures, 2007). As an informational shadow is created for every object connected as a node to the Internet of Things, what does the shadow look like and what is its affect on an object?

Most implications of an Internet of Things consist of programs resulting through the convergence of identification and location technologies related to the manufacturing process for consumer goods and their associated logistical systems, such as stock control and product tracking. These systems offer the ability for the condition of an object to be recorded in a variety of forms and streamed to databases that can be correlated and mined to ensure that things, for example, are in the right place now or have been in the right place in the past, have been kept at the right temperature and handled by the right people (Speed, 2010). Sterling terms theses objects 'Spimes' – objects that can be tracked through space and time, and throughout their lifetime. Spimes are regarded as "material instantiations of an immaterial system, they're virtual objects first and actual objects second", which "begin and end as data" (Sterling, 2005). From books to frozen peas, parcels, to even people, things move through scanners to update their location; if that location has particular properties, then aspects of its condition complement the data that is associated with the object. "In this way, things carry data about the world around them" (Speed, 2010).

However the ubiquity of smart-phones and online platforms such as StickyBits, Itizen and Tales of Things (http://www.talesofthings.com), offers individuals the ability to re-appropriate previously closed channels and tag physical objects with memories, stories and media content. Anders (2001) discusses the ability of an object to be the methodology for the mapping of space and information, a 'cybrid reality' – "I have a physical object here that notes my handling of it and displays its contents to me in this way". The change in informational processes become spatial in nature and in direct relationship with the physical, resulting in a virtual and physical world that correspond with each other, comprised of entities that 'cybridize' within that world. This ability for material artefacts to become an interface to the Internet of Things is addressed in the artwork RememberMe (http://fields.eca.ac.uk). The RememberMe artwork was a collaborative project with the Oxfam and FutureEverything 2010, where people who donated objects were asked to tell a brief story about them into microphone – where they acquired it, what memories it brings back and any associated stories. These audio clips were then linked to an RFID tag and QR code and attached to the items as they joined the shop's stock. Visitors to the shop, including conference delegates were able to use bespoke RFID readers, or their own smart phone to browse artefacts that were displayed amongst the many thousands of other objects. Labels highlighted the RememberMe objects and once triggered, speakers located in the shop replayed the previous owners story, evoking a ghost from the past. Once tagged the objects were in the public domain for purchase by other members of the community, and the project's iPhone and Android apps allowed new owners to access old stories but equally importantly, add their own.

However when we are discussing the attachment of data to objects, whether it's labeled 'Spimes' or 'Cybrids', I question whether Greenfield's 'informational shadow' is the right analogy to use. The term shadow by its definition implies that it is the object that casts the information – the data must be read

from it. However the Internet of Things can provide a technological framework for data to be written onto objects, in situ or remotely, allowing the data to cast its own shadow on to objects that are either present in the real world, or no longer exist having been lost or destroyed. In artistic practice, negative space is used to refer to the space around or between the subject(s) of an image, and not the subject itself. The surrounding space is used to artistic effect as the 'real' subject of the image, and is used to form an interesting or artistically relevant shape. The importance here is that it is the immaterial space that is used to define the method of viewing the representation of the object for the audience. In the same way, objects in the Internet of Things become abstracted manifestations of their data whose immaterial representation may differ from their physical form. When we stop examining the physical object, and instead start seeing the immaterial data that surrounds it, the form of the object begins to disappear – by concentrating on what doesn't exist, the negative space, we can more accurately define the boundaries of what does exist. When we view an object in the Internet of Things, foremost we are viewing its data, and its form lies in the negative space created by the associations between databases tables and indexes. Therefore this author proposes it is more accurate to describe objects in the Internet of Things as having informational clouds, and like clouds which form part of a complex weather systems, objects in the Internet of Things do not exist in splendid isolation, but as part of network. Therefore question arises, what happens with these informational clouds begin to interconnect?

LOOKING THROUGH THE CLOUD

Ubiquitous digital devices are built into the world of everyday life, of social relations, places and things (Richard Coyne, The Tuning of Place, London: MIT Press, 2010), and the Internet of Things is evolving into a "conceptual framework for understanding how physical objects, once networked and imbued with informatic capabilities, will occupy space and occupy themselves" (Bleecker, 2006). This provides a technological paradigm under which we can re-conceptualise new forms of spatial arrangements.

Through an enormous quantity of new associations being generated via thing to thing and thing to people communication, The Internet of Things allows us to see a whole set of pattern relationships that were previously not visible in our networks – "society itself is to be rethought from top to bottom once we add to it the facts and the artefacts that make up large sections of our social ties" (Latour, 1992). Society, organisations, agents and machines are all effects of patterned networks generated through the interactions of actor-networks, the observation of which can only be achieved by tracking the traces left when relationships, or associations, are being produced between intermediaries (Law, 1992; Latour, 2005). Social networks are comprised by the patterns of casual interconnection and interdependence among agents and their actions, as well as the positions they occupy (Jose Lopez and John Scott, Social Structure, Buckingham: Open University Press, 2000) – in other words their relational structure is the sum total of all the social relationships of all the agents at a given moment in time.

Actor-Network Theory (ANT) can be seen as a tool for exploring and describing how the social is assembled by way of technologies; objects and artefacts, and its import is one of agency, specifically responsibility that is distributed equally across entities, including a host of nonhuman ones not normally seen as exercising agency at all. (Latour, 2005). ANT does not typically attempt to explain why a network exists; it is more interested in the infrastructure of actor-networks, how they are formed, maintained and how they can fall apart. Actor-Network Theory incorporates what is known as a principle of generalised symmetry; that is, what is human and non-human (e.g. artefacts, organisation structures) should be integrated into the same conceptual framework and assigned equal amounts of agency.

An actor is not the source of action but the moving target of a vast array of entities swarming towards it, and action should be felt as a set of agencies or translations between mediators that may generate traceable associations. (Latour, 2005). In the Internet of Things, "agency happens with the ecology of networked publics –streams, feeds, trackbacks, permalinks, Wiki inscriptions and blog posts" (Bleecker, 2006). In other words the agency lies in the flow of data between networked objects. The Space of Flows is Castels' (1996) theory relating to network society and technologies role in a new type of space; made up of movement that brings distant elements – things and people – into an interrelationship through synchronous, real-time interaction. Flows are understood by the purposeful, repetitive, pro-grammable sequences of exchange and interaction between physically disjointed positions held by so-cial actors in the economic, political and symbolic structures of society (Castells, 1996). The Space of Flow is defined as consisting of three elements – "The medium through which things flows, the things that flow, and the nodes among which the flows circulate" (Stalder, 2001). The Internet of Things can be understood in terms of these three elements – tag/reader, data and objects.

Through contextualising the Internet of Things through Actor-Network Theory and the Space of Flows we can conclude that an object's agency, meaning, functionality and value is deduced from the relation-ship created by its informational cloud when inserted as an actor into an intersection of a flow in a net-work – things are less defined by their intrinsic qualities but more by their relational position to one an-other (Latour cited Stalder, 2003). McLuhan (Marshall McLuhan and Barrington Nevitt, Take Today: The Executive as Dropout, Ontario: Longman Canada Ltd, 1972) states the "meaning of meaning is relation-ship", and by this he meant, that there is no content without context and that the importance of a piece of information, its real meaning, changes depending on what it is related to. The difference between data, information, and knowledge is the amount of relationships that are contained within it. In other words function, value and meaning in the space of flows are relational and not absolute and as the net-work changes – as old connections die and new ones are established as the flows are reorganised through other nodes (Stalder 2003), a nodes agency, meaning, functionality and value changes too. We cannot help but view the world in terms of unseen relationships where the things-in-motion illuminate their social context.

AT THE CENTRE OF THE FLOW

Actor-Network Theory proposes that the structure of networks consists of nodes both human and non-human, where associations between the nodes exist in a continuous Space of Flow. The Internet of Things offers a technological framework for this theory, connecting everyday objects to networks and providing them with a rudimentary knowledge about what they are and their environments they inhabit – given the fact that an object through a tag/reader can query a database to discover associations about itself, and any other object within its vicinity. This interconnection of objects may determine the joint effect they have on the world at that moment, as the organisation of a synchronous real-time relation-ship between the nodes of a network, gives the network as a whole the ability to exert a causal influ-ence. "Agents residing on one scale start producing behaviour that lies one scale above them: ants cre-ate colonies; urbanites create neighbourhoods; simple pattern-recognition software learns how to rec-ommend new books. The movement from low-level rules to higher-level sophistication is what we call emergence" (Steven Johnson, Emergence, London: Penguin Books, 2001). The source of relational emergence is the organisation of nodes, and the maintenance of a set of substantial relations between the nodes that constitute them into a particular kind of whole at a particular moment in time, and thus allows a node to produce causal impact in its own right (Elder-Vass, 2010).

In the study of Human Geography we are constantly reminded of how people shape their world and of how people and places vary across time and space. Places are constantly changing and people are responsible for these changes. People create cultures, values, aesthetics, politics, economics and more, and each of these affects and shapes places (Erin Fouberg and Alexander Murphy, A. and H.J de Blij, Human Geography: People, Place and Culture, Hoboken: Wiley, 2010). The structure of a network, the relations among network members, and the location of a member within a network are critical factors in understanding social behaviour. Complex, dynamic social systems are analysed in terms of stabilising and destabilising mechanisms, and traditionally it is only human agents who play strategic roles in these processes. Institutions and cultural formations of society are carried by, transmitted, and reformed through individual and collective actions and interactions. These social structures help to create and recreate themselves in an ongoing developmental process in which collective agents play constructive as well as destructive and transformative roles in the context of complex sociocultural arrangements. These arrangements of social life involve time, space and place as a constitutive factors in the construction and reconstruction of what people do and in the way they do things together, as active agents with their distinctive characteristics, motivations, and powers contributing to the reproduction and transformation of our networks. In other words societies are composed of the relations between people, and the ramifications and latticework of those relations constitute the structure of society.

However through re-contextualising the Internet of Things from a relational emergentist methodology, within the context of Actor-Network Theory and the Space of Flows, it raises questions about how our social networks will be constructed, destructed and transformed by the interactions represented when people to people, people to things, and things themselves are interconnected. The behaviour of the relations between the nodes of a network in particular temporal and spatial contexts defines the behaviour of the network as a whole. Networking objects means we could possibly gain new insights into how we make places, how we organise space and society, how we interact with each other in places and across space and time, and how we make sense of others and ourselves in our locality, region, and world. As objects are treated like code, the messages they encode will emerge from the pattern of social relations being expressed, allowing the Internet of Things to provide the meta-data that enables clusters of data to self-organise, assembled out of an unthinkable number of associations created by agents both human and non-human.

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CHOREOGRAPHING TOPOLOGICAL SPACES WITHIN DANCE PERFORMANCE WITH REAL-TIME VIDEO

Kate Sicchio

This paper will explore how the use of real-time video projection in live dance performance creates multiple spaces for choreography and how these spaces result in a topological approach to dance-tech work. Within the research, the types of space identified within choreography with real-time video projections include physical space, camera space, projection space, and compositional space.
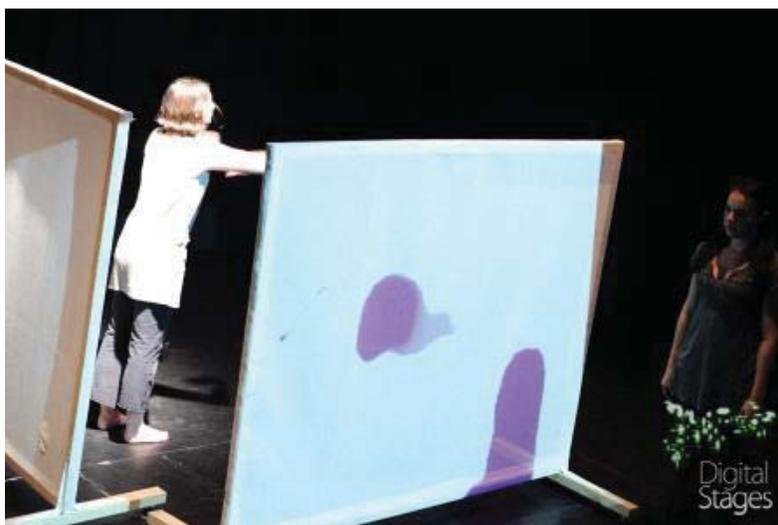
Fig 1. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt
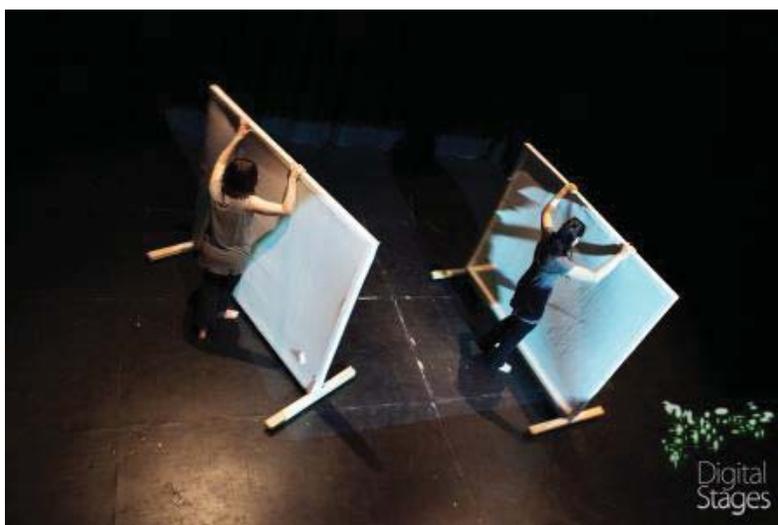
Fig 2. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt

Fig 3. Nayra mara at Digital Stages Festival, London. (c) 2011 Piotr Erdman www.otof.lt

This paper will explore the use of space within choreography with real-time video and will discuss spaces that have been identified through a practice-as-research approach. By creating a dialogue between performance works by the author and topological definitions of space, further considerations of composition of space within dance may be considered as well as means to achieve this, such as the use of qualitative rhythm.

To begin this consider of space, a definition of choreography must be considered. In this research choreography is the nexus between space, performer, movement and sound (Sanchez-Colberg, 1992). More specifically in this research, dance works created for black box theatre spaces will be considered. This paper also considers real-time video technology. Real-time video refers to the processing of video by a computer, so it has as little latency as possible when pixels are captured. This then may be utilised by software to transform pixels using a range of techniques such as background subtraction or visual effects. Real-time video may be live footage or footage used within video tracking systems, but it has as little delay as possible (to the point where it may not be recognisable by the human eye). In this work, the real-time video creates projections, which are then incorporated into a black box performance space during a live dance performance.

TYPES OF SPACE IN CHOREOGRAPHY WITH REAL-TIME VIDEO

With choreography for the stage that utilizes real-time video projections, multiple spaces for movement must be considered. These include the physical space of the performance as well as camera space, projection space and the compositional space. These spaces form frames for movement and have interrelationships that create the composition.

To create a definition for a frame for movement, one can adapt Deleuze's cinematic concept of the frame. He discusses the frame as creating a space that maybe transformed and creates an open set. "The frame therefore forms a set which has a great number of parts, that is of elements, which themselves form sub-sets… Obviously these parts are themselves in image [en image]" (Deleuze, 1986, p12). By creating spaces that are sets of elements or movement, the frames and their relationships create a composition. "Framing becomes the means by which the plane of composition composes" (Grosz, 2008, p18). The composition of these frames will be discussed later in this paper, by examining the topological properties of these frames and the emerging choreotopology.

The physical space is the black box theatre and creates the first frame for movement. "The typical proscenium stage creates a theatre of illusion whereas smaller, more informal spaces lend themselves to performances in which events are to be seen as happening in a quotidian time and place…non-proscenium spaces communicate the proximity of life to art" (Foster, 1986, p60). The physical frame is where the dancers perform and the movement is first generated.

Camera space frames movement not only in the lens of the camera but also within the programming of computer vision utilized in dance with real-time video. Within the camera space the location and position of the camera not only effect the framing, but also transform movement into a digital space. "The distance between the camera and its subject matter, the angle, the focus, the use of lighting and the style of editing all contribute to this modification" (Dodds, 2001, p30). Camera space also involves computer vision that manipulates the movement of pixels. "Multimedia computers have become fast enough to manipulate video on a pixel-by-pixel level rather than frame-by-frame" (O'Sullivan and Igoe, 2004, p234). This manipulation of movement via programming is integral to the choreographic process.

Projection space involves the surface of the projection (such as a screen, cyclorama, etc), as well as the content of the video being projected. The projection space is a physical construct, whether it is a wall, cyclorama or custom screen, which provides a surface for video to be shown. Another component of projection space is that it is not simply the geometry of the screen or projection surface, but there is also a digital space to be considered. This aspect of projection space is where the movement captured in the camera space re-emerges as part of the choreography transformed in real-time. This frame looks to transform the movement captured in the camera space and present it back into the physical space.

Compositional space is the most topological of the spaces as it has continuous interrelationships with other spaces and it is these relationships that are choreographed into a composition. Compositional space does not act as a container for the other frames of the composition (physical, camera and projection), nor does it react with space outside those identified in the performance. While it is the territory for the dance piece, it has constantly changing relationships with the other frames that can be choreographed by exploring rhythms within the movement.

Topology and Dance Composition

Topology in its mathematical definition includes sets and subsets that are open and when sets intersect the union creates a collection of open sets. It also can be applied to choreography. "Topology characterizes dance as a precisely choreographable pattern in space and time" (Portanova and Piccirillo, 2009, p2). If each space for movement (physical, camera, projection) is considered an open set of movement, then the compositional space created by their interrelation is a combination of open sets of continuous movement (Rotman, 2009). This causes qualitative space as the continuous movement is outside of measurement and Euclidean geometry. Topology is "the process of arriving at a form through continuous deformation" (Massumi, 2002, p184).

Deleuze and Guatarri (1988) discuss the plane of consistency or composition as "not a plan(e) of organization, development, or formation, but of nonvoluntary transmutation" (Deleuze and Guatarri, 1988, p269). This idea of composition as "only relations of movement" (Deleuze and Guatarri, 1988, p266) reflects the topological nature of the compositional space within dance with real-time video systems. The measurement of the space does not determine the relationship of the live dance with the projected dance, but instead it is choreography of movement across these spaces. Examining the plane of composition as transmutation and relationships of movement, the topological design of the space becomes apparent as the composition is created through movement.

Within dance composition of space, rhythm emerges as a critical part of choreography in topological spaces as rhythm is found in movement and in time. Rhythm becomes the action, distribution and energy between the frames of space in a topological choreography without becoming a metric organizer of movement. Rhythm does not have to be quantitative to be part of movement composition, but instead rhythm creates space and time with energy in a qualitative manner, as "it is well known that rhythm is not meter or cadence, even irregular meter or cadence" (Deleuze and Guattari, 1988, p313). Qualitative rhythm is creates this composition of space by providing the temporal means for movement throughout the composition in a qualitative distribution, rather than require a measurable increment of movement, space or time.

Nayra mara - Performance at Digital Stages 2011

During January 2011 a new piece entitled *Nayra mara* was formed exploring the composition of live dance with real-time video projection. The real-time video system was comprised of a CCTV camera, the software package Isadora, a MacBook running the software and a video projector. This piece began as a solo performance and was later developed into a duet with performances at the Digital Stages Festival in London in April 2011.

An important addition to the compositional landscape of this piece was the making of moveable screens out of sharkstooth mesh, a semi-transparent fabric that allows for front projections to be seen, as well as the fabric to been through when back lit. This means that the choreography is not only movement of bodies and pixels, but now screens as well. It also allowed for projections to be in front of the dancers within the physical space, rather than always placed behind them. These movements considered in relation to each space create a dance composition.

Because of the movement and possible semi-transparency of the screens, there were a lot of spatial relationships based upon the location of the screens that had not been possible in previous work in this research project. This new movement and new relationships of spaces because of the new movement, contributed significantly to the creation of topological compositions of physical, camera and projection spaces. Because of this, the movement creates compositions that are not plotable configurations in

physical space but deformations and distributions of movement across spaces. Continuous change in location of the frames of movement means that the use of space in the piece can be described as topological.

The piece begins with the two screens in parallel diagonal lines on the stage in the black box space. One performer begins to move in the physical space and travels in between the two screens. This is the first time that the movement is seen behind the projection space, however, at this moment due to the lighting, the camera does not see the performer behind the screen. As the performer travels, the movement becomes visible to the camera and is simultaneously in the camera space and physical space. The camera space is programmed to look for the difference in pixels caused by the movement and this movement of pixels is then projected on the screen. The movement continuously flows from physical to camera to projections space and the arrangement of the movement in these frames forms the composition. As Grosz (2008) discusses in regards to architecture, the choreography negotiates the spaces existing in continuous relations to each other and the movement is present in the physical space of the blackbox, the camera space, and in the projection space of the screens simultaneously and the use of real-time technology permits a topological relationship. The performers walking around the screens follow the traveling, which is repeated several times with an increase in the speed of the walking each time. This can be seen as an increase in the energy flow and the resulting qualitative rhythm, which constructs the composition.

During the Digital Stages performance this section was not as successful in demonstrating the topological spaces because the lighting effected the projection as the dancers entered the stage. The lighting hit the screens and prevented the movement on screen to be seen clearly. There were many reasons for the lighting design interfering in this section, including the locations of the light in the rig and the lack of side lighting options. Despite this not working as well in this opening section, later in the piece a similar effect was used and was more visible to the audience, so the continuous movement was apparent and the topology was formed.

Following this section, one performer moves one screen to the back of the black box. The second performer circles the second screen around the centre of the space. The other performer begins to then circle that screen in the space. This movement of the projection space adds a new movement that is also in a continuous relationship with the other spaces in the composition. As the frame moves, the camera picks up its movement and creates a difference image that is then projected. However, the projection space in now moving in a circle and the movement from the camera space is only visible when the projection space is moving through a position in which one of its wide sides is in front of the projector. When this happens, the movement of the performer and the screen are visible briefly and then they continue to move and the image is lost from the projection space, until it is repeated moments later. The projection space now depends on time and movement to be part of the composition. This moment in the piece creates a dynamic space and illustrates Massumi's topology as a system for understanding spaces where movement is continuous. If one were to make this moment of the piece static, the movement would not be seen transforming into projection space.

In the middle of the piece the movement in the physical space begins with a gesture forward with the right arm and repeats this several times, gaining speed and momentum and allowing the left arm to join the gesture and the body to bounce as a result of the force of the movement. The movement is stopped abruptly and both arms are "caught" behind the live performer, where they struggle to release the hands from behind the body by leaning forward. Eventually they release the arms from this position and rebound and settle back to the original neutral standing position, to being the sequence again. The

movement is transformed from the physical space by the camera space and then the projection space to then join the compositional space. The result is a projection that is reflecting the gesture but has been transformed into a blurred form, which slowly increases and decreases in size based on the amount of movement in physical space.

In this section, one performer is located in front of one screen and the second performer is behind the screen. The second screen has been placed perpendicular in the physical space. After the movement sequence is repeated twice by the performer in front of the screen it is then repeated by the dancer behind the screen. The semi-transparency of the screen allows for the camera to see the movement behind the projection space. This is the first time throughout this research that the movement being performed is located behind the projection being generated. The performer then walks around to the front of the screen where the movement that was just performed has been captured and is projected as the performers watch.

Two important aspects of choreotopology are occurring in this section of the piece. The gesture creates the interrelationships as it happens across space and the choreography of these interrelationships utilizes qualitative rhythms. Because the movement can be seen through the screens, the possibility of performers being located behind the projection space is possible and creates new relationships of the physical space, projection space and camera space within the composition.

The rhythms of the movement in this section of the piece are qualitative and contribute to the choreography of topology through non-metered intensions for the timing of the movement and through the use of energies. On different planes (projection, camera and physical) and with no pre-determined meter as the timing of the movement is based upon improvisation of the live performer, this section demonstrates rhythm as qualitative. Meter, as well as how the movement "ties itself together in passing from one milieu to another" (Deleuze and Guattari, 1988, p.313) across spaces. It also explores different energies to produce these qualities of rhythm, with an increasing intensity of the force of the gesture developing and then ending abruptly.

Summary

Within choreography with real-time video projections, space becomes complex. Four frames for movement emerge, including physical space, camera space, projection space and compositional space. The relationship between these spaces can be considered topological as they rely on continuous transformation of movement. This interrelation creates a dance composition with consideration of all the frames. Another choreographic element to creating dance work with multiple frames for movement is the consideration of rhythm.

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WALKINGTOOLS CONCEPTS: RETHINKING LOCATIVE MEDIA

Cicero Silva & Brett Stalbaum

Digital location is moving us towards a complex definition of what is locative. The article analyzes the implications of what is forming the structure of the politics of the space and the relation between the physical world and the representations that we have from it since the creation of maps and cartography. The article proposes a relation between content and location based on the subjective experience of the space.
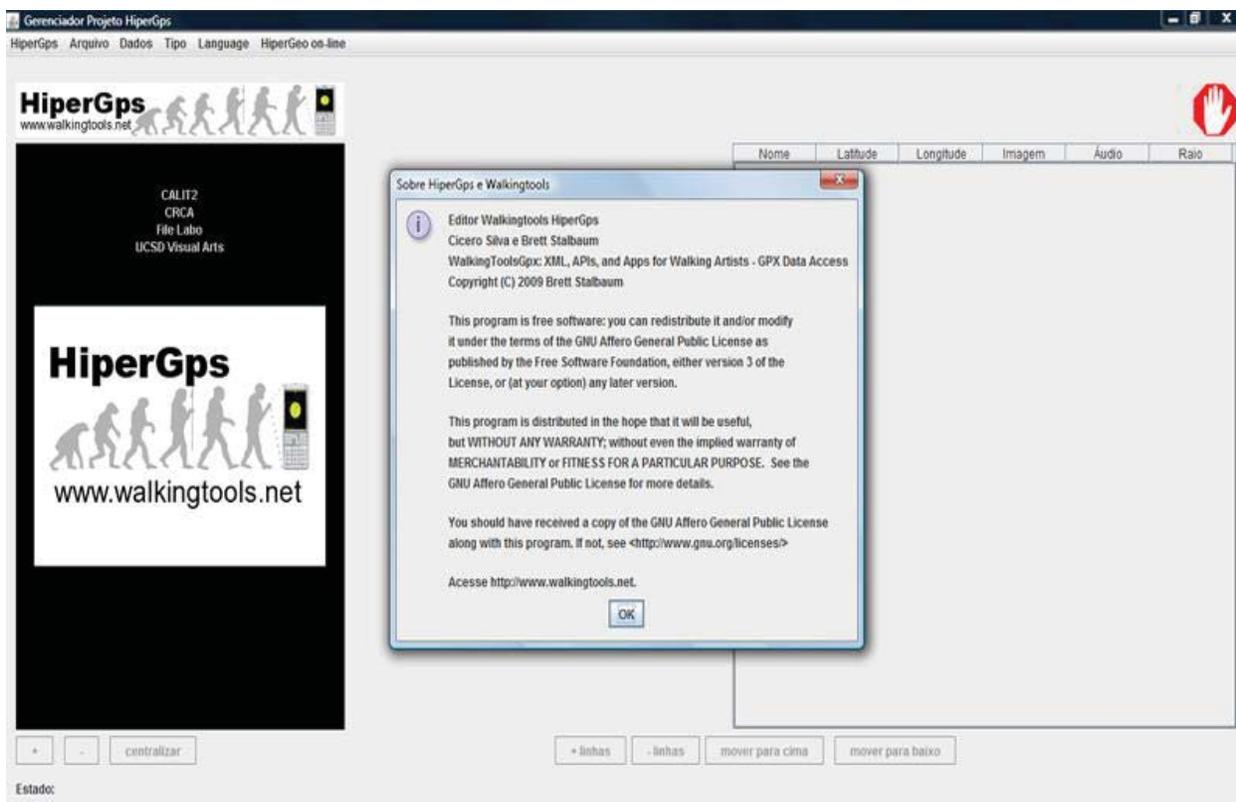
Walkingtools project by Brett Stalbaum and Cicero Inacio da Silva.

Wikipedia may be unreliable, nonauthoritative, and suffer systemic "hive mind" bias across a large number of topics, but for the purpose of capturing the mimetic zeitgeist of emerging discipline areas, its hivey, collaborative nature comes as close to producing reliability as we could hope for. This is further verified by the world's leading ontologist: the google internet search engine currently lists that wikipedia page as the number one hit for "locative media". Thus, it is safe to assume that the following definition is at authoritative in a collective sense:

"Locative Media are media of communication bound to a location. They are digital media applied to real places and thus triggering real social interactions." (http://en.wikipedia.org/wiki/Locative_media)

This we will refer to as the *normalized authorative* definition of locative media. Is this the limit of locative media, a meme that emerged only in the past ten years, somewhere in the confluence of ubiquitous computing and the significant influence of Marc Tuters and Karlis Kalnins? We will argue here that it is not, claiming that the normalized authoritative definition is so narrow that that the conceptual blind spots are are necessarily numerous. We speculate that exciting new territory and interesting unexplored possibilities exist, and will propose an agenda that seeks to move beyond the influential and important early phases of this new media. In the process, we will first parse some bits of the genealogy of the current definition, including examining some interesting rear garde polemics surrounding it. Following that, we will look at at narrative practice, examining its intersections with the normalized authoritive definition and examining some alternative practices. To that we will add some other speculative thoughts based on inspiration and frameworks drawn from the history, theory, and practice of conceptual art. In no place in this essay will we pretend to offer a comprehensive solution. Our goal is merely to define the problem and imply that there is work left to be done.

But before exploring these issues, let's wave the butterfly net and see what memes we can pull out of the air. Mapping and map hacking. Spatially tagged hypermedia and geo-annotation. Location aware story telling. Web 2.0 mashups using the Google Maps API. Neogeography. Google Earth competing with ArcGIS, spreading the software metaphor of geographic data layers from the professional realm into the consumer realm. Cast in virtual tourism, turn-by-turn in-dash GPS systems, and the waypoint merging with the vacation photo in the form of geotagging on websites like Flickr. Or even less exciting, consider the banal dream of wireless marketing: a consumer's mobile phone, fully aware of the user's geographic coordinates, chirps and delivers an electronic coupon for a nearby coffee shop, into which they stroll like a Pavlovian dog salivating a conditioned response to steamed milk. Certainly this is one of the most quotidian platitudes of recent ecommerce, but its activist other is also worth calling out. The latter stems from the cultural imagination of the sociologically engaged artist: the possibility of yet another technology or platform such as the Sony Portapak, community access television, the personal computer, and Webs 1.0 and 2.0 that will inevitably revolutionize the social as the means of production and distribution become more ever more democratically distributed. And of course, the artist imagines themselves standing there, producing their own narrative, a different content for the same systematic assumptions, hoping to stimulate a different interaction that the social engagement involved in purchasing a cup of coffee. Indeed, now 43 years since Nam June Paik supposedly used an early Portapak to videotape the Pope's visit to New York, we can see the art/activist ideological trope playing out in much the same way: the democratization of the content expressed through use of the medium allows potentially socially transformative media content to challenge dominant commercial content, therby "[T]riggering real social interactions" in competition with the social interactions already taking place in a consumer economy. These many tropes - mapping, geoannotation, geolocative services, and the implications of locative media for artistic agency within the domain of the social - can be said to explain how we so rapidly came to a relatively calcified understanding the new location aware media.

The activist trope may be a regularly occurring one in the artworld. Lev Manovich points to concerns with new technology's role in promoting "better democracy" as one of the ideological tropes typically accompanying the emergence of any new medium. We have our radio stations, they have theirs. We have our television stations, they have theirs. We have our web sites, they have theirs. Now we have our

own location aware media, and we hope to be as successful as the socially transformative agents of critical opposition who came before us.

Whether or not an optimism regarding the utopian or democratic potentialities of a new technology (or in this case, a new configuration of existing technologies) is a recurring trope (flowing from photography through Web2.0), concern with autonomy and opposition are *prima facie* apparent in the collective classification of locative media by contemporary artists and scholars. The social is the sign underlying its initial conception, with artists trying to be the balance against locative media's inverse revolutionary influences: dependence and compliance in a consumer culture. For example locative media wikipedia entry discusses a text by Ben Russell from 2004 in which he finely parses many of the social claims that can be made on behalf of the new area of practice, including public participation in the development and use of new technologies, the emergence of communities of interest, and the political issues of surveillance and control. In 2005 Galloway and Ward clearly enumerate the many political issues inherent in locative media: "Where does the technology originate? How is the project funded? Who gets to use these technologies to create cultural 'content' or artefacts? Who gets to set the rules of engagement? What are the power relations at play? What shape can resistance take?" In his essay "Locative Dystopia 2" Drew Hemment speculates a subtle and sophisticated answer to such questions, finding that "Locative Media's political moment might not be despite its complicity in mechanisms of domination but because of it, residing in the acceptance of the paradox and occupying the ambiguous space it creates, creating a site of resistance by working from the inside." Similar obsessions are clearly stated by most commentators, and in most artist project descriptions. But what is less examined is that by adopting a position of opposition, the artists enter a binary argument and adopt the very assumption that locative media technology is a communications technology. For artists the goals are different than the marketers: to be used in expository artistic expression and critical or sociological pedagogy seeking to mediate behavior as opposed to expository marketing and capitalist manipulation of the consumer. But locative media is too rarely seen as anything beyond this, for example as a medium with specific formal qualities that are poorly understood and in need of formal exploration.

Interestingly, the second google hit for locative media is an essay by one of the aforementioned founders of locative media, Marc Tuters. At first glance, the essay would seem to propose getting beyond current conceptions of locative media, inasmuch as its title is "Beyond Locative Media". But in fact, "Beyond Locative Media" is a defense against a rear garde action by prominent critics such as Coco Fusco, Jordan Crandall, Brain Holmes and Geert Lovink, who variously criticize the cartesian foundations of the medium itself, or the "decorative" artworks that function more like trade-show demos, or the unavoidable fact that like the internet, the Global Positioning System is a U.S. military technology with an irrevocable imperialist taint. These are all in fact completely reasonable (if sometimes predictable) critiques that locative media artists must answer. Tuters graciously accepts this, but responds via Frederic Jameson and Gilles Deleuze that artists must maintain an engagement with the media in order to have any hope of situating the contemporary subject in the context created by new technology, and to be in position to develop tools of resistance. Putting aside whether this is actually a direct response to any the specific critiques offered, we want to call attention to how the political trope simply rises again in Tuter's response to the political criticism of locative media as a political medium. Tuter's makes essentially Habermasian claims about the ability of locative media to communicate rational knowledge in the public sphere. Ester Polak's MILK project is highlighted in support of this, an evocative multimedia and geographic mapping of the path of milk en route from cow to cornflakes. In other words, the political moment of locative media is to be found in visualizations made possible by the "Internet of Things", thereby expanding the public's understanding (and presumably political response) of the structure and

distribution of material wealth. In other words, it is the locative variant of the profound cultural influence of documentary cinema on recent world history, or less sarcastically positively modeled on Donald Kuspit's severe critique of "Gallery Leftism" in which the artist calculates "to occupy a certain position, in the artworld... having a socio-political effect in the world".

What amazes us is the locative whirligig of assumption of political efficacy or some related role generally. Not that we consider this desire negatively in any way, on the contrary we sometimes tilt at the same windmill. Nor that we wish to actually analyze the actual political efficacy of any media. But we are concerned over the continual overreaching claims by artists that their work is a strong mediator of political opinions through the mechanism of the viewer consuming the artist's representations. The filmmaker Michael Moore may have provided the most notable recent example of what we are trying to get at here, in that his great films have not been politically transformative, functioning instead to reinforce already polarized points of view. The number of people who think that Bowling for Columbine (2002) is an anti-gun film is simply astounding! Well known political artist/prankster who sometimes goes by the name Mike Bonanno recently recounted a story from the Yes Men's "Yes Bush Can" bus tour in 2004 in which they performed "identity correction" by presenting themselves as members of the Bush Campaign team, complete with a campaign bus! At one stop, while giving one of their absurdly over the top pro-bush speeches, Mike noticed that almost everyone listening to them were either angry detractors or enthusiastic supporters. One man, a European, was able to read them for the politically provocative pranksters that they are, which in the final analysis was worrying to "Mike". Certainly there are at least contemporary questions about art's ability to communicate, let alone persuade.

Anti mapping

How are we to parse these? We may need to peer back a bit further, to seek a model that reveals a productive distinction that might extend the range and depth of locative media practices, breaking it from some of its present stasis.

A very similar pattern can be observed in the historical development "net art" practices back in the Web 1.0 1990's, a recognized period in computer art history that the present author was part of. The first wave of 1990's net art projects were interested in Web 1.0's abilities to represent information, identity, narrative, and function as a distribution channel for art practices focusing on online communication as the mechanism of individual creative expression and collective social engagement. The web was a communications channel for artists with a message and they used the media exactly as it was designed to be used. But it was not long before a smaller group of artists, mostly based in Europe, began to resist the more obvious approaches to and applications of the world wide web, questioning the formal aspects of underlying medium itself, treating the internet conceptually, hacking it, breaking it, and making it do things it was never intended to do.

Examples seem necessary at this point. We might point to artists like Judy Malloy, Abbe Don, Mark America and others associated in one way or another with digital story telling or hypertext story telling in the late 1980's and throughout the nineties. Following in a well laid tradition of hypermedia development instigated by Ted Nelson in the 1960s and 70s, these artists created stories and poetry delivered by emerging hypertext technologies that would finally crystalize in hypertext transfer protocol. In every sense, these accomplishments

For many of these artists, the web was a place to perform and to forge spaces of temporary autonomy, not a place to gaze at glowing messages or produce glowing messages to gaze at. And when we think of today's geospatial web in this context, we can see that notions more closely mapping to the former social applications of communications and representation abound, while notions of exploring the conceptual depth and unseen potentialities of the medium are rarer. We might define the two approaches as art *using neogeography and locative media* and art *of neogeography and locative media*.

There is a poorly understood relationship between data and location is obscured by our narcissism, our desire to see ourselves reflected in the high tech mirror. This is why we map. Many of the alternatives for locative can be revealed in widely misunderstood relationships between the virtual and the real. We can say that maps doesn't reveal us something, they command our view. The next step maybe is analyze why Google has decided on May of 2008 change his product policy from "Google and Maps" to "Google on Maps", showing us that they are aware of this turning point related to the power of the representation and the control of the spaces by virtual means, i.e. by the old but still valid concept of "map".

The issues are complex, and in the process of teasing the relationships we will also examine the currently accepted definition of "locative media" that seeks an escape into the the political by stimulating social interaction. What we need now is speculate routes of escape.

It is not the engagement with maps that is interesting, it is engaging with place.

GEO SOUND HELMETS: BREATH-CONTROLLED INSTALLATION

Cara-Ann Simpson, James Laird, Ben Landau & Eva Cheng

Geo Sound Helmets is an interactive and immersive installation of personal sound environments controlled by the participant's breath. *GSHelmets* are geologically inspired over-sized objects containing new technologies and soundscapes from specific geographic locations. The project explores aural geography, art/technology/audience collaboration, sensory interactivity, artist as facilitator, and audience as simultaneous composer/listener.
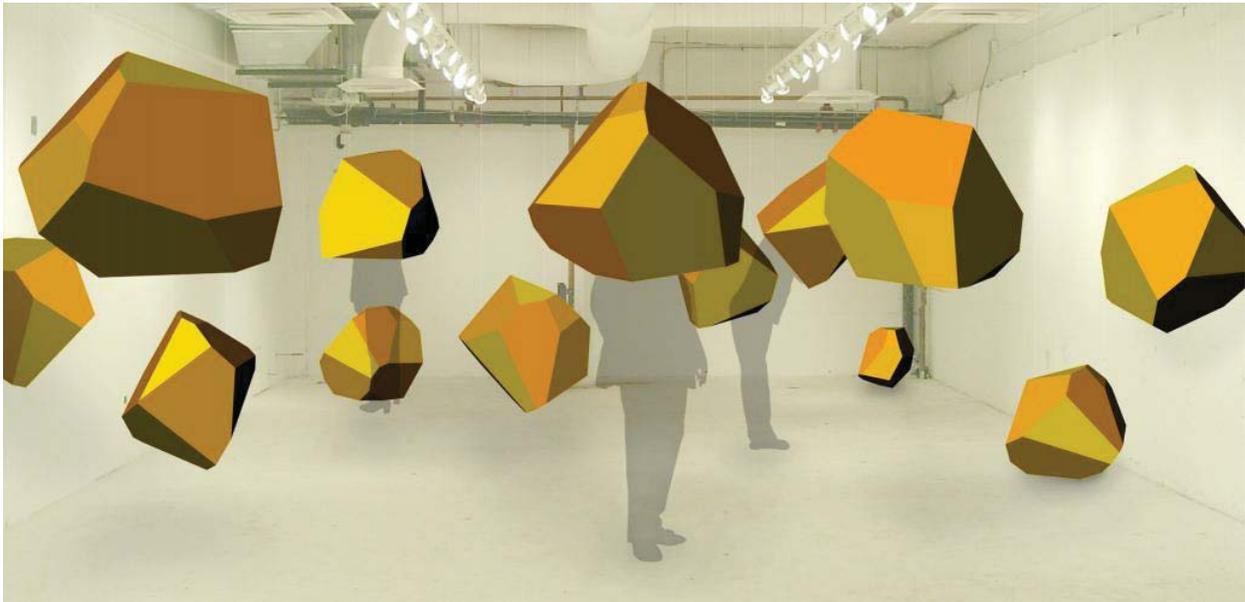
Fig 1. Geo Sound Helmets – installation concept, 2011, Ben Landau, digital image. © Ben Landau and Cara-Ann Simpson.

Fig 2. Geo Sound Helmets, 2011, Cara-Ann Simpson and Ben Landau, digital image. © Cara-Ann Simpson and Ben Landau.

Geo Sound Helmets (referred to as *GSHelmets* for brevity) is a series of immersive and interactive personal sound environments. *GSHelmets* are irregular shaped helmet-objects containing surround sound Vibrating Technology Speakers (VTS), motion detectors and breathing sensors. *GSHelmets* investigates how an individual's control over their biological impulse to breathe and move can be applied to drive an artistic and creative project. The project creates personalized sound worlds of geographically distant locations where the individual has control over the audio composition by changing their breathing patterns and shifting within the object.

The term 'geo', which is often used as a prefix to mean 'of or relating to the earth,' is important to the concepts behind *GSHelmets.* The sound recordings used as the basis for the compositions within *GSHelmets* are field recordings from specific physical locations, and as such they strongly relate to the use of 'geo' as geographical. Similarly, the design of the objects is influenced by the idea of 'geo' as geological and references the rock and gem cutting where strong planar surfaces exist in an asymmetrical geometric structure.

GSHelmets explores differing roles of artist and audience, interactive installation within public spaces, new technologies within art, and the importance of physicality. As an exhibition *GSHelmets* questions the validity of the author/artist as sole creator and suggests that the artist (and collaborative team) lays a foundation for the public to mould and manipulate into his or her own artwork or composition. Thus the artist's role within *GSHelmets* is that of facilitator, while the public becomes simultaneous composers and listeners. This paper will discuss *GSHelmets* in the context of other artists' works, cultural theory relating to social and environmental sounds and the listener, object design, and the technology involved.

The physical construction of the installation invites participants to within the space to put their head and shoulders inside different helmets where they will hear three-dimensional manipulated soundscapes from locations including (but not limited to) Australia, Singapore, Hong Kong and Canada. It is important to note that the helmet-objects are quite large and are not worn as helmets; rather, they are attached to existing architecture and act as isolation booths for the participant's head and shoulders (refer to Figure 1). Motion sensors built into the helmet enable the unit to be switched on automatically when a participant interacts with the object, and switched off when the participant leaves. Similarly, breath sensors (located between 10-30cm from the participant's mouth) detect changes in breathing patterns and react in close to real-time to manipulate the soundscapes according to the participant's breathing pattern. The sound is altered as the person breathes faster or slower, more deeply or more shallowly, or moves substantially within the helmet.

Human senses are intimated connected, and in particular our internal processes have large, subliminal effects. For example, during a heartbeat (which is quite noisy and causes the entire body to pulsate) proprioception and other senses are modified, leading us not to notice our body changing as we are accustomed to the phenomenon. Similarly, when we work in time with breathing it makes subtle changes more difficult to notice. We are, however, used to a number of natural bodily functions occurring when we breathe such as varying blood oxygen, which directly affects alertness. Using sound spatialization algorithms, in particular, is an interesting investigation into subconscious bodily changes and modifications of our senses as it will be relatively difficult for people to detect exactly how the soundscapes are being altered.

Bernhard Leitner's (b. 1938, Austria) project, *Headscapes* (2003), is designed to exist neurologically within the physical constraints of the listener's head and uses headphones for listening. [1] Leitner's

practice is dedicated to hearing sound through different parts of the body, and in *Headscapes* the listener's head becomes a new type of interior acoustic architecture where the experience is solitary and encompassing. [2] In many ways this work is the more extreme step taken from his body of work, where interior architecture and highly designed objects embrace the listener to cradle and enforce a particular type of listening that is specific to the human body.

Maryanne Amacher's (1938-2009) work, *City-Links* (an ongoing project from 1967) explores the sonic potential of urban environments. This work in particular, shows how site-specific sound can be transported to a different location. The work's outcome in the early 1970s for example, used a microphone installed in a window at the New England Fish Exchange in Boston (overlooking the ocean), which transmitted the live sound to Amacher's home studio. [3] This work engages with the idea of aural geography being used to portray 'absent locations' - where the site of the sound is removed from the audience's location. *GSHelmets* utilizes aural geography to portray the character and search for the keynote sounds (and frequencies) and find soundmarks (i.e. an aural landmark) that are unique to a site.

This idea of locations having unique aural identities is exemplified in *World Soundscape Project (WSP)*, initiated by R. Murray Schafer in the late 1960s from Simon Fraser University, Vancouver. The project recorded environmental sounds to understand the principles of aural geography (also known as acoustic ecology). The ultimate aim of the project was to examine the aural impact of humanity on the environment and to find solutions to balance the ecological soundscape. [4] The project also caused the notion of locations having unique aural identities through the detection of keynote sounds and soundmarks. [5] Schafer understood, however, that sounds are intrinsically different to the visual and can never be understood in the same way. [6] He suggested that "Seeing is analytical and reflective" and that sights could be described as nouns. [6] Conversely, Schafer suggested that sounds and "soundings" are active and generate actions, that "sound are verbs." [6]

GSHelmets' use of aural geography underpins another concept within the work - the exploration of the differing roles of the artist and participants or audience. The project questions the validity of the artist as sole creator and suggests that the artist lays a foundation for the public to mould and manipulate into his or her own artwork or composition. The artist's role within this project is that of facilitator, while the public become composers and listeners. Achim Wollscheid's (b. Germany) work, *missing recipient* (2004) uses the Akademie fur Tonkunst in Darmstadt to monitor movement on the stairs of the lobby, which in turn triggers corresponding moving lights. Environmental noise from the immediate surroundings is recorded, manipulated and played back in real-time. The work enables the audience (general public) to manipulate and interact with the installation on a very subtle level. [7] *Missing recipient* uses motion detectors, real-time audio effect and public interior spaces to investigate the physiological reaction of the audience that is determined by psychological decisions in a similar manner to *GSHelmets*.

This idea of the artist as facilitator and audience as composer is also apparent within the electromagnetic induction works by Christina Kubisch (b. 1948, Germany). Kubisch has worked with this technology since the late 1970s. Using wireless headphones Kubisch enables participants to wander freely around the space - whether this is within an art gallery, park or urban landscape. Kubisch suggests that the participant becomes a "mixer" who has control over the composition and duration of their experience. [8] The works work in a similar social manner to *GSHelmets* in that they isolate the individual participant to experience a personal soundworld that immerses and encompasses the participant in sound. *GSHelmets,* however, creates a small personal sound environment - an interior architecture within interior architecture. It isolates the participant to enable full immersion of an absent aural location where the actions of the individual determine the outcome and duration of the composition.

The act of isolating the participant occurs for three reasons, the first being to highlight the contemporary trend of deliberate isolation in public and social situations, such as individuals using headphones and mp3 players to listen to music on public transport or when exercising in public spaces. These examples draw on Michael Bull's suggestion that individuals feel the need to create personal sound environments in which they live daily. [9] With this in mind, *GSHelmets* acts to re-create a personal sound environment for the participant, and to then introduce the second reason for this isolation. Environmental sounds that individuals are deliberately wanting to block out are re-introduced to the participant in such a way that seeks out the beauty and subtle musicality of these locational soundscapes. This re-introduction of environmental noises also facilitates the ability to listen and understand the aural geography of a location that an individual may not have visited. For example, a listener from rural Australia could listen to a cityscape of the bustling metropolis of Hong Kong.

These ideas draw on theories posited by philosopher Roland Barthes and sound artist Pauline Oliveros. In 1984 Barthes proposed that hearing was physiological, whilst listening was psychological, suggesting a formal separation between the two. [10] *GSHelmets* works on both levels, where the subtle physiological changes of the body (and of hearing) can alter the audio, thus creating a psychological awareness of listening to the soundscapes and looking to deliberately alter the outcome. Pauline Oliveros suggested a new form of listening, which she labeled "deep listening" where the listener is open to the entire field of sound - a deliberate psychological decision to incorporate the surrounding environmental soundscapes. [11] This form of intense listening to the audible environment as a holistic guide reveals the situation specific nature of sound that depends not only on a particular site, but also on circumstantial time in which the field of sound was deeply listened. In this way the soundscapes presented in *GSHelmets* are not only locational to the aural geography but to the times and dates of the recordings as well.

The design of the helmet-objects is particularly important to the philosophy of *GSHelmets* as the comfort, both physiological and psychological, of the participant is paramount. The use of VTS technology allows the helmets to be slim-line and lightweight, where the interior of the object is seamlessly integrated into a singular component. The design of the installation objects is informed by their intended use, the term 'geo,' and the idea of the group of helmets acting together to form an installation. The helmet's use relies on the inviting nature of form and promise of sound permeating within. The functionality of the helmet relies on the positioning of the sensors around the inside edge of the helmet, which need to be aligned with the users face, in order for them to affect the audio output.

The angled form of the helmets references the term 'geo'. An initial exploration of geo revealed designs that represented earth itself in a geocentric view. This centered on geodesic domes which were attractive for their even form and integral strength. However, a more powerful metaphor was found in geological nuggets. The irregular angled forms reference crystal growth, while the sound bites are compared to precious stones captured from the earth. The angled forms are offset to form a skin within the helmets to give the idea of a geo interior.

The group of helmets forms an installation in a gallery space or thoroughfare. They therefore need to make an impact in the space. The modular and irregularly angled silhouettes form a stark contrast to clean walls, and regular, expected interiors. The bright and complementary tones reference precious or unusual geological finds, and again stand out in the monotone environment such as the gallery space (refer to Figure 2). The specific design of the helmet also impacts upon the layout of the sensors and components within the object, which have precise requirements for functionality.

The technical components of *GSHelmets* are comprised of a breath (humidity sensor), and an InfraRed (IR) LED sensor for detection of the participant, which are interfaced to an Arduino microcontroller connected to a computer running Max/MSP. Breathing is sensed by detecting humidity and since exhaled air is close to 100% relative humidity, breath can be easily detected. In order to avoid processing the ambient humidity changes as a signal (10-70% is common), the project uses differentiators to extract only the short-term, time-varying component of the humidity signal. This signal will decrease if the ambient humidity is high (>80%). The humidity sensor used for *GSHelmets* has a relatively slow response time; thus, the derivative of the derivative is taken (chaining two differentiators of different speeds) to obtain a strong signal.

The presence of the participant is sensed with an IR LED and sensor (a bright LED is used). The infrared receiver is designed for conventional use in TV remotes, where the IR light is modulated (turned off and on) at 38kHz to avoid interference from background and outside light. The 38kHz signal is turned on and off a few hundred times a second to ensure that the sensor is not overloaded; this compensates for background light levels by turning the receiver sensitivity down (automatic gain control).

Both sensors are driven and read using an Arduino microcontroller. The firmware has been modified from the default standard to enable the project to drive the LED at 38kHz, whereas standard Arduino timers are limited to <25kHz. Modification was required with the computer serial interface, as the default Arduino serial routines are not compatible with the 38kHz signal generation. This has resulted in more complex software, but is compensated by straightforward hardware as specialized 38kHz circuitry is not required. The IR receiver is directly interfaced to the Arduino digital inputs and drives a test LED, while the humidity sensor is interfaced to analog inputs. The inputs are converted to numbers and sent to the computer over a serial port.

Max/MSP was used for the prototype of the installation, reading from the USB serial port and performing the double-differentiator filtering as described above. Each differentiator stage subtracts a delayed version of the signal from the current signal, which calculates how much the signal has varied in that time. A moving-average smoothing filter occurs before and after each differentiator. The first differentiator is reasonably slow (1000ms difference), and serves predominantly to remove the ambient humidity signal. The second differentiator is faster at around 200ms and detects the breathing cycle, rejecting the ~5 second slower components of the sensor response. Together, these filters work effectively to reject the large changes in the input signal that occur while someone moves close to or away from the sensor.

The 'head' sensor is used to gate the audio on or off and uses a slow fade for a perceptually smooth transition. Positive humidity peaks (exhalations) control an effect applied to the signal. The humidity signal is tied to a wet/dry reverb mix, where the filter output is most apparent at maximum humidity. This generates a time-varying effect controlled by the user's breathing, and is intended to permit perceptual manipulation. Surround sound spatialization in the helmets have initially been produced through amplitude panning and phase decorrelation, with a view to implementing state-of-the-art near-field 3D sound spatialization algorithms**.**

Geo Sound Helmets is an exciting project that will continue to evolve and develop as further geographical compositions are added to the installation. The work enables a diverse audience to interact and become composers and creators, while the artist and collaborative team facilitate. By isolating individual's to re-introduce them to the audible environment surrounding them and in absent locations, *GSHelmets* questions our societal trends and how we interact with each other, as well as our environment.

The technology involved in the project demonstrates the validity of incorporating new and evolving technologies into creative projects that can enrich the experience of the audience.

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BETAVILLE: THE VIEW FROM NEW BROOKLYN

Carl Skelton

The Betaville project has matured from a software art experiment into a vehicle of creative collaboration and exchange: a tool in planning and architecture studios, and a *fully public medium* for concept development and advocacy in the context of local art and urbanism projects. In this paper, one of Betaville's founding citizens will present some of the first results from Betaville's implementations in the field.
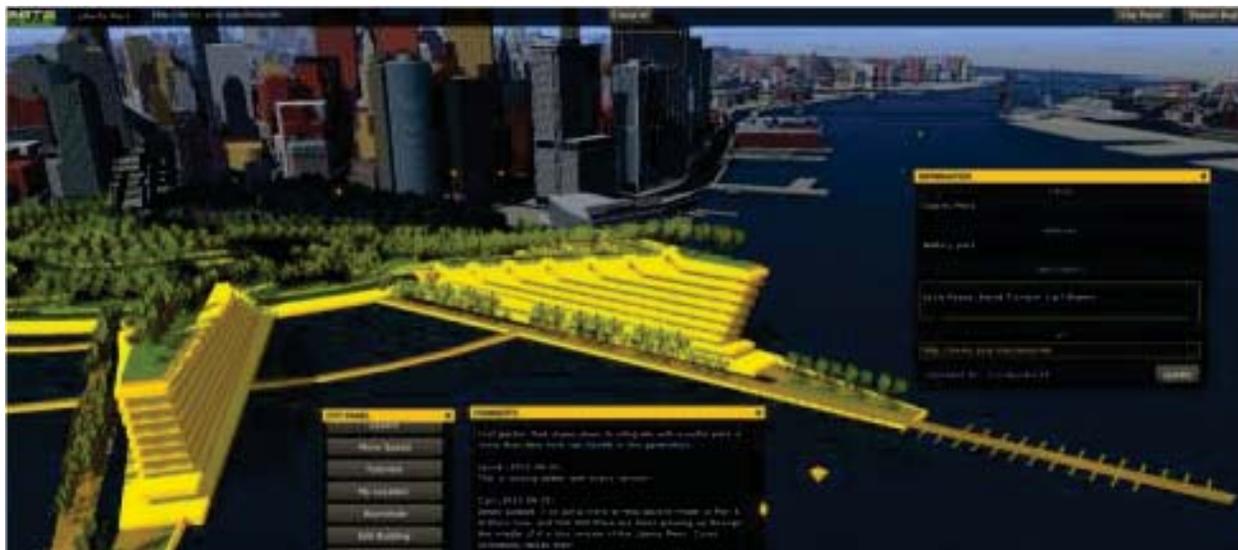
Fig. 1 Inside Betaville, lower Manhattan: Concept for a mixed-use development that would permit/thrive on public access to the waterfront.
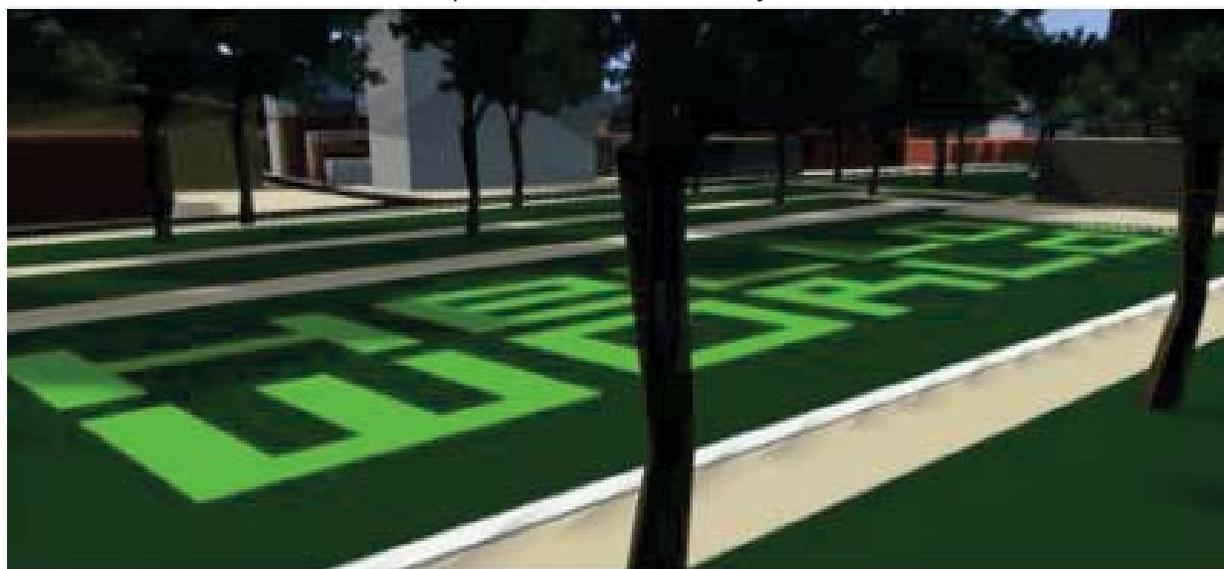
Fig. 2 Concept for artificial turf playing field, Cadman Plaza Park, Brooklyn.

Betaville is a massively participatory editable virtual world, designed to support collaborative development of new ideas for the built environment, from public art installations to comprehensive plans for urban design and development. Betaville is built to provide a shared environment for deeper, broader, and more effective public participation in the elaboration of new ideas, by providing an online "mirror world" of a particular building, place, neighborhood, or district, in a visual language that is common to artists, architects, and other professionals, but also to the rest of the community. Ideas for changes can be uploaded from most modeling applications from Google Sketchup to Autodesk Maya into the world for discussion through built-in commenting mechanisms, and each proposal can be iteratively matured over weeks and months, as necessary.

Betaville's driving motivation was to provide a way to upgrade public art and urban planning/design: could public work, or works, be developed further before major investments are undertaken, by more appropriately public means? The infrastructure and tools had accrued in society at large by happenstance, could we bring them together to get public culture more developed? If tools needed building, the work that had gone into building creative programs in engineering schools ought to be helpful… after all, the best precedent was open-source software development, and we had lots of friends with skills around, looking for big yummy problems to solve. Might there be an opportunity for another, broader approach to Douglas Engelbart's agenda for the augmentation of human intellect at creative levels, in regard to the built environment? The common language of 3D fly-through, with embedded links to full background information, and a complete record of the process to date, combined with the competence to leverage public data, verifiable dimensions, low enough overhead to permit implementation before and between formal proposal processes, or processes initiated at smaller scales than the multi-billion.

The precedent had been set in software development: over time, ad-hoc communities of interest, through mixes of formal and informal kibitzing by amateurs, noobs, self-taught anarchists, academics, and bored support staff gradually build consensus around mature design solutions to complex problems: GNU, Apache… Why not try to port this to local art, design, development issues? Ideally, such an environment could be set up ad-hoc at any scale, from an undergraduate or even high school studio course to an architect's office, a city agency, or a community group; development of the core tools and specialized extensions would be ongoing through a subset of the global community, while creative coalitions might form at a local level between stakeholder groups with a tradition of rivalry or antagonism, within the hortus conclusus of a virtual variant of the world in play, capable of supporting any number of ideas and of tolerating any number of re-combinations and refinements until a consensus emerges around a mature solution, or a viable distribution of distinct zones.

Constant's New Babylon, his *Autre Ville Pour Une Autre Vie*, might yet meet David Gelernter's *Virtual Worlds* as day-to-day lived public space, with an understanding that the built environment both expresses and determines the "terms of use" of citizenship, and that therefore debates about public space are as fundamental as any other public debates, for which the development of access and effective (read-write) literacy are both human rights and socio-cultural "capital".

The Betaville project was launched as a joint initiative of the Brooklyn Experimental Media Center (BxmC) of New York University's Polytechnic Institute and the Media2Culture (M2C) Institute for Applied

Media Technology of the University of Applied Sciences of Bremen in July 2008, at a symposium for International Urban Media hosted by M2C in Bremen.

I had arrived in Bremen with a loose knot of what seemed like incommensurable desires as an artist with an interest in the public realm as a creative field at three levels: As an artist, making unfamiliar concepts (proposals) for new public works clearly understandable in their form and relationship to context not just to juries and panels, but also to neighbors in good enough time to provide opportunities to develop concepts further through open consultation with people whose knowledge of contemporary art, but whose informally-acquired knowledge might crucially improve the work, and whose standing as a citizen of the district ought, in any honest definition of the public realm, give them a say in plans to alter the physical world whose alterations are intended to change the environment in which they live. As a citizen sensitive to the effects and side-effects of public space, to explore the possibilities for an augmentation of collective creative capacity, analogous to Engelbart's vision for the augmentation of human intellect through real-time shared computing environments with graphical interfaces, or a post-Beuys "very social sculpture".

If the ideation and experimental concept development stages of urban art, design and development can be available to the breadth of people, and on the kinds of terms, that have characterized open source software development, might it not be possible to arrive at analogous levels of imaginative consensus and quality over time? If that many can and will commit that much to SimCity and Google Earth and Linux, why not open up the question of real streets and neighborhoods, to a similarly rich mix of academics, creative professionals, and bootstrapping self-teachers? As the founding director of creative programs within an engineering school, serving a complex mix of artists, designers, and programmers from a hyper-diverse mix of backgrounds, with a weirdly rich mix of perspectives and ambitions, might it be possible to build a set of software tools as a shared resource whose code base would be open and available for alteration on the same terms for us and others with similar interests at a global scale? In "media" terms, it was a simple twist on the old McLuhanism: if the medium is the message, we might simply make the medium itself *plastic,* amenable to both local and global change.

While New York City is a major world capital in many domains, it is an astoundingly small town for computer science and engineering, and particularly so for research and development cross-overs between the cultural, civil, and technology sectors. BxmC is a fledgling enterprise, and the opportunity to partner intensively with a like-minded group in Bremen has been a precious boon. It should be noted that BxmC and M2C are exceptionally compatible hybrid enterprises, offering creative programs with an orientation to the public and civil sectors, within engineering schools which are themselves set within comprehensive local academic networks. Together, we have been able to build Betaville through what might be considered a complete avant-garde cycle: from the kind of speculative-exploratory "experiment" that properly characterizes cultural innovation, to the due diligence of design and technical development of an "experimental" prototype, to a responsibly deployable infrastructure for general use in situations where third parties are at stake: a public space, a neighborhood, a city.

As we have moved further into realms where the work is not only taken at face value, but begins to risk long-term impacts, the burdens of due diligence have increased, and extra-curatorial pressures on the work's content have arisen as not only subject matter, but the actual purpose of the work, requiring attention sustained beyond the festival or conference, and local engagement beyond the limits of itinerant art practices… a level of participation in which the *public* is treated as not just an audience, but a constituency. Likewise, the full engagement of other professions (planners, architects, politicians) requires a range of approaches outside the scope of even "relational" practices within contemporary art norms.

As a work of collaborative art, Betaville makes visible and performs a new scenario, and stages the experience of distributed creative transformation of built worlds for the people who "go there". As an open software project, it offers a set of tools which must be robust, scalable, and non-destructive in interacting with the contemporary realpolitik of urban evolution and transformation. First, we could ask ourselves as citizen-artists, What Would We Do If We Were For Real? Then, we had to ask ourselves as citizen-engineers, What Would This Do To Us If It Were For Real?

BxmC and M2C can span these gaps, at the price of some complicated logistics and VERY promiscuous interdisciplinary collaboration: art, engineering, politics, roughly in that order, bearing in mind that graphical computing skills, hardware, and networks have developed well beyond the traditional perimeter of authority-empowerment in these *incompletely public* domains.

The Brooklyn team has led the basic server and web client technical development, and certain instrumentation functions for assessment purposes. We worked up a first 3D "base model" of terrain and buildings, and experimented with deployments in downtown Manhattan and Brooklyn, while the Bremen group led on alternative clients, polling systems, and the ThinkBETA consortium.

In fact, the two groups have worked together quite closely, through a coordinated program of integrated research, project courses, and thesis work, with regular exchange of students and researchers in residence. The first public demonstration of the Betaville suite was given at the Municipal Art Society's first Summit for the Future of New York City in October of 2010, and a follow-up presentation/announcement is scheduled for October 2011. What follows is a partial outline of a selection of the developments on the Brooklyn side.

The research prototype and test flights have proven the robustness of the platform, and collaboration with experienced partners provides some necessary assurance that we won't actually cause damage by jumping into situations we don't know well enough. At the time of writing, several full deployments are planned or underway out of Brooklyn:

- International University Haiti/James Jay Dudley Luce foundation, Architects for Humanity
- Urban Assembly Gateway School
- ReGenerations, New York Hall of Science
- Betaville on the Bowery, New Museum
- Downtown Brooklyn Commons

Consider this last item, in a bit more detail: by the spring of 2009, we had a mock-up and a rough prototype in hand. As the Polytechnic strove to establish an "urban" initiative, I was asked to present the project to Joe Chan, president of the Downtown Brooklyn Partnership (DBP), a local development corporation for the area around NYU Polytechnic… the kind of institutional diplomatic errand that typically leads (at best) nowhere, and (at worst) to many more before petering out. Joe responded in particular to a design concept for the extension of an auditorium down to the basement level, and then out as an amphitheater scooped from the MetroTech Plaza. "Like the Pompidou!" he exclaimed. "What the…?" I thought. Joe proposed the idea of using Betaville as a public vehicle for an open process about the issue of "making sense" of the odd disconnected patchwork of green spaces in downtown Brooklyn, initially through an ideas quasi-competition to be run in Betaville, including the area colleges with architecture and/or planning programs: City College of New York (planning), New York City College of Technology (Architecture), Pratt Institute (Planning), and NYU's Polytechnic (Digital Media).

As it became clear that a one-semester design studio couldn't really accommodate both familiarization with the Betaville environment AND serious conceptual work, we opted to run Poly's participation through Betaville, as one new vehicle/approach. The program was defined by the DBP as "Downtown Brooklyn Commons", an area centered on the Cadman Plaza park, bounded by the Brooklyn waterfront to the north and west, and the Fulton Mall commercial district to the south and east: a perfect storm of urban art, design, and planning conundra, from parkland isolated and bisected by commuter pass-throughs to extreme socio-economic diversity, large-scale redevelopment projects in the teeth of unstable economic conditions, and open questions about future plans for adjacent lands, both private and public.

After a bit of background research, and a bit of discreet consultation with a few local experts and stakeholders with deep roots but without local partisan grudges, we opted for a very broad range of propositions, from park quasi-art installations that could be used to teach math or keep score by local schools using the park as their playing field, to speculative concepts for art/infrastructure hybrids, elevated linear parks, a stadium project as a lever to bankroll healing of the interface between local/pedestrian/bike traffic and regional commuters (Bring Back the Dodgers, AND Save Lives!), some straight-up public art installations that might be visible from Google Earth, if not outer space… and a handy comparative example of a similar problem in downtown Bremen, the Rembertiring, where the similar physical spaces contrasted usefully with the very different regulatory, planning, and cultural forces at play. At the presentation, in Brooklyn's borough hall, a latent coalition crystallized around one particular concept, the adaptive upgrade of a semi-utilized park building very close to the pedestrian access to and from the Brooklyn Bridge boardwalk: a visitors' center and "Open Museum", which would provide orientation to the district in three distinct modes:

- historical~ (phone apps for self-guided tours through historical points of interest, AR exhibitions of buildings and infrastructure that are no longer there, or were designed but never built at all);
- contemporary~ the district as an open-air gallery, augmented by new works of art to be experienced by the blending of the direct experience of the district with audio and graphical media supplied through portable devices, or simple downloads to the equipment visitors are already carrying as a matter of course;
- future~ again, through mobile multimedia applications and mobile web-based tools, but here a program built around a Betaville of downtown Brooklyn, populated and created/re-imagined over time by the full spectrum of visitors, workers, students, and citizens of Brooklyn's downtown.

This strange blending of modes and mandates struck a chord with advocates, planners, and local political representatives, and attracted more interest from likely collaborators within area institutions, all at once. In effect, a sensitively calibrated demonstration had opened the door to a full engagement. We are now working to follow through on this concept, with a full spectrum of participation. A series of formal announcements will be made over the course of the next few months.

At the very least, we can "augment" the current practices~ town hall, charrette, call for proposals… at best, we may be able to seed an effective local virtual avant-garde, working with locally adapted mash-ups of the tools and practices conventionally associated with art, engineering, and politics, making the most of direct access to a global network of local, virtual, and ever-expanding vanguards. Virtualization of experimental ideation for the built environment makes it possible to combine the best of both worlds: opening up of the conceptual range traditionally associated with science fiction and revolutions, while providing for a level of inclusiveness, intelligibility, plasticity, due diligence, and a collective attention span beyond the research grant term, the five-year plan, or the four-year election cycle.

Betaville has already demonstrated that the development of a fully functional open-source software infrastructure for such applications is feasible, and that therefore the prospect of a citizen-built virtual city, rather than a commercial virtual world whose politics can never transcend "house rules", is also feasible in the near term. Betaville itself may yet suffer a crisis of legitimacy as a work of 'extremely relational contemporary art' as it becomes a reliable medium, a 'public work' of infrastructure… the good news is that we will now be able to fully exploit its potential as a medium, for new works and forms of mutually augmenting imagination, iteration, and development. That will suit us fine. After all, we're not just the principal investigators, research assistants, partners, participants... We're also Betaville's first constituents. In the meantime, everyone is welcome in our world, or to build your own with the tools already available for download via Betaville.net.

Every Living City is in Beta. Let's Play.

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DATA DISINFORMATION: DATA MANIPULATION AND IMAGEMAKING

Helen Sloan

Written in parallel with the exhibition *Uncontainable: Broken Stillness* and the panel *Data Disinformation* this paper examines the ways in which artists are diversifying the role of imagemaking through data manipulation, bespoke software and hacking.

The relationship between technology and speed has been closely associated with the development of progressive technology in the 20th Century and now in this century with the ubiquity of personal computers, mobile devices and networks with rapidly increasing capability. It has been an expectation that machines will work faster and more seamlessly in the service of making society more flexible and agile. Unless procedures go wrong in the mainstream, data transfer, manipulation and creation are rarely questioned. Notably Paul Virilio commented on these developments observing that speed is so much a part of our engagement with society that we are dependent on it while apprehensive or even fearful that the technology of speed may break, stop or cause accident and disaster. [1]

Concurrently with these developments there is a global economic turning point, dwindling planetary resources and a shift in the ecology of practices from the individual to the collective - these socio-economic changes offer both positive and negative positions for creative and artistic practice in the scheme of broader societal change.

The exhibition *Uncontainable: Broken Stillness* and the panel discussion *Data Disinformation* implicitly engage with these current broader societal issues through a deliberate investigation into the relationship between new creative practices and older analogue pursuits such as painting and pre-digital photography – the exhibition suggests that the temptation to discard art history in the digital era may be misguided.

Uncontainable: Broken Stillness is a celebration of an artist's signature work and style. The exhibition does not suggest an alternative for shared working but that there is space for individual practice to make a contribution. The pioneering work of imagemakers such as John Heartfield [2] and later Peter Kennard [3] left no doubt that their influence on imagemaking of the time and their political context was extensive. Richard Hamilton [4] and Victor Burgin [5] among others appear to have used their predecessors' techniques. The rise of photoshop and other image manipulation packages introduced a tacit acceptance that this form of imagemaking was no longer particular to the indvidual imagemaker but a technical enhancement of the photographic process accessible to all. In some respects this was a very positive development for users, but as packages were readily available it was and now is often too easy to spot general characteristics of Photoshop, Director, Flash and Eyecon for example that have been imposed on any unique image.

The artists in both the panel discussion and the exhibition at ISEA were selected for their use of digital techniques embedded in the development of a visual language begun in earlier forms of image-making. The artists are using the unique value of technology to increase the spectrum of markmaking,landscape,

media and gesture. Their work involving bespoke programs, hacked packages and mediated imagery enhances the role of the image both aesthetically and politically at the hands of the artist.

Tim Head, a forerunner of the contemporary trend towards fusion of art and science and producer of politically driven imagery and installation, strips data back to the material of the OS and the screen with a program written in C that randomly generates lines of colour (in some of his works randomly generated colours are produced pixel by pixel) on screen in his conceptual works such as *Laughing Cavalier* shown in the exhibition. Peter Hardie, a pioneer in computer animation, has dedicated years to studying the properties of water and the representation of its movement in animation. His *Ripple* series shown in the exhibition combines his interest in impressionist painting with animation. This work strives to find marks and techniques that can only be produced through computer programming. His study of water and light has combined mathematics,
the study of molecular movement and light with the observational techniques of the impressionists. It is this combination that has enabled the artist to extend the range of techniques possible for describing movement of water and reflection of light on it.

Susan Collins has worked since the 1980s in computer and electronic arts and is recognised as a leading UK artist in this area of practice. *Glenlandia*, a contemporary investigation into landscape art, is an archive of images gathered from pointing a webcam at Loch Faskally. The work shows images on screen generated by changing pixel by pixel over approximately 21 hours in a day. This piece provides a timeframe as well as an in-depth study of a single landscape. Presented on the screen in landscape format the artist introduces representation of time showing simultaneously day and night views of the same scene studied and recorded over two years. She has produced a series of archives in the UK and internationally that explore the subtleties of the landscape tradition. boredomresearch continue the landscape theme using Processing to develop artificial life for their playful diptych *Lost Calls of Cloud Mountain Whirligigs*. The work generates fictional beings (Whirligigs) set in an environment combining landscape with mechanical technology. Each viewer experiences the piece differently as the Whirligigs exhibit individually generated behaviours and lifespan. boredomresearch rely on the generation of unique images and behaviours so that no two people will see exactly the same image and are interested in the way that viewers engage with landscape and the ability of digital media to develop fictional fantastic landscapes for the viewer to engage with.

Sigune Hamann, photographer and video-maker, uses analogue 35mm stills photography adding movement to the image by shooting a still film in one take. The resultant *film-strip (Whitehall 9.12.10)* made at the Student Protests in December 2010 stunningly combines moving image, panoramic photography and painterly gesture. This work develops her interest in the role of the camera and subject in standard narrative in film and photography and the application of digital techniques to old media to question and subvert these narratives. For example the student protests were a mix of dreary, dynamic and subversive atmospheres and yet here film-strip shows a beautiful painterly scene that seems removed from the reality of the subject. David Cotterrell's work also subverts context by
challenging our understanding of war through media images. His recent body of work assembled from footage taken during his residency in Helmand Province, Afghanistan, deliberately looks at images of war that represent the waiting for action rather than the much publicized activity of war. *Green Room* is a video loop showing the anticipation of the arrival of casualties to the medical room in Helmand. Treated in post production and heavily mediated, *Green Room* creates a sumptuous image that enhances anticipation of action – a very different tableau from media and cinematic representations of casualties of war.

Susan Sloan has researched extensively the use of motion capture in animation. This technique most associated with gaming and cinema special effects typically focuses on the production of stylised and standardised movements of characters. These are achieved through a post production 'cleaning' process erasing glitches in movement. Through the inclusion of individual signature gesture and character in her subjects, *Mary and Annie*, Susan Sloan develops the language of portraiture and likeness through image and movement. Her short loop of each character provides an image that occupies a place somewhere between a painting and an animation.

Relevant to this discussion is the most recent work of Terry Flaxton with whom SCAN worked in 2010. His pioneering research into the production of HD moving images and changing audience engagement (due to a different physiological response to the one with SD images) has called him to question the way in which HD images should be produced - research shows that audiences remain with HD much longer than SD. His new images are rich, often appearing to be slowed down or completely still to compensate for this change in engagement. [6]

Whilst the artists in *Uncontainable: Broken Stillness* suggest movement or animation, these movements are understated falling in between the language of moving and still image. It is the power of the subtle suggestion of movement, the place the work occupies in art historical, cinematic and media representation and the role the pieces play in the development of image-making that is the focus of the exhibition.

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CLEANING AND CHARACTER IN MOTION CAPTURE PORTRAITS

Susan Sloan

This recent series of work focuses on the portrait, explored through the medium of animation, using Motion Capture data as the core material. Analogous to traditional notions of portraiture, drawn, painted, filmed, photographed or sculpted, at the core of these animations is a representation of the sitter.
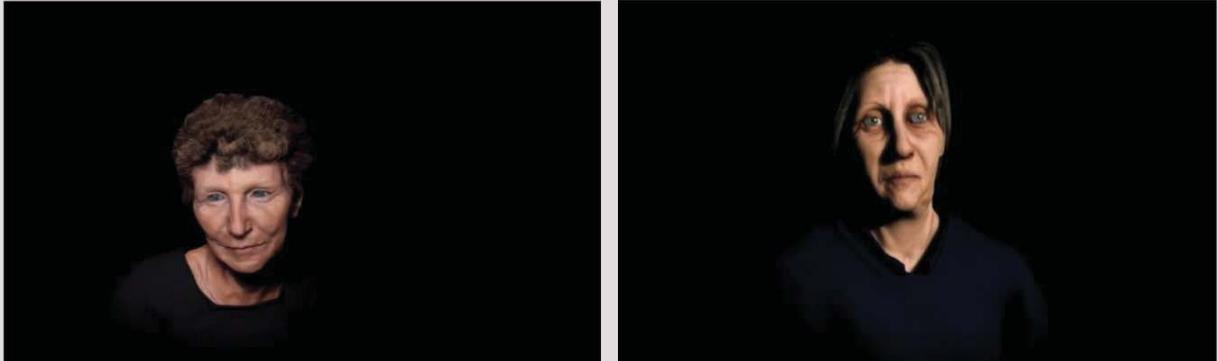
Mary, Annie. Uncontainable: Broken Stillness, 2011.

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Framed as a single shot and composed around the head and torso of the sitter, the works point to historical portraiture traditions, although in the animated form it is simple gestures and movements that give insight to the sitter and who they are.

Working with people I know or meet by chance, I am attempting to capture a sense of stillness and perhaps the ordinary. Using Motion Capture technology I record the subjects, essentially just sitting, being themselves, albeit under the gaze of 10 cameras. There is no performance as such and no narrative unfolds in these works but rather, I am fond of the idea that time slows down as the viewer spends time watching the sitter 'sitting'.

The use of Motion Capture has been developing in many areas such as entertainment, military, medical and engineering fields. It is a process that records motion data from a moving subject in 3 dimensions. There are many Mocap systems in use and they fall into 3 main areas, mechanical, optical and magnetic. In essence, they all track markers which are fixed to the body (animal/human) at key pivot and rotation points and produce a set of 3D co-ordinates and their rotations and trajectories over the period of the movement sequence. This tracking data is fed back to a software system and applied to a virtual skeleton. In the entertainment industry such as Games and Film and within the Performing Arts this is often called Performance Capture. The performer and the data recorded will drive the virtual skeleton. In these cases the virtual skeleton is often referred to as a puppet. In the Film and Games industry, the skeleton will, in turn drive a 3D character either in real time as in in-game animation or 'cut scenes' where the Mocap will be added to and polished off as a finished performance for screen.

In the field of gait analysis however, it is often not a performance that is being captured but normal and pathological function in the study of animal and human walk cycles for Orthopaedics and Physical-Therapy

Motion Capture portraiture lies somewhere in between these two areas of motion study. I am attempting to record a gestural stance, or an awkward tilt of the head and yet I am also drawing from traditions of painting and sculpture in the representation and interpretation of that data .Whilst the portrait is entirely constructed in 3D modelling software the motion of the subject is recorded from real life. The works become a record and an interpretation at the same time. The relationship between the recorded data and manually animated and sculpted forms becomes significant. The portraits are not just an interpretation of the external visible characteristics of the sitter but also a document of their spatial co-ordinates, their motion and very often their emotions.

I am interested in the notion that Mocap is a document of existence in the same way that a photograph or a piece of video footage is. It is not one moment or an event captured in time but a document of an individual's movement and identity removed from a specific time and place.

Within the Games industry individual characteristics in Mocap are often 'cleaned up' or removed from the motion capture data in the production of generic motion sequences such as run cycles, 'idles', 'sneak' cycles or 'punches'. This is done primarily to remove unwanted artifacts from the data such as glitches and ticks but it can be the 'personality' of the performer and their gesture that is removed or binned in favour of a more generic stance or 'readable' action pose.

Having studied my own motion capture I find idiosyncrasies that I have not been aware of in footage from other recording media (such as video). Motion capturing myself has allowed me to observe aspects of my gesture and motion that had otherwise been invisible to me (but perhaps not to others). I have a limp; I look at my feet when walking; I position the chair with my hands before I sit down; I make

sure the chair is still there (and hasn't wheeled away) as I sit down. I have a self conscious way of moving through space. I rely on visual cues to navigate around objects. Whilst this all makes sense to me (I have proprioceptive deficit in the lower half of my body), seeing my own motion, face to face, with no other information about place, time and context has given me an insight into the way I am, that I have never been able to see before.

The moments when the performer stops performing, forgets about the cameras or drops their guard are, for me, the most compelling pieces of motion capture. More interesting still, is motion captured footage of non-performers, individuals who are not perhaps relaxed in front of the camera.

I am intrigued by the notion that Motion Capture is, like many other areas of animation production an 'asset', a component part of a very large and complex pipeline of a Film or Games production. Sequences of motion, mostly performed by unidentified performers will be kept in Motion Capture data bases to be reused in Games and their sequels. Efficiency is paramount within the pipeline and assets such as models, environments, and animation are designed to plug into this pipeline to keep production flowing. Furthermore, Mocap was once thought of as a labour saving method of producing animation sequences in bulk, quickly and relatively cheaply. However. it is no longer, viewed as the 'cheating' form of animation but rather as a method and a medium in its own right. Through studying Motion Capture as portraiture it is the identity of the sitter that is paramount to the project. The captured motion rather than being an asset becomes the fundamental building block.

HAUL OUT – GOODBYES

Tegan Smith

The YouTube video project *Haul Out* is a riff on shopping exposés where young people show off recent purchases. By creating a persona who cannot let go of possessions and using stuff I plan to discard, I reveal the underside of consumer joy. I present strategies for using social networking sites, specifically regarding how YouTube operates, public visibility, and the nature of physical and electronic garbage.

Fig 1. Haul Out: 3 Second Thoughts, 2010 and Haul Out: Swap Meet, 2011, Tegan L. Smith, video stills.

Fig 2. Haul Out: 8 Unboxing and Demo, 2011 and Haul Out: 9 Elvis Balloon, 2011, Tegan L. Smith, video stills.

Fig 3. Haul Out: 3 Second Thoughts, 2010, Tegan L. Smith, video still.

Through my video project Haul Out – Goodbyes, I reflect on consumer excesses in light of accountability to things cherished and discarded; and consider how YouTube participation is influenced by the specific ways it operates as a technology, video-sharing community and commercial enterprise. In this paper I focus on three areas of uncertainty: multiple purposes, public visibility and waste.

Multiple Purposes

After completing ten *Haul Out* videos, I mull over whether artistic and critical interventions in social media networks have the ability to withstand the flow of commercial messages. This series is a riff on the proliferation of YouTube shopping exposés such as *Hauls,* where people show recent purchases, and have created a fashion and bargain forum. Young women with the most viewers are beginning to make careers with sponsored *Hauls*. From the opposing side of consumer joy, my videos emphasize bad shopping habits, amassing useless things and general wastefulness. The objects I showcase are not new, rather they are about to be given away as charity shop donations. Unlike in the *Hauls*, my price tags are long gone and would not be evidence of thrift but examples of money frittered away. The *Haul Out* vlog was launched on November 26th, Black Friday, or conversely, Buy Nothing Day. Advocating for not shopping becomes problematic in a medium such as YouTube, which is based on advertising.

The *Haul Out* series is part of a larger project, *Tender Loving Stuff,* in which I tackle hoarding and wasting as they relate to psychological attachment, economic prosperity, poetic inspiration and transgression in contemporary social practices. Assuming the YouTube persona TLS1HO began as a spontaneous attempt to understand compulsive buying and stockpiling. The character allows me to indulge in the incomprehensible anxieties of someone who cannot let go of possessions. I toy with truth and fiction in the act of

reclaiming my real-life belongings as art props, and naming the project and persona after my initials. Notions of self and morality are uncovered through statistics of visibility: this is my reality show and I am performing a version of my life.

The transformation of my art practice from video installation to purely internet pieces was a deliberate strategy based on questions about materiality. My primary goal was to explore ideas about stuff without creating more. During the last decade writers and academics from various disciplines have re-examined the degradation of the global environment, while rethinking the relationship between people and stuff in terms of past materialist theory. Notably, W.J.T. Mitchell is "encouraged…by the precedents of Marx and Freud, who both felt that a modern science of the social and the psychological had to deal with the issue of fetishism and animism, the subjectivity of objects, the personhood of things." [1] As I rummage around my hunches about the agency of stuff, I ruminate on thing-power. There is something more complex involved than individual human desires or capitalist manipulations of them. The *Haul Out* videos offer a perspective for observing the plethora of published work, internet sites and television programming on material chattels.

YouTube genres known as *Haul, Demo and Unboxing* provided existing phenomena to engage with ideas regarding objects, identity and commerce. The three internet categories epitomize YouTube's role as a site for grassroots video production and networking, conjoining with its marketing intent. The videos are shot mainly in private spaces, often in a bedroom. Each video proceeds as a seemingly unscripted one-sided conversation directed at the viewer. The vloggers talk informally, while describing in glowing terms one acquisition at a time. The *Haul* videos are made chiefly by women in their teens and twenties with newly-bought clothes. In *Demo* videos they demonstrate how to use products, usually makeup. A few young men present clothes and makeup in a similar gushing manner to their female counterparts. The *Unboxing* videos are primarily the domain of male geeks who unpack the latest electronic gadgets. In their version of the *Demo,* they set up new equipment. Like many YouTube aficionados, I am drawn to watching these optimistic young people. Elle and Blair Fowler (pseudonyms), twenty-three and eighteen year old sisters, are famous examples. They are interviewed on national television, have hired Hollywood agents, and are now paid for showing specific brands. Truth in advertising legislation has come into play, and some young vloggers use their YouTube channels for pitching their skills to potential sponsors, raising the spectre of self-promotion in social networking.

YouTube is a challenging venue for an art piece, and for an older participant. The numerous videos posted with free, web 2 public access make it an easy place to show off, and an easier place to get lost. Convincing people to view a video takes more than simply posting. According to Jean Burgess and Joshua Green, YouTube literacy "means not only being able to create and consume video content, but also being able to comprehend the way YouTube works as a set of technologies and as a social network," and the most capable users are in their twenties or thirties. [2] Viewer statistics record an immediate standing for each video, and YouTube's ranking algorithm includes views, ratings, shares and links. The vlogger's choice of taglines determines what categories will be matched with their videos. A recent search of "haul out" shows that my videos have slipped behind several sailboat haul outs. Although I have used the tag "haul" on all the *Haul Out* videos, none appear in that word search. Elle and Blair invariably top the list. A producer has no control over what individual and corporate advertising pops up as suggested watching beside their videos.

Public Visibility

While Elle and Blair's videos clocked over seventy million viewers in three years, my *Haul Out* videos had just over five hundred during their first six months. In comparing the TLS1HO moniker to their glamorous AllThatGlitters21 and juicystar07, mine is homely. In stark disparity against their youth, meticulous make-up and accessories, TLS1HO is mature, unmade-up and shabbily dressed. Cute items enthusiastically displayed contrast with the worn and unsuitable things shown by my older, rumpled and not so self-assured persona. Their articulate and confident performances prompted me to edit out ums making my later videos half their original lengths. Among the haulers, there are socio-economic status clues in items shown, presentation polish and production quality. The most-watched videos are much more slickly produced than mine. Burgess and Green say that "...to build an online presence within the YouTube community as a vlogger requires time, patience, and persistence, rather than a more casual mode of engagement with YouTube." [3] Elle and Blair blog, tweet and facebook constantly, and their admirers post fan pages. Flirting with cyber-celebrity, I keep track of my *Haul Out*statistics to post on Facebook, Twitter and my website. Such public exposure might reveal vulnerability and could result in setting oneself up for embarrassment, like imitating the popular girls in high school. Elaine Scarry says that "...if the person or thing outlives its own beauty... then it is sometimes not just turned away from but turned upon, as though it has enacted betrayal." [4] Emulating young beauty, and the latest trends could be seen as treachery, or instead unveil too much about consumer products, the human body and inevitable decline to develop a massive following. On the other hand, my videos might find aesthetic relevance as cautionary tales about the worth and treatment of stuff.

The *Haul Out* series is both personally and socially timely. *Tender Loving Stuff* grew in response to helping family members move. I became riveted to reality television shows such as *Life Laundry* about compulsive attachments to possessions, and frequented internet support groups for hoarders' families. In one episode of the television show*Hoarders*, a woman broke down in tears when she realized her childhood teddy bear was under her heap of junk, and that she should have taken better care of it. Her grown children were disgusted, for they felt more neglected than any teddy could. Compulsive shopping and squirreling away behaviors are often associated with fearful memories from periods of economic hardship. As an artist and former economist, I aimed to investigate beyond individualistic psychological explanations for other insights into the prevalence of hoarding. Anthropologist Daniel Miller says his studies show that "...the people who successfully forge meaningful relationships to things are often the same as those who forge meaningful relationships with people..." [5] The TLS1HO starting point was the curiosity and confusion of not understanding other people's attachments. Playing and playacting provided a vehicle to inhabit another point of view. Even while TLS1HO voices opinions and displays emotions that are not exactly my own, ad lib faltering seems to make it more authentic than it is. My detachment quickly melts away as I discover the contradictions of my self-deception, and begin to recognize my profligate and avaricious paths.

In the search for more resources and an on-line community, I revisited videos of critical theorist Slavoj Zizek, who takes on global issues as a loud, confident and imposing presence, whether at public lecterns or a landfill. By contrast TLS1HO's small, hesitant persona speaks in a conversational tone from the kitchen or bedroom. While Zizek pounds the air for emphasis, TLS1HO fondles objects with both hands. She looks into the self-operated camera as cohort in production while Zizek seems unaware of the lens. His diatribes incorporate political imperatives and abstract philosophies, whereas TLS1HO's ramblings on domestic concerns occasionally build to whiny harangues. I compare my work to such a tour de force because we are of the same generation with similar interests, yet work in different styles. TLS1HO seems stereotypically feminine in her concentration on shopping and domestic space. Her informative

videos extend to coherent storytelling within the milieu of YouTube shopping vlogs, and acquire social relevance only when enlarged to mass consumption and aggregate demand. Fortunately, there is a sense that anyone can do what she is doing: TLS1HO is no star, and that may prove to be her strength. If she can avoid narrowing her appeal to a niche group and encourage people to examine their own possessions, she might thrive in what Burgess and Green find scarce in YouTube: space for "quieter forms of engagement." [6]

Waste

The *Haul Out* project confounds social media and consumption behavior, and draws attention to the ways we coax, idealize, thank and admonish inanimate objects for their performance; use stuff to express individuality, even when it is mass-produced; and collect as a means to prevent feeling empty, lonely, or forgetful. As interactive electronics are becoming integral to daily life it hardly seems unusual that TLS1HO talks to things. As stuff is accumulated and consumed, it is invariably mistreated, favored over and becomes a minute detail in a heap of more stuff. Through the Haul Out videos I comment on responsibility for garbage, while resisting or not, the temptation to buy more. As TLS1HO views her image, she becomes concerned about buying new clothes, makeup and technical equipment.

My personal mound of obsolete and broken electronics is daunting. So far I have dealt with only one appliance, an electric wine vacuum. I have boxes of discarded computer equipment waiting for a *Haul Out* treatment. Such waste contains lead, mercury, arsenic and chromium that can effect human and animal health. According to Environment Canada, 140,000 tons of e-waste are dumped annually and the amount continues to increase. [7] In the U.S.A alone there are over 200 million active mobile phones. To prevent dumping in developing countries, disposing of electronic equipment is now the subject of international law. [8]

Comparing material objects versus digital data and dissonant feelings about dropping each in the trash, I butt against cyber overindulgence. I began adding up my space occupied on YouTube, Vimeo, Facebook and Twitter accounts, my personal website and current entries on other websites, and gave up when a check on wayback.archive revealed references to past exhibitions, one appropriately from the former DeadTech gallery. Like garbage in a landfill, electronic junk piles that I think are gone are still there: will my electronic trash end up with twitter tweets in the Library of Congress or in someone else's mashups? At the risk of feeling overwhelmed by Well-Informed Futility Syndrome, I face additional concerns about the electricity which runs technologies. The examination of unwanted manufactured products takes on a broader meaning with recent natural disasters, as I imagine my stuff floating on a tsunami. The devastating effects of earthquakes, floods and wildfires are exacerbated by products of human invention, like the nuclear power plant. New media speeds up information transfer and nanotechnology promises to reduce storage size, at the same time, rendering devices instantaneously obsolete; and it sometimes seems that what we are saying is going out of style as quickly as the medium.

The *Haul Out* videos reveal a jumble of art concerns, social critique and self-indulgence that parallel the odd and ordinary junk in the donation bags. In *Vibrant Matter* Jane Bennett says that objects "…have the power to startle and provoke a gestalt shift in perception: what was trash becomes things, what was an instrument becomes a participant, what was foodstuff becomes agent, what was adamantine becomes intensity." [9]Hopes are raised for the reinvigoration of democratic principles through social networking and contemporary materialism which takes into account the molecular structures of things and organisms as colonies of microbes. Boundaries between the animate and inanimate change. By giving each

item a moment in the spotlight, I pay homage to its function as a memento to guard against forgetting, and to abet in conjuring up a fictional history of success, accomplishment and love. Excessive memorabilia collections can interfere with sorting through what is important to remember, and clog the present moment, preventing immersion in current relationships.

I conceived and framed the *Haul Out – Goodbyes* project as art even though it was produced independently without plans for showing it within the art market or traditional institutions. As TLS1HO struggles to detach from possessions, I become more considerate of individual objects, their connectedness and the quiddity of stuff. Despite the challenges, YouTube offers a context to reflect on humble objects disregarded after the initial stimulation of purchasing wanes.

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CREATING BLACK BOXES: EMERGENCE IN INTERACTIVE ART

Joan Soler-Adillon

In the context of interactive art, emergence can be understood through a close analogy to an unpredictable black box. Cariani's emergence–relative–to–a–model and his notions of combinatoric and creative emergence can be used as a guideline to analyze the presence of emergent phenomena in interactive art in general. A thorough understanding of these phenomena should allow for the creation of pieces that exhibit emergent interactive behavior.

Introduction

A black box is typically understood as any device, system or part of them that remains opaque to whoever tries to understand how it works. One can only know what comes in and what comes out of it, but not what happens on the inside. The idea was first developed in engineering, but it later on was generalized, mainly under the influence of systems theory discourse in early cybernetics.

In the first paragraphs of the usually considered founding text of the discipline, Arturo Rosenblueth, Norbert Wiener and Julian Bigelow defined their object of study, a behavioral approach to knowledge, in the terms of a black box–like entity: "Given any object, relatively abstracted from its surroundings for study, the behavioristic approach consists in the examination of the output of the object and of the relations of this output to the input (…) omitting the specific structure and the instrinsic organization of the object." [1]

This was further elaborated by W. Ross Ashby, who generalized the idea to examples such as a child trying to open a door, while not being able to examine the connection between the handle and the latch which remains hidden inside the opening mechanism. The point is that, in fact, we are interacting with black boxes all the time: "In our daily lives we are confronted at every turn with systems whose internal mechanisms are not fully open to inspection, and which must be treated by the methods appropriate to the Black Box." [2]

These methods consist, in a nutshell, first in the definition of both the inputs and outputs of the system under examination, and then in the experimentation with those in order to establish the relations among them (the protocol in Ashby's terms). The goal is to find the regularities and repetitiveness in behavior that will inform the experimenter of the inner workings of the box.

Unpredictable Black Boxes

Both in its original engineering context and in general, black boxes need to be fundamentally reducible and predictable. Its interior will remain unexplored, but theoretically it can be understood in terms of the analysis of its parts and how they are connected, and the relationship between inputs and outputs has to remain the same over time. Otherwise the task of the experimenter testing it would be an impossible one.

But there is another kind of black boxes which is of interest here. These would be much less predictable black boxes. That is, systems in which the relation of inputs and outputs is not fully foreseeable, and the inside of which is not only unknown but unknowable, not reducible to the analysis of its parts and connections upon an eventual opening of the box (or zoom in into the system).

These black boxes are found at the heart of the cybernetic theory, in the form of adaptive devices. Most certainly not all black boxes and adaptive devices in cybernetic discourse are of this kind. In example above, the child doesn't know the insides of the door but these are knowable once the door's handle–latch system is inspected. The black boxes that Ashby found everywhere can be of both types. But what is important here is that both can be viewed as a central idea in the ontology of cybernetics.

According to Andrew Pickering, this ontology allows cybernetics to propose an image of the world that is performative rather than representational. A theory of knowledge which is largely built up through a performative relationship with black boxes, and many of them are of the unpredictable kind. Rather than about control in a classical sense, "the entire task of cybernetics was to figure out how to get along in a world that was not enframable, that could not be subjugated to human designs – how to build machines and construct systems that could adapt performatively to whatever happened to come their way." [3]

This performative knowledge is the above mentioned behaviorist approach of early cybernetics, or what Ashby himself call an "ultimate practical purpose" [4] of his black box methodology.

The Designer's Point of View

Another characteristic of the cybernetic approach to the black box is that it is not only about dealing with these systems, but also about creating them. Indeed, this is something that some cyberneticians did, like e. g. W. Grey Walter's Tortoises, W. Ross Ashby's Homeostat or Gordon Pask's Musicolour Machine. [5]

The idea here is to create something that will appear as a black box to its own creator. That is, a device that will surprise its designer, in terms of its behavior and of the relationships between the inputs it receives and the outputs. That is, even though she has designed and programmed it, the relationship between what the system or the piece perceives (the inputs) and how it responds to it (the outputs) become unexpected.

This is precisely where the ideas of the unpredictable black box and emergence can be linked. As will be explained below, emergence implies fundamental novelty, i.e. that the system creates something that was not explicitly built on it by its designer.

This is not something that a designer of a conventional computational system would desire, but it can be the case in digital art practices. In generative art and especially in Artificial Live (ALife) Art, it is often sought by the artist to create systems or processes which exceed her expectations. The idea is to do so not through some blind trial and error, but through emergent phenomena (or self–organization in cybernetics discourse): "The basic principle of emergence is that organization (behavior/order/meaning) can arise from the agglomeration of small component units which do not individually exhibit those characteristics". [6]

What is Emergence?

Emergence, in its many forms and contexts, is always related to fundamental novelty. It is often explained with the idea of a whole being 'more' than just the sum of its parts. That is, of being irreducible to the analysis of its conforming elements in isolation.

These explanations are usually articulated in terms of different levels of complexity, in which the lower or micro levels (the parts) generate processes which appear at the upper or macro levels (the whole) as emergent, i.e. not explainable with a classic cause–effect relationship.

This idea questions the traditional reductionism of science, since it implies that not everything is explained by studying smaller and smaller parts of whatever system is under analysis. Whenever emergence is present, reductionism is brought into question. A classical generic example would be to question, in the succession of orders of knowledge physics–chemistry–biology–psychology, if each one is fully reducible to the previous or if, instead, emergence occurs when a level of complexity increases.

Emergence didn't become a concern in the academic discourse until the mid–ninetieth century, when John Stuart Mill used the concept (not the term, which was introduced later by George Henry Lewes) to distinguish different types of causation, but it still remained a marginal concept. In Newtonian science emergence was unknown and unknowable. In fact, it is by definition inconsistent with a science that aims to reduce all possible phenomena to simple facts and laws, in which reductionism is an indisputable method.

It was not until the second half of the twentieth century that the work of some rather unorthodox scientists started to prepare the context for it to appear in its contemporary form. By the end of the century, it was already a central concern in the Complexity Sciences (ALife, dynamical systems theory, neural networks, etc.). [7]

Typical examples used to describe emergence include ant or termite colonies and their social complexity, the human mind understood as a product of the interconnectivity of neurons in the brain, chemical clocks in non–equilibrium thermodynamics, or the complexity generated from the simple rules of cellular automata.

Emergent Interactive Behavior

In the context of digital art, emergence has been mostly been experimented with in ALife Art. ALife art is the artistic arm of the scientific Artificial Life, a discipline which comprises "a range of (mostly) computer based research practices which sought, among other things, alternatives to conventional Artificial Intelligence methods as a source of (quasi–) intelligent behavior in technological systems and artifacts. These practices included reactive and bottom–up robotics, computational systems which simulated evolutionary and genetic processes, and are range of other activities informed by biology and complexity theory." [8]

In this context, the idea of emergent interactive behavior is to create systems that respond and behave not in a predetermined way, reading responses from a database – or responding as if they did – but generating these responses through emergence: "Emergent interactive behavior would not be derived from

a set or pre–determined alternatives. Rather, behaviors might arise through a contingent and uncon-nected chain of triggers." [9]

This mid–nineties ideal has been rarely, if ever, completely achieved in interactive artworks. In fact, it depends on how we choose to understand emergence that determines whether or not it has been (see below).

Two of the most often mentioned examples of emergence in Artificial Life are Craig Reynold's Boids and John Conway's Game of Life. In both, a very simple set of rules produces astonishingly complex results when the systems are simulated. In Art, examples are scarce. Simon Penny's 1995 Sympathetic Sentience is one of the most cited ones.

Works in which Genetic Algorithms are involved are usually related, too, to emergence. Examples of these would be Christa Sommerer Laurent Mignonneau's A–Volve, Ken Rinaldo's Autopoiesis or Ruairi Glynn's Performative Ecologies, to name a few.

Creative Emergence

Just like Ashby was concerned with defining a black box, and claimed for a clear delimitation of what the inputs and outputs to be analyzed were, if we are to understand how emergence does really occur in interactive art, we need a method that delimitates what to observe and judge, in order to be used as a tool for analysis first, and creation later.

The method to be examined here finds its context in the literature of Artificial Life and, more generally, in cybernetics. It is Peter Cariani's analysis of 'percept–action systems' (autonomous artificial systems and devices which perceive and act on their environment) and how they might exhibit emergent proper-ties that would lead to changes (improvements) on their performance. [10]

Cariani's approach is known as emergence–relative–to–a–model. Unlike other approaches to Emer-gence, Cariani does not accept the switching among levels of complexity (e. g. from the molecule to the pattern) in order to describe emergent phenomena: "For the purposes of judging whether an emergent event has occurred, we need to be careful not to shift frames of reference in these situations, from talk-ing in terms of microstates and pixel states before and "higher level" features afterwards. If we start to observe the device in terms of individual pixels, we must continue to do so in those terms throughout. If we wish to include complex pixel patterns (e.g., cycles, waves, moving patterns which look to us like a horse galloping), they need to be in our state descriptions from the start, or they will remain in the realm of tacit, private observation, unrecognized by our public model." [11]

He labels his approach as an "epistemological, observer–relative conception of emergence." [12] An ap-proach which is similar to that of Ashby's concerning the black box problem, and which fits perfectly with the aim to find a use of emergences for the designer of an artistic interactive system. The concern, like in the early cybernetics and also in interactive art, is on how the interactants relate to the system performatively.

In order to discern whether or not emergence occurs in a system, Cariani proposes the construction of a model of it, very much like Ashby's experimenter constructs a protocol from the examination of the rela-tions among the inputs and outputs in the box.

This model is built after observation of the system, simulating it if necessary. It must contain all possibly observable system states and transitions, according to a predefined set of observable variables that explain its behavior. Once this is done, more observation is performed. It is in this observation relative to an observational frame that emergence either occurs or it doesn't.

Once more, this is contrary to many descriptions of emergence, which use precisely the moment of simulation of the system to account for emergence. In these descriptions, emergence occurs when the result of the simulation differs from the expectations that one would have after examining the individual elements and the rules to be simulated, as does happen in Reynold's Boids or Conway's Game of Life when one sees them for the first time.

Cariani's model is based on a semiotic framework of syntactic, semantic and pragmatic operations, which correspond respectively to the computations, measurements and evaluations. [13]

The syntactic operations exist in the symbolic realm. They are logically necessary and governed by conventions (rules). In these operations, the system relates symbols among them generating the state transitions and, therefore, changing the system's state through computations.

Semantic operations involve measurements and actions. That is, relations of the system or device with its environment. They are empirically contingent and materially governed. The possible measurements for the device (through its sensors) determine its epistemic capabilities. The variables in the world that the system can perceive and how it measures them are determined by the configuration of the sensors. This is where the symbolic part of the system is in contact with its non–symbolic environment.

Finally, there are the pragmatic operations, which evaluate the sensor readings of the semantic level and computations in the syntactic level vis–à–vis the system's goals.

When emergence does happen, it can be either combinatoric or creative. Combinatory emergence consists in changes on the syntactic or computational operations. In this case, the set of primitives (building blocks) with which the device works doesn't change, but the combinations of these primitives do, allowing for novelty to arise. Devices that fall into this category are computationally autonomous.

These systems are closed in the sense that their search space, no matter how big, is always finite. If the primitives are defined beforehand, the possible combinations among them are also predefined.

Creative emergence is a much more fundamental way for creating novelty. It consists in the introduction of new primitives in the computations, through changes in the semantic operations of the system (semantic adaptation). This happens when a new sensor is added (through evolution) in the system. It could also be the case of an increase of the sign–states in the system (the equivalent of creating new concepts in a human mind).Devices that fall into this category are epistemically autonomous.

As opposite to the closeness of combinatoric emergent systems, these are open–ended systems and devices, as their search space is ill–defined. If new primitives can be added through the introduction of new sensor capabilities, the creation of new behaviors (transitions between system states) is theoretically unlimited.

Emergence and Interactive Art

According to Cariani's methodology, we can understand how combinatoric emergence might occur in ALife simulations. The key issue is to generate a large number of interactions among the system's fundamental elements (Cariani's primitives), which in certain cases will generate emergent phenomena observable through simulation. This would be, for instance, the case of genetic algorithms.

My own installation Digital Babylon from 2005, which used genetic algorithms, can serve here as an example. This piece represented a simple ecosystem with two species and a food element. Once all the rules were set and the simulation run, patterns of behavior appeared in some of the species and the system as a whole. Some of these would be emergent under some descriptions of the phenomena, but not under Cariani's model.

What would fit his combinatoric emergence, though, were the changes in behavior that appeared after a rather long simulation of one of the prototypes of the piece. In it, one of the species had significantly changed its behavior due to the recombination of the characteristics in its individuals. E.g. they moved in small circles and very close to each other, which significantly differed from their initial behavior. [14]

Much more difficult is to account for creative emergence. The most evident way to do so would be for the device under analysis to evolve new sensors and expand its epistemic capabilities (its abilities to perceive its environment). But this, which has happened in natural systems, is extremely rare in artificial ones.

Another way would be to create autonomous objects capable of evolving new primitives through interaction of the cybernetic devices with humans. If the biological examples are the most clearly emergent, mixed artificial–biological systems should have its possibilities.

Humans beings, from a systemic point of view, can facilitate the creation of novel ideas (adding new primitives to expand their sign state–sets), allowing for creative emergence to occur. And this can be a way to open the closeness of the computer's formal system: "Human–machine combinations can be open–ended systems that generate new primitives." [15]

Thus, a door is opened here to the creation of fundamental novelty in the context of interactive art. With Cariani's methodology, a system can be described in detail and designed so that it allows for the system–interactant relationship to create new primitives and, therefore, newness in the first or in both, by amplifying the possible sign–states.

Conclusions

If carefully defined and used, emergence can be a powerful concept in the creation of interactive art systems. From the artist's point of view, it can be understood through the idea of the unpredictable black box. When creating an explicitly intended emergent system, the artist will know what the inputs to it will be, but hopefully the outputs will deviate from her expectations precisely because it is designed in such a way that its inner workings cannot be fully specified.

There is a clear paradoxical component in designing a device that should be emergent, since emergence is precisely the opposite of specification. But following a methodology like Cariani's, and allowing inter-activity into the system, we should be able to generate devices and systems which exhibit emergent interactive behavior.

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SOFT CLOUDING – CURATING A NEW SEMANTICS FOR SOUND ARCHIVING

Morten Søndergaard, Thomas Markussen, Barnabas Wetton & Ivan Dehn

This paper will present and discuss the *Soft clouding* project from the perspective of the three practices and competencies brought together in one transdisciplinary process of curating a semantics of sound: Technological, Humanistic / Curatorial, and Design / Action-based.

Soft Clouding is a blended concept, which describes the aim of a collaborative and transdisciplinary project. The concept is a metaphor implying a blend of cognitive, embodied interaction and semantic web. Furthermore, it is a metaphor describing our attempt of curating a new semantics of sound archiving.

The *Soft Clouding* Project is part of LARM - a major infrastructure combining research in and access to sound and radio archives in Denmark. In 2012 the LARM infrastructure will consist of more than 1 million hours of radio, combined with metadata who describes the content. The idea is to analyse the concept of 'infrastructure' and 'interface' on a creative play with the fundamentals of LARM (and any sound archive situation combining many kinds and layers of data and sources).

This paper will present and discuss the *Soft clouding* project from the perspective of the three practices and competencies brought together in one transdisciplinary process of curating a semantics of sound: Technological, Humanistic / Curatorial, and Design / Action-based.

Everything is tagged…

One of the main obstacles of creating an interface for an infrastructure, which contains a combination of many already rather large archives, is the amount of information involved; the way it is structured and described – on all kinds of levels.

In this regard, it is very near – but not similar – to the concept of 'cloud computing'.(Leadbeater 2010)

Cloud computing is a concept for next generation Internet where data is organized in a different manner, than is the case in the current www setup. The speed and growth of the Internet means we are drifting away from taxonomy and the search-oriented architecture gives us new possibilities in crowd sourcing and collaboration. The innovative idea of Cloud computing is that everything on the future www is 'miscellaneous', yet traceable in tagged contexts (Weinberger 2008)

Emergent technologies like *Echonest* and others, gives us a opportunity to 'trace' sequence and identify 'hidden' content in large amount of sound data. On the other hand, some of the mechanisms of emergence are organizational and collaborative, rather than purely technical.

The next most likely stage of the web's technical development – cloud computing – will act as a giant accelerator for cultural cloud formation. 'It will be like a giant machine for making clouds of culture.' (Leadbeater 2010)

Everything is tagged…

Cloud Computing & Digital Infrastructure

However, the LARM infrastructure is not yet one cloud of data, but consists of many clouds of data coexisting and overlapping each other. This is partly due to the in/consistency and in/compatibility of the many kinds of material in the different archives. But it is also due to the simple fact that digitalization is not the answer to everything in archives – especially, when the material is as time-based, particle-spatial and fugitive as sound.

Finally, it also appears that the system and epistemology behind the 'non-tagged' world is still very active – and not always easy to pursuade to give up the privileges of controlling 'their' cloud of data and information. Thus, there is a kind of power struggle involved in the ability to tag information across all platforms between the 'traditional' modern institutions - like libraries, media companies, and universities. The challenges of cloud culture is not only that of creating possibilities of digital infrastructures in society, that could change that society all together; it is as much a question of convincing and transforming a 'modern' post-industrial system of cultural politics.

As cloud culture comes of age, we need to make scenarios of possible uses of the tagged world. This is our attempt:

Our links to one another, we believe, will be increasingly routed through a vast shared "cloud" of data and software. These clouds, supported by huge server farms all over the world, will allow us to access data from many devices, not just computers; to use programs only when we need them and to share expensive resources such as servers more efficiently. (Leadbeater 2010)

An interface to an infrastructure of sound-archives is dependent on the development of alternative methods and modalities for 'seeing' and 'touching' acoustic temporality and its (natural and cultural) contexts. In other words, we need to 'curate' a new semantics of sound and sound archiving. In this context, to 'curate' receives an extra level: to create and manage a systems design.

Soft Clouds…

Thus, we conceive soft clouds as the clouds of data, metadata and relations between data and things in the cloud (sound and radio programs i.e.) that you generate in a (research or creative) process.

The cloud is a promising cultural tool. In order for tags in the cloud to become culture, we would argue that we need another level of interface where the human body (the 'soft' level of HCI) is active.

We want to create an interface for that process where you may create and operate with your own 'soft clouds' – either from existing data and material on the platform, or from new material and data (or both).

Soft Clouding is taking networking to a new level (of reality) outside the taxonomies of the Internet.

It is embodiment without the (physical) body.(Ihde 2002)

The infrastructure is NOT the Internet, it is not ONE cloud of data either - it is something different. The infrastructure's primary inventive point is the link between body position and information. We are building a system that flows and links between different ways of organising information in a way that parallels the way the mind works and organises in parallel organisational fields (Pinker 1997). It is a bodily sensing of information in loose conversational clusters that can be manipulated in space.

Innovation through metaphors...

Working in a transdisciplinary team we have asked ourselves the question: In what way can we make tangible representations of the ordering of sound and the information that pertains to it? This is as essential for a single user tool as it is for formulating a frame for the kinds of discussions that take place in a temporal context with more than one user involved.

In the transdisciplinary, innovative discussions we are using metaphors and images that can drive our thinking such as

- "it changes patterns according to what you are thinking about by reorganising the emphasis (metadata) that is connected to the groups of information."
- "It is a tangible time machine"
- "It is a map and a conversation at the same time"
- "It is transparent and yet consistent"

We want to be freed from the constraints of the Desktop paradigm. The Desktop paradigm is such a well-founded method of understanding the ordering of data - once ideas are digitalized, that they fall 'naturally' into our way of thinking. We want to move beyond that and take tagging to another level.

Grounding a collaborative systems design paradigm

Soft clouding is a way to work with embodied, physical space as a framing for reality-based interaction where the relations and i.e. in/consistencies of different material define the interface.

One of the dominating visions in interaction design driving this field – Reality-based Interfaces – is to design for increasing naturalness in the way we interact with computers through drawing upon our skills in the way we manipulate and understand the physical world.

In contrast to this view, our vision is that future use of computers should not just mirror our relation with the physical world, but should rather evoke new kinds of experiences that augment people's perspectives on the world. By basing our vision on this assumption our vision comes closer to the design paradigm known as *aesthetics of interaction* without being equal.

Aesthetics of interaction is an emerging paradigm in interaction design and Human-Computer Interaction that can be divided roughly into three approaches. The *media-centric* approach conceives of digital

aesthetics as the discipline that should make software engineers and designers conscious of how the computer functions as an expressive medium.

The *product-oriented* approach views aesthetic qualities in a more decorative sense as those pertaining to pleasurable or desirable qualities.

The *experience-based* approach to aesthetics sees aesthetic qualities as a resource for creating experiences with technology that not only affect our body, but also - through this affection - spark our imagination or evoke thoughtful interaction and critical reflection ([Krogh, Petersen et al. 2009](#))

We share the assumption with proponents of the experience-based approach that digital technology is a new sensuous material for designers that needs to be explored in its own right rather than being modelled on the idea of a refashioning or re-mediation of old media. Computational artefacts merge physical and digital materiality into new hybrid sensuous qualities and functionalities, which can be exploited in the design of educational settings, cultural institutions, urban space, and so on.

The sound archive is a Hertzian space or electronic geography made up by wavelengths of various kinds. With Soft Clouding we aim at developing a whole new conception of what an archive is and how people may access intangible and fugitive sounds through tangible and haptic experiences. Not in the sense of Tangible Interaction (Ishii & Ulmer) where interaction is reduced to physical controllers for two-hands manipulating digital information, for instance turning and twisting a bottle for playing music files. Rather than physical interaction our aim is to make a sound archive emerge in 3D architectural space. In this sense, it might seem as if we wish to revive Mark Weiser's idea of ubiquitous computing, according to which computer technologies should be integrated into the walls and floors of buildings transforming them into interactive spaces. Yet, in contrast to UbiComp, we do not subscribe to the idea of the invisible computer staying in the background and serving people like a butler whenever there is a need for it. The Soft Clouding project is based on a vision of making the invisible computer a sensible part of people's spatial experience, replacing the computer butler with a computer wizard inviting people to enter a new space for having sound experiences. In this space sounds are able to become tangible felt and sensed through the felt sensations and movements of the body. Now, how is this to be understood?

In the context of ordinary conversation the gestural and bodily underpins verbal communication as an extension/continuation of spoken language. Spatial positioning frames spoken language.

The need to position, make spatial and codify the spoken word through the body is so intense and ingrown that it is even used in telephone conversations where the listener is unable to see the point being made *through* the gestures of the speaker. Nonetheless, through the force of this gestural instinct the speaker is obliged to use it in order to make or emphasize a point. And the more emotionally intense the point being made the stronger is the impulse to move in order to able to express it.

From the perspective of the Soft Clouding team herein lies the key to how haptic, internalized sensed sensations can meet the external world in a paradigm that is, to a high degree, distinct from the desktop method of organizing information. We fully accept that "desktop thinking" is a powerful and well established default position for storing and organizing discreet units of information but it its form, based as it is on a visual representation of physical objects that cannot be easily reproduced or moved does not provide a sufficiently open potential for linking and thinking on your own or with others. We posit that Michael Polanyi's notions of tacit knowledge can provide us with a model for how *Soft Clouding* can be

experienced by focusing on the continuum between the sound space and the body; and the gestural as a way of accessing and organizing this material.

In the preliminary planning for the project, it was discussed how to create a bridge between the desktop paradigm and a vision of a playful open-ended space that is bounded solely by the size of the collection and the uses it is put to through the users. Therefore the primary research within the Soft Clouding project works experientially with how to position sound files in a three dimensional space through binaural sound input that can act with or as further, wider extension of the visual representation of the sound archive.

The average human has a visual field of around 80 degrees around the head facing forward. Of this peripheral vision – the part of vision that deals largely with movement and cannot perceive detail or colour to any great degree – makes up the greater part of the eye's function. Therefore our ability to see space is determined by a largely coordinated but unconscious movement of body and eye. In comparison we are able to hear 360 degrees around the head and place sound with a high degree of precision in relation to ourselves, including events that take place directly behind us. Understanding this fundamental difference makes it possible to establish an experimental space in Soft Clouding to test how the gestural relates to manipulating and playfully organizing ideas alone or with others in a technological body-space. We try to create an environment that is common and accessible to all the users, be they physically or digitally present in it.

The *Soft Clouding* project is working towards a parallel, otherworldly extension of the desktop paradigm in order to provide a new, gestural platform for organizational thinking and sharing. It thinks in terms of contexts and space rather than boxes and files. Although it takes sound archiving as its starting point the medium and long-term goal is to contribute to developing a new semantic about how to access and organize media in an experimental technological body-space that supplements the desktop paradigm.

Curating a new semantics…

To take this a step further, looking at some of the problems we face from a humanistic HCI-perspective, if Soft Clouding is to be successful the real impact of the new semantics would have to be operational on a cultural level (that is, expectations towards a technological body-space are collectively shared by a large number of people). Cloud computing does not 'just' translate into a systems design or a new paradigm for experiencing data overnight; it is based on a gradual transformation of an entire culture, into that which Leadbeater, perhaps a bit haphazardly, terms a 'cloud culture'.

This means, that for Soft Clouding to have any impact on an individual, personal level from any user we may imagine, this user would have to navigate intuitively with the semantics of a technological body. This, already from the start, makes it difficult to achieve a 3D space that would fulfil that semantics, if the cloud culture were not fully realized on a collective scale. Also, if we have to operate in sound, and with sound, as physical and acoustical elements in space, there would be at least 4 dimensions to navigate in – since time in sound experience and sound production is implicit.

Therefore, we are operating with the term technological body-space. To mark out the distinction from ordinary 3D experiments that we find are limited, especially in terms of the hugely expanded network metaphor of a tagged society; not to speak of the 'radical' idea to bring ALL of the human senses into an archive-interface and systems design.

It is a huge step away from (the idea of) the literary paradigm of archives, but only a small step ahead for a new semantics for sound archiving.

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CAMERA, CANVAS, AND COMPUTATION: NEW FRAMEWORKS FOR REPRESENTATION AND ABSTRACTION

Anne Morgan Spalter

Visual computing has irrevocably blurred the lines between representation and abstraction. Just as photography with its innovative realism changed the nature of painting, so digital image capture and computational creative processes are changing the relationships between previous traditional art media and directly influence our frameworks for creating and interpreting new media works.

Vacation Meditation, 16.5"x12.5" unique inkjet print, 2011. Collection of Genevieve Keeley.

Introduction

The relationship between abstraction and representation is a relationship of language to silence, of the recognizable to the wordless and experiential. Both art genres evoke an emotional response; both approaches have known histories and structures. They exist at opposite poles of the art magnet, however, and there is sparse middle ground. Either an image resolves perceptually into something recognizable or it does not. The brain seeks familiar cognitive objects - and may find something the artist did not intend - but a millisecond is enough to know whether a work is a picture "of something" or not.

The abstract can be seen as a categorical subset of representational work, as all the features of abstraction are contained within a representational work: composition, color, line, gesture, mark making, form, etc. Any representational work can be processed to relieve it of its burden of language and reveal the "abstract" features that contribute to the composition and mood.

The two genres are usually distinct from the beginning to the end of the creative process. It is rare that a traditional artist sets out to create an abstract work and ends up with a realistic picture - or vice versa. Some works can function on both levels giving each equal due, as maybe Pointillism does or some more extreme Cubism. Either genre can comment on virtually anything from the personal to the political - as artists from Motherwell to Malevich can attest.

The invention of photography had a profound effect on the goals of painting: the technical challenge of representation had been met. The documentary aspects and mathematics of perspective no longer had the same visual power in a painted work. Representation did not go away, as some had predicted, nor did the art of painting, but the focus shifted, bringing abstract qualities to the fore.

The invention of computers has brought about another change, just as significant, if not more so, and has brought things full circle. The computer does not treat pixels in an image of a face any differently from those in a red square. Although image processing algorithms can recognize faces and other objects these are still human constructs realized with code. The computer doesn't care or make these distinctions, all the data is the same - just as a realistic or abstract painting begins with the same tubes of colored paints.

In my artwork, the computer has afforded a new way of working with imagery and mark-making that transforms works from representational to abstract in a way impossible with traditional media. In recent works, I have been able to integrate digital photography, traditional drawing and painting, and 2D, 3D and motion-based computational effects to make works that combine the visceral impact of traditional physical techniques with the compositional complexity and perfect ordering made possible by computation.

The Working Process
For example, on a vacation in Jamaica, I took a digital of our hotel pool. Back in my studio in Pawtucket, RI, I used this as a reference for a pastel drawing. From the photo, I derived instant perspective and was able to recreate specific details of palm fronds and pool lighting. The pastel drawing is not a photograph replicated by hand but uses details that would be otherwise forgotten as a jumping off place for constructing a composition loaded with internal emotional and personal experience. These are conveyed through the use of gesture and color and, of course, the choice to include certain details and leave out others. I was fascinated by the artificial color of the pool water and its strict rectangular geometry in an otherwise natural setting and used this to construct an image that contrasts technology and nature.

The results, in part because of the digital photographic influence, employ a Western style of image-making, resulting in a representational work using standard perspective and other spatial cueing techniques such as color warmth, overlapping, and scale. The aspect ratio and field of view are also influenced by the digital course.

After completing the traditional drawing, I took a high-resolution digital photograph. Now the bits were in my computer, and became plastic again in ways not possible with the drawing hanging on the studio wall. In a single keystroke I switched polarities and entered the world of abstraction. My goal was to bring a type of Eastern, patterned, mathematical compositional strategy into play, without sacrificing the original mood of the piece. In other words, I wanted to use the computer to take the work someplace new, building on the original effort but using the computer to explore territories not possible with my wooden case of pastel sticks. (See Fig. 1.)

As a math major in college and a lover of Islamic art, I have always been fascinated by the power of patterns to describe space and transcend the everyday world, suggesting a higher order. The circular kaleidoscopic algorithm I used let me bring all these factors into play without letting go of the visceral mark-making and human touch that comes from drawing by hand. I created a series of images, that varied the role of the pool and its artificial coloring and that of the greenery growing around it. I was also intrigued by the level of complexity so easy afforded by the computer and its affect on the feeling of the work. The resulting works bridged cultures and received attention in Middle Eastern publications such as Vision magazine, The International Herald Tribune, and on Dubai One TV, as well as in the US. [1][2][3][4]

After experimenting with the compositional options I moved further into the computational realm by creating time-based works based on the same strategies. The sense of space and potential for motion in my work is an important aspect for me and setting the kaleidoscope in motion I was able to bring back the feeling of experiencing a space—not a traditional Western one anymore, but an idealized sensorium. By controlling such aspects of the center point from which the algorithm worked to the number of branches, scale and rotation, and movement speed, I could explore this new computational space interactively and choose the images and sequences that best conveyed my goals for the work.

I am continuing this exploration in new work, combining abstract patterning with recognizable objects that come and go during the piece. For example, in kaleidoscopic works based on video shot of highway traffic from a small plane, I am playing with patterns formed by the abstract semiotics of the highway - white dashed lines, solid yellow ones, signage, etc. - combined with recognizable portions and patterns of vehicles that emerge, rush by, combine or splinter, and disappear.

Conclusion

From the original digital photo through traditional processes and back to the computer in both still and motion-based contexts, I was able to explore an aspect of the external landscape that intrigued me and bring my internal emotional response into the work in a variety of ways. The abrupt shift from representational to abstract made possible by the computer is, I believe, indicative of the ways in which the computer continues to change the process of art making and interpretation.

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RESPONSIVE SPACES: MOTION, ACTIVITY AND INTERACTIVE ART

Ryan Spicer, Andreea Danielescu, Aisling Kelliher & David Tinapple

We present an overview of interactive art that reflects human activity in physical space. We discuss the varied approaches of these pieces and present our own work, Building with a Memory, which is situated in a workplace and builds on this prior work to provide an informative and aesthetically satisfying experience.
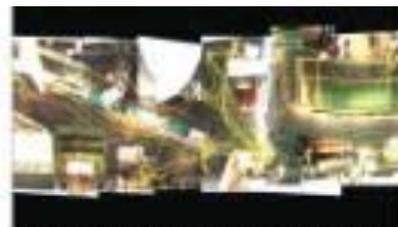
Fig 1. Four approaches to representing human activity in interactive art. Top Left: Urban Pixels by William Mitchel and Susanne Seitinger. Top Right: You Are Here by Snibbe Interactive. Bottom left: Motion Traces by Tmema (Golan Levin and Zachary Lieberman) with Ars Electronica Futurelab. Bottom Right: Artifacts of the Presence Era by Fernanda Viegas. All images © respective artists.

Fig 2. Building with a Memory uses wall-mounted LED lights and a video display (see inset detail) to present current and historical human physical activity in a multi-use workplace. Copyright Arizona State University 2011.

Introduction

Sensing and responding to dynamic human activity occupies a rich position in the history of interactive art. Artists such as Camille Utterback, Golan Levin and Petra Gemeinboeck explore human movement as a physical, distributed and social phenomenon. Their work and that of the broader community engaged in creating responsive experiential art is the focus of our research and the inspiration for our creative experimentation.

We present an overview of works that track and display human activity, particularly movement. We focus on the temporal and spatial lenses each work adopts in interrogating and responding to human movement. The purpose and provocation of these installations range from utilitarian to aesthetic. Works such as Ishii's *Pinwheels* provide information on social and technological interactions. In contrast, Rokeby's *San Marco Flow* and Gemeinboeck's *Impossible Geographies* render patterns of movement at vastly different scales and require varying levels of conscious participation. The works represent varying approaches in feedback mechanisms, analysis of captured data and scale of detected and represented activity.

Inspired by these works, we introduce *Building with a Memory*, an interactive installation that captures and represents human movement in a collaborative workplace. Unlike other workplace media systems which often focus on interpersonal communication, we design an aesthetically-informed system that provides both artistic and informative value. We explore co-located and distributed sensing and feedback, and display activity over scales varying from a single room to the surrounding environment. Recording, analyzing and representing the ebb and flow of activities over time provides opportunities to develop insight into the community, for members and visitors alike. We use indirect lighting and video

to provide ambient feedback. While we capture activity over time, we mask identity of individuals to maintain privacy while providing practical information on the history of the community.

A Survey of Bodies and History in Interactive Art

Some artists use the opportunities provided by interactive media to catalyze interaction with others in under-utilized public spaces, or increase awareness of the history of space. Other artists produce installations that encourage in-depth interaction between individuals and installations. Others use these mediums to make the viewer aware of the patterns of everyday activity in public spaces. Still others use these technologies to augment the workplace, providing ambient information to everyday users of the space. Each of these approaches has implications for the type of sensing and feedback, level of abstraction, and kind of historical and current data presented.

Many pieces encourage interaction between viewers and the installation in public space. Camille Utterback's *Aurora Organ* and *Abundance* exemplify this style of interaction. *Aurora Organ* invites patrons to engage with each other and six LED-lit acrylic columns through touch panels embedded in a lobby space's railing. By touching the interfaces, patrons can contribute splashes of color to the corresponding column; special cases reward patrons for working together to trigger all sensors at once. *Abundance*, a public-art installation in a building's courtyard, uses a projection mapped onto a building for output, and computer vision for input. Activity is captured as brightly-colored silhouettes that leave behind traces, which fade over time to lines. Certain patterns of activity trigger special responses, encouraging people to play in the environment created by the installation.

Pieces that encourage interaction between people in the context of the media system serve a different purpose. Snibbe Interactive's *You Are Here* (Fig. 1, upper right) is situated in a museum exhibit rather than a public lobby or courtyard. Like *Abundance*, *You Are Here* uses video to extract the paths of individuals through the space. In *You Are Here*, video from multiple cameras is digitally stitched to detect movement throughout the entire exhibit floor. *You Are Here* focuses more on literal history than *Abundance*'s abstracted silhouettes. The installation's display and controls are located in the sensed space, and viewers can hide or show the video image and adjust how much history is displayed. The exhibit catalyzes discussion about surveillance, tracking and recording of history in the context of the larger museum exhibit's discussion of computation and technology, in addition to encouraging specific kinds of interactions.

Jason Bruges Studio's *Shortcut* integrates computer-controlled lighting into the pavement of an urban alleyway. The installation senses movement through the alley, and reflects this motion in patterns of light. Rather than encouraging performance or interaction among people present in the space, the installation reflects their motion, building up patterns of light over time. This creates a pleasing interaction in what was previously a dark alleyway, and also improves the safety of the space by providing lighting when people are present. The lighting changes are immediately visible to the participants, but also leave traces for subsequent viewers to interpret.

Mitchel and Seitinger's *Urban Pixels* system supports an interaction where participants use flashlights to trigger individual LED lights, setting off patterns of activity across the other networked devices (Fig. 1, top left) [5]. Like *Shortcut*, *Urban Pixels* responds to human activity with light. *Urban Pixels* has a more flexible spatial layout, and one instantiation requires people to choose to interact with the pixels using a flashlight rather than passively sensing their motion.

Lozano-Hemmer's *Pulse* family of installations, including *Pulse Room*, *Pulse Spiral*, and so forth, use a single tangible object to provoke interaction. By gripping a heart-rate sensor, viewers can contribute their pulse to the installation. Each participant's pulse is visualized as a flickering incandescent light into an array of light bulbs, each representing a participant's heart beat. Lozano-Hemmer uses these captured heart-beats as stand-ins for individual identity, and through this metaphor presents an abstract, ephemeral history of the work's viewers.

Levin et al's *Motion Traces* (Fig. 1, bottom left) uses computer vision techniques to control a projection and multicolored lighting in one corridor of a retail space. The installation presents multiple variants of feedback, each of which maps the position of visitors in the corridor to an abstract video rendering. The system is primarily commercial art -- it serves to entice visitors into the retail space and build positive associations with the brand.

Another tradition of installations considers human motion through public space, without displaying the analyzed motion to the sensed population. Rokeby's *San Marco Flow* fits into this category. Like *Abundence* or *You Are Here*, the installation uses a camera to capture motion through a large public space. Unlike these other pieces, where the generated feedback is visible to the sensed population, *San Marco Flow*'s video feedback exists inside a gallery space. The majority of people contributing sensed motion to *San Marco Flow* may not even realize that they are being sensed.

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SYNCRETIC SOCIAL AGENCY: DETERRITORIALISED ROBOTICS AND MIXED REALITY DATA TRANSFER SYSTEMS

Julian Stadon

This paper adopts a syncretic approach to the gathering of disparate beliefs and ideologies in order to expand on the topic of anthropomorphic representation in order to deconstruct our relationships with agents and the architecture of autonomy.

Focusing on networked agency this investigation seeks to articulate the need for dialogue in anthropomorphic social robotics to include, in order to fully understand the breadth of relationships, particularly their effect on consciousness and identity. In this paper I refer to the notion of agency rather than the field of robotics as I believe the notion of servitude applies even to the most advanced artificially intelligent autonomous robots. Citing examples of research from the fields that include media art, telematic robotics, real time digital simulation and mechatronics, this is an attempt to analyse hybridized agency in mixed reality data transfer (MRDT) systems that follow a Deleuzian paradigm of intuitive deterritorialisation and reterritorialisation of the body in real time situations.[1] Second order cybernetics was very successful in its endeavor to explain our early relationships with robots in terms of interactivity and connectivity however the incorporation of more networked systems of autonomous/anthropomorphic based interactions have created a system of agency that is less anchored in a traditional bio-physical/electro-physical dichotomy.[2]

It is a popular belief that we are now, through a media convergent, participatory culture (integrated socially through a subnet of platforms) creating a collective intelligence that exists in this global village of knowledge (data) transfer.This perspective evades mythological notions of anthropomorphic interaction. Networked robotic systems that use real time MRDT expand autonomous robotic interaction beyond traditional bio-physical/electro-physical relationships and are integral to understanding our relationship with autonomous agents. Adopting a syncretic approach to this discourse allows for the inclusion of social networks in dialogue concerning social robotics. Syncretism has traditionally been regarded as an attempt to harmonise and analogise disparate ideologies, socio-political views and fields of inquiry. Unlike traditional sites for communication and cultural exchange, social digital platforms rely on actions and conversations to shape not only the social and cultural environments, but also the spatial environments. Such systems allow participants to physically interact with virtual (deterritorialised) biological representations and mediate (reterritorialise) through physical engagement, rather than entering traditional text or numerical based data sets and command sequences.

Robots have always questioned our stance on expressive cultural and spiritual engagement; particularly the social implications of the human-machine synergies have arisen through their development. Robotic development has generally resulted in a significantly anthropomorphic output, that fits nicely into traditional notions of agency and recent sociable robotic development is no difference. Even within the field of artificially intelligent robotics a dichotomous paradigm of 'otherness' (master/servant owner/pet child/friend etc.) still serves as the best model to explain our relationship with these machines. This is due to the very physical nature of both entities involved in the system.

Thorough analysis of this traditional cybernetic relationship exists in the work of Donna Haraway and Katherine Hayles that is specific to the integration of humanity with machines. Haraway relates the body's augmentation through digital technology to the notion of the social cyborg. In *A Cyborg Manifesto* [3] she argues that the body can be viewed as a conglomerate where its components can be separated, combined with new elements and put together again in ways that violate its traditional boundaries. This rhetoric implies a fractured identity that articulates a cyborg reality that is socially inclusive. *In Chaos Bound* literary theorist N. Katherine Hayles refers to the notion of dispersed self in light of virtual bodies and narrative, arguing that by turning bodiless information into narratives, the teleology of disembodiment is replaced with contests with ambiguous outcomes: "As I have argued, human being is first of all embodied being, and the complexities of this embodiment mean that human awareness unfolds in very different ways than intelligence in cybernetic machines. Stelarc expresses a more dramatic response claiming,

"Evolution ends when technology invades the body. It is no longer of any advantage either to remain "human" or to evolve as a species. Human thought recedes into the human past. The end of philosophy, the end of the human form." [4]

These views seem to predate the integration of networked technologies within robotic systems, particularly mixed reality data transfer systems. They also are situated in a humanist paradigm that tends to neglect the other species we coexist within these realities. Of course recently Stelarc has shifted his research into networked agency with his Prosthetic Head project. This is an example of how even AI agent systems rely on human engagement still in order to be meaningfully experienced. In the work Stelarc argues that against the metaphysical notion of mind/body separation, declaring the mind to be no more an agent than the body. The work forms a metaphorical network through its intrinsic association with Stelarc's identity through its similar semblance and behavior to Stelarc. It is in affect a post-biological mixed reality system of data transfer that acts both as agent for the audience and for Stelarc's ongoing performative exploration of the relationship between mind, body and machine.

Networked agency shifts user-agent relationships into a new era that I believe to be far less autonomous than the physical output of such systems suggest. It is ironic that we often think of non-physically present environments (cyberspace, nanospace and psychic/apparitional space) as virtual realities or alternate/other realities, considering how hybridized they all are, through their ability to transfer data in an interconnected, intercommunicated way. For example I cannot take a rock and combine it with water to create ice in an eco-space, however I can translate an image of a rock into code, cut and paste in the code for an image of water and hybridize the data, which I can then use to create anything from a sound wave to a calibration for a freezer in order to create ice. It is important to remember the fluidity of data as it allows for new media that deconstructs and reconstructs information in a way that can articulate the entire spectrum of wet and dry, natural and artificial, embodied and distributed, tangible and ephemeral, visible and occult. [5]

In order to understand the context of this paper we must first analyse the architecture of autonomy. In the increasingly reliable Wikipedia is suggests autonomous robotics as:

"…robots that can perform desired tasks in unstructured environments without continuous human guidance. Many kinds of robots have some degree of autonomy. Different robots can be autonomous in different ways. A high degree of autonomy is particularly desirable in fields such as space exploration, cleaning floors, mowing lawns, and waste water treatment." [6]

If one believes that these are indeed the tasks allocated to autonomous robots by definition it appears as though autonomous functions are by nature arbitrary and in no way contributing to a rich cultural discourse.

An example of a current research project that conflicts with this statement is being conducted at the Robotics and Mechatronics Centre (RMC), German Aerospace Centre. This projects developed a real-time interactive simulation and training environment used as a platform for the analysis, training and programming of on-orbit servicing tasks. Basically it is a real time haptic mixed reality data transfer system that can control robots in space. By networking haptic-enabled virtual telepresence with it, the robot does in some sense lose its autonomy, however both user and agent are able to work independently of one another in a hybridized fashion to complete tasks. It is similar to a NASA astronaut receiving commands from mission control and carrying them out, however in this case the data is transferred in an intuitive real time mixed reality state. [7]

Clearly there are experiential differences between the two and one allows for a much broader social engagement in a process usually limited to a few highly trained individuals. It also alleviates the physical conditioning usually requires to perform such tasks. Here the robot is very much the agent friend of the user as it helps them perform far beyond their biological realty, and therefore it is post-biological.

Post-biological, in this sense, refers to a redefinition of the embodied subject which encompasses their location in virtual environments as well as in the physical. This involves the creation, through art practice, of what we might term autonomous agents that are born from data but which take on the appearance of bio-forms and thus *become* embodied. At the same time these agents are a differential embodiment of the 'bodies', which first generated that data in their everyday activities.

Another way of looking at autonomous architecture is the cybernetic paradigm of action/response. The father of cybernetics Norbert Wiener describe this model in regards to how messages are communicated between involved entities in systems:

"... society can only be understood through a study of the messages and communication facilities which belong to it; and that in the future development of these messages and communication facilities, messages between man and machines, between machines and man, and between machine and machine, are destined to play an ever increasing part." [8]

Recent developments in the way we access networks require this statement to be revisited as systems are becoming more universally accessible and interacted with. Our participation in metaverses such as Second Life, and social networked cyberspaces such as Facebook, Twitter, Youtube, Blogs and Wikis serve as a precursor to our collaborative, hybridized colonisation of post-biological space. Soon we will live in a society of second order presence and identity that endlessly creates and distributes various representations of ourselves under a collaborative paradigm of socially inclusive construction. These systems link traditional virtual and biophysical systems in a way that allows free public access and contribution.

In Leonardo Educational Almanac vol.5, N. 5, May 1997, the notes of Eduardo Kac and Marcel.li Antunez Roca decided that robots were:

"… a new art form and they are prone to be hybridized with diverse technologies. This quality makes them transcend the category of object to be diffused into the environment…Robotic art can occur in physical places, in telematic space, in virtual environments, or any combination of these that includes an actual location." [9]

This definition provides a much more expansive outlook on the spatial presence of autonomous robots, but more importantly it alludes to a hybridized technological engagement that is reliant on networked interactions. A good example of such a system is Ken Goldberg's Telegarden. The work depended on telerobotic users to tend the garden. Web users could view and interact with a remote garden filled with living plants, being able plant, water, and monitor the progress of seedlings via the tender movements of an industrial robot arm. The very life of a living community depended on networked transfer of data to an agent that facilitated the tasks necessary to maintain life.

The final aspect relation to the structure of autonomy is latency in open systems of engagement. All cybernetic feedback systems endure what is known as time-space inconsistency. This is the spatial difference between user and agent and occurs due to latency, bandwidth speed, the paths chosen for data transfer to occur to name a few examples. This creates a deterritorialised autonomy in that a potentially infinite number of users can participate with agents in this 'gap'. It is in this ambiguous space that robots can truly become autonomous as they are free within the network, emancipated of control and alleviated of the responsibility to respond. While computer scientists detest the effect this has on functionality, artists should embrace this in between space. It is a new millennium version of the gap between painting and viewer, representation and ideas, but it goes beyond dichotomies. It is forever expansive in it's invitation to be engaged with.

Edward Shanken published a very thorough overview of telerobotics: *NeMe: Tele-Agency: Telematics, Telerobotics, and the Art of Meaning* in which he describes a range of artworks that push the boundaries of the field. In his conclusion he discusses the difference between active-active and active-passive models of agency:

"This nomenclature emphasizes the difference between those models without burdening the issue with the ethically loaded terminology of "master" and "slave" which is pervasive in the robotics literature. But that such terms can be recycled as though depoliticized from any real-world considerations demands further reflection."

This master-slave metaphor is one that is being replaced by peer to peer through the autonomous appearance of intelligent robotic systems. A dichotomous system I would like to compare this is to a recent model developed for a digital simulation research project by Kashif Zia, Andreas Riener and Alois Ferscha at Johannes Kepler University this year. A simulation of an evacuation situation was established at Linz train station in order to analyse cognitive decision making in socio-technical systems. [10] Participants were asked to wear sensory impaired items such as blindfolds and ear muffs while being dictated by a 'Lifebelt- a technology designed to assist in such situations. The resulting data indicated an exchange system orientated around fear and hope, both existing as feedback loops that are directly relational to intension, emotion, belief and individualism. All of these are linked to the reliance and trust one has on networked technology and the intelligence that exists at the other end of the data transfer.

Lev Manovich expresses this new relationship with technology as a migration from "the orgy of electronic cables" to a state that is

"…completely integrated and fused with the lived environment…neither threatening nor is it some out-side force that has been domesticated. Rather, it is playful and playable: it brings a party to the every-day". [11]

So taking what has been discussed into consideration how do we then define our relationships with an-thropomorphic agents in real time data transfer systems that traverse multiple worlds, ideologies and realities? First we must understand the structure of such relationships and Deleuze and Guattari do very well to relate scientific discourse to such social structures. In *Difference and Repetition* Deleuze intro-duces the notion of deterritorialisation (through dispersion) as a "dark precursor" that "relates hetero-geneous systems and even completely disparate things." In order for deterritorialisation to occur there must be some form of agent that can remain constant and self-referent. Deleuze and Guatarri state that: "The alignment of the code or linearity of the nucleic sequence in fact marks a threshold of deterri-torialisation of the "sign" that gives it a new ability to be copied and makes the organism more deterri-torialised than a crystal: only something deterritorialised is capable of reproducing itself." [12]

Anthropomorphic agency's hybridization with physical and biological architecture is constructed by the methods used to connect the environments. The combination and cohesion of heterogeneous elements is generally problematic, particularly when a three dimensional space is primarily viewed on a two di-mensional plane. The integration of virtual elements and physical environments rely on bridging dis-parate with dynamic so that are simultaneously accessible and able to be openly engaged with, edited and developed.

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STITCHING TOGETHER AN EDITORIAL SEWING CIRCLE

Åsa Ståhl, Kristina Lindstrom, Johanna Rosenqvist & Melin Margareta

Fragmented stories of an *editorial sewing circle* are temporarily sewn together. We thereby explore what public emerged through the combination of two known situations and collectives for sharing, joining, and negotiating stories: the *sewing circle* and the *editorial board*. Although we make texts and textiles public, the focus was also on *being* public – inviting people to become part of the *editorial sewing circle*'s negotiation processes.

Introduction

"I am so angry with you, because you say so many relevant things!"

This SMS was embroidered and published in the magazine Aluma. It was the invitation to collaboratively compose a feuilleton based on participants' text messages. These mobile-phone text-messages were embroidered, shared and negotiated at an *editorial sewing circle* hosted by the authors of this paper at Gallery KRETS in Malmö, Sweden in 2009. The final version of the feuilleton, what was decided in the editorial process, was also published in Aluma. At the last day of the *editorial sewing circle* a *patchwork-seminar* was held at the gallery to discuss editorial boards and sewing circles as historical, professional and artistic practices of storytelling, collaboration, production and power. During the seminar each of the four authors of this paper placed text-patches on the floor, and invited the participants of the seminar to do the same.

Fragmented stories of this *editorial sewing circle* are temporarily sewn together in this paper. We thereby explore what public emerged through the combination of two known situations and collectives for sharing, joining, and negotiating realities and stories: the *sewing circle* and the *editorial board.*

By engaging ourselves in the craft of story-quilting (Bränström Öhman and Livholts 2007), in the seminar and in the writing of this paper, we hope to draw attention to the seams: the things that separate as well as hold together.

Sewing Circle

The first major patch in this textual quilt, trying to reflect upon our editorial sewing circle, is the notion of the sewing circle. What usually defines the sewing circle is the sewing together, be it on individual or joint projects. What is being made public from these gatherings are the products of the decision-making of what should pass as social goods, in all aspects. One example is Church-quilts, traditional communal-products of the village sewing-circle, where the circle of women made decisions of patches of moral stories to be passed-on and told as textile texts, traditionally given as rite-de-passage gifts to girls, thus influencing the social order of villages.

Historically, the sewing circle seems to have been used as a means of disguising power under the cloak of meeting for an ostensibly lesser cause, while really discussing important matters. They have functioned as semi-secret discussion groups, letting the formal power rest in the hands of others. Sewing-societies is another example of a covert public realm where women have turned the unpaid time to benefit the community, for example by auctioning their goods and using the profit to pay for lampposts as well as send money to people in need. It is more open in form than the closed circle and have existed in Sweden at least since 1840. This has been described in several texts by Louise Waldén (1997; 2001). She has written about the cultural history of women, seen through the example of textile crafts, drawing on experiences from the fields of both women's rights movement, technique in connection with social change and handicraft associations.

THE TEXTILE AS TEXT SPELLING OUT SURVIVAL STRATEGIES

In the seminal text "What constitutes powerlessness" Waldén tries to read textile as a text of which the culture and literal heritage have primarily been formulated in a feminine context. She sees two stories. On the one hand a description of textile production marking one the darkest chapters in women's history in terms of exploitation and terrible working-conditions. And – on the other side – as a dignity description of the pride, care and concern for the sparse but treasured textile of the workers home, and linen cupboards of the noblewomen alike. Waldén suggests a third reading style: "Stories of survival strategies under the cover of textile. Being able to read the fabric's text requires knowledge of women's history, condition and culture." Only then, she states, the textile text lends itself to reading. And only then the separatist seclusion can be seen as a refusal to comply to an unequal power structure and a refusal to allow the formal lack of power to be matched by real powerlessness.

UNDER-COVER POWER

History shows us, as told by Waldén, that the sewing circle may be used as an under-cover method to induce power into an unequal power structure. The caricature-like gender-dichotomy is an enlightenment-heritage. What is or was constructed as masculine was per definition the opposite of the feminine. Strong, rational, public sphere, metal craft and art, hard news equal masculine. Weak, emotional, private sphere, textile craft, soft news equal feminine. And the masculine sphere equals everything with high status, while the feminine equals everything with low status (Rosenqvist, 2007; Melin, 2008).

Throughout the twentieth century working with textiles has been professionalised within for example handicraft associations (Rosenqvist, 2007). The connotation to the home and the feminine crafts served as a legitimising factor when women went from working in their own homes to working in the boutiques of the handicraft associations, thus making public some of the chores of the private sphere. The separate sphere can thus be read as a means of under-cover power recognizing the difference, of teaming up with other, like-minded individuals, of forming a meeting-point and a protocol that is defying power.

APPROPRIATED SEWING CIRCLES

One of the many contemporary artists and activists who have used the under-cover method of the sewing circle is Malin Arnell. She hosted a sewing circle as part of an art exhibition in Trehörnahult, Sweden during the summer of 2001. Those attending were women in the neighbourhood, but also random visitors. Arnell created an open space for textile craft and conversation during the entire period. She

states in her invitation: "The invisible is equally significant and important as the visible. I want to feel that I am needed, I want to feel like I am part of a community, and I want equality."

The sewing circle was used for its power to transform private chores and applied craft into public art. The way in which Arnell was touching upon the important aspect of making public was to invite everybody to add to a communal tapestry by embroidering "I feel that I am needed" and sign with their name.

CRAFTIVISM

Crafts in various forms has had an upsurge in the last 15 years. This renewed interest takes different forms – from learning the different techniques to craft activism (Åhlvik & von Busch, 2010). Ele Carpenter (2010) points out that the increasing interest in handicraft also have brought about commercialisation of knitting, which she exemplifies with a surplus of knitted cakes. She argues that the knitted cakes have confused the political intentions of activist craft, which focuses on doing and making things together rather than buying things, locally produced or not. Often these activists are aiming at the public sphere. Knitted graffiti – with the original Knitta Please crew formed by Magda Sayeg in Austin, Texas in 2005 – is one example of the latter (Levine 2008). Knitted graffiti might serve as an example of the advantages – or the critical potential – of working anonymously but more importantly outside the institutions. On their website (www.knittaplease.com) the crew members present themselves under fictitious names as anonymous yet individual parts of a subversive whole – promoting the power of the movement and the strength of the textile metaphors, not the knitters as individuals. Whereas Arnell urge participants to sign their art pieces individually and then put them together, Knitta Please find it empowering not signing communal work at all. In comparison with sewing circles that raised money for new lampposts, groups like Knitta Please knit-in lampposts, financed by the welfare system. These are two different ways of making a mark or acting in the public.

Editorial Board

A second patch in this quilt of understandings of the stitched-together editorial sewing circle is the editorial board. In the field of journalism editorial boards organise and control news production. They put reality together with the help of a hierarchical and bureaucratic news-organisation, and distribute newsproducts to the public. The tasks of the editorial boards is to get an overview of information, value it according to quality and news-value, then set the production process moving by delegating tasks, so that the information becomes formatted news-products, whether broadcast, printed or digitally published.

POWER AT WORK

Newsrooms and editorial boards are conflict-ridden places of male power-play (eg. DeBruin, Ross, 2007; Melin, 2008). The concept *doxa* can be used to decipher these inherently gendered powered conflicts as doxa, what we believe about the world, ourselves, our attitudes and behaviours – perceived common sense – is what is at stake in these conflicts (Bourdieu, 1998).

The *doxa* of journalism, is what is defined as journalism, what should be news, and how it should be presented, as well as how to do journalism, how to be a journalist, how to interview, dress, act, think as a journalist. In a study of British and Swedish journalism Melin (2008) found strong doxas. In the central

stage was the journalist – a white hetero-sexual, protestant male; a tough guy, slugger and bloodhound, who chases news in order to reveal crooks – all the while being objective and distant. This doxa was lived through decisions made in editorial boards, and reflected in the published news.

STRATEGIES TO STAY IN POWER

A way to understand how dominating players in the field of journalism hold on to the power (to define doxa) and handle conflicts in newsrooms and editorial boards is to use military language. Strategies are used on battlefields by dominating players, who have a power-base, a place from where they use strategies to ward off unwanted others (deCerteau 1984).

Melin found that editors, high-ranking journalists – often male – elite-players on the field of journalism in Britain and Sweden used a number of strategies, such as dichotomising journalism into gendered differences of important hard news and unimportant soft *female* news.

In the UK, Melin found a pub-strategy. The *guys* continued newsroom crude banter, macho jargon and power-play over a pint in the pub. Scottish pubs are by definition masculine places, where few have female lavatories, which makes pubs closed spaces for but the most courageous women. Also, these pubs were the hang-outs of politicians, the very important news-sources journalists seek. Tomorrow's news-stories were thus made in these pubs. Also, as the editors and journalists alike hung out together, tomorrow's editorial boards and morning-meetings were often predetermined in the pub, as was the division of stories and patches.

MEDIA ACTIVISM: PATCHING-UP SURVIVAL-TACTICS

According to Bourdieu the field of journalism is doxic, i.e. there is supposedly only one way of seeing journalism. Not so, argues Melin. She found outspoken and under-cover opposition, alternative ways of thinking and doing journalism, termed *allodoxa* by Bourdieu. There were journalists that questioned newsvalues, and argued that the *important*news are the so called soft (female) news, that objectivity is but a chimera, and that hunting down crooks and chasing after politicians is indeed cowboy-journalism in its worst sense.

GUERILLA TACTICS

In response to the symbolic violence of strategies used by powerful journalists, oppositional groups use *tactics*, which de Certeau likens with guerrilla-warfare. Melin showed that a number of tactics were used by many journalists (mainly women) in order to enter the field, to get a place and a career, indeed to cope in every-day-journalism. Most of these tactics were done with hands above-the-quilt, with raised voices trying to change the very nature of journalism. There were women who tried to be *one-of-the-boys*, who dressed and acted in a manly fashion, cracked sexist jokes and hung out in the pub. They accepted the doxa, with news-values and ways of doing journalism, but opposed the gendered logic of journalism. Many of the best known female journalists in Sweden and Britain have used this tactic, some seen in bullet-proof-vests on television-screens from war-zones all over the world, or known as "hard-nosed" interviewers in high-powered television-programs.

Other journalists (mainly women) tried to change the very nature of journalism, by trying to create spaces where an allodoxic journalism was possible, where the hierarchic newsroom could become an including and creative space, where ethics matter and where subjective and analytical reportages are rewarded, and where other stories could be told. Designated female spaces, like *Women's Page* and *Women's Hour* in Britain and *Idagsidan*, *Freja* and *Radio Ellen* in Sweden are some examples where women created spaces inside news-medium. There are also examples of alternative *medium*, like the Scottish feminist magazine *Harpies and Quines* that was created by some female journalists with negative experience of traditional news-rooms. These, more historic, examples were resource-wise limited. With today's new technology a number of new alternative spaces turn up on the quilt that is the media-landscape. It is now possible for people with allodoxic approach to journalism to create their own blog, or facebook site. *Feministing.com*, *bullybloggers.wordpress.com*, *Feministiskt perspektiv* are but a few examples of such platforms, where journalists and bloggers set up their own agenda and manage to embroider their own versions of reality. And to draw a link to the historic past, Lesely Riddoch, one of the editors of *Harpies and Quines* has created several alternative media, eg. the webpaper *Africa-woman*.

It is important to point out that the tactics found are not static. Indeed they are dynamic on many levels. First, individual journalists changed their tactics over time, according to what best suited their different life-situation. Secondly, groups of oppositional journalists did not simply act in defence. They took specific strategies and turned them around, eg. male journalists have used social networking as a way to keep unwanted others out, thus female journalists created their own network, which has strengthened their positions.

Stitching Together an Editorial Sewing Circle

Let us patch up these different professional and artistic forms for storytelling, collaboration, production and power-relations by looking back at the *editorial sewing circle* that we created at gallery KRETS. Like in most sewing circles we had set the table with cookies, coffee and tea. Together with passers-by, we spent time embroidering, telling and listening to stories. The embroidered messages were temporarily hung on clothes-lines which made it possible to constantly re-write the emerging narrative through moving the messages around.

Both sewing circles and editorial boards relate to the public sphere. But what kind of public was created through stitching them together into an editorial sewing circle? Who were the actors? What were the concerns?

The actors at KRETS ranged from crafts-women, artists, people who wanted to write articles for Aluma, regular visitors to the gallery, our friends and colleagues, as well as passers-by.

Some of the concerns that were brought up during the patchwork seminar were the separation between art and craft, feminist potential of bringing craft into the art world, subversive power of working within areas that are considered of less importance, why and why not separatist groups can be empowering, what is considered newsworthy or of public interest as well as what is dismissed as gossip and hen-talk.

The authors of this text – who are also researchers-artists and perhaps main actors in the editorial sewing circle – have had our own concerns and agendas that ranged from (un)disciplining academia, arts and craft and to create publics.

In our attempt to put research and practices of sewing-circles and editorial boards together, one conclusion is that the survival strategies Waldén refers to have their sibling activity in what DeCerteau have described as guerrilla tactics and we use in the field of journalism. One of our main arguments is that there is a tendency for oppositional groups to appropriate types of strategies used by those in power, and turning them around. On the one hand contexts such as the sewing circle can be used as a power-base to create potentially empowering networks precisely because those spheres are not considered important. And on the other hand things such as handicraft or so called soft news are made more important through bringing them into the public through knitting lampposts as well as creating one's own platforms for publishing. What is termed 'gossip' in sewing circles becomes power-talk, private knitting becomes knitting-graffiti in public spaces, soft, female journalism becomes influential feminist blogs.

When considering what kind of public that emerged through our editorial sewing circle we could make a distinction between being public and making public. In traditional sewing circles and editorial boards the meetings and negotiations that go on in them are not accessible to everybody nor made public. Parts of these negotiations are however more or less explicitly made public through publications, textiles such as quilts or action for change. In our editorial sewing circle one version of the *SMS-embroidery-feuilleton*was made public through publishing it in Aluma. But, the point was not only to make it public, the focus was also on being public – inviting people to become part of the *editorial sewing circle*. In the gallery space we opened up for discussions, negotiations and questions. All of these debates were, however, not made public when publishing in Aluma nor did we make a joint action beyond the editorial sewing circle. In this paper we try to publish and make some of our negotiations accessible.

All formats of narration have their limitations. SMS has its 160 characters. Aluma offered one spread to publish the SMS-embroidery-feuilleton. At KRETS we had three days and two hours for the patchwork seminar, transcribed to about 30 pages. In this paper our action space is 3200 words.

In the welcoming statement at KRETS we noted that there are many voices in the room which are not heard. Some voices are silenced because of the format, comparable to how not everything can be included in an SMS restricted to 160 characters. A risk in writing in the mode of story-quilting is that it looks too smooth, that we work too well with the given format, restrictions and possibilities. How can you as a reader distinguish the four authors' voices? Is the unified yet separate voice escaping accountability? Who is responsible for the choices made in the process of writing this? Is it necessary to know in this context? One suggestion when reading this text is to pay conscious attention to the seams, to see what separate and hold together the patches. And, perhaps, with Waldéns words, the reading of the seams and patches require knowledge of certain women's histories, conditions and cultures.

Throughout this story-quilting-project we have acted in already existing publics, such as a magazine, a gallery and an academic conference. In those established spaces we have also created our own pub-lic*s* by re-negotiating the forms of the existing, such as the sewing circle, the editorial board and the feuilleton. Thereby we have been working both within the power and also created action spaces.

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NEW MEDIA AND EXHIBITION MAKING: SOME FORECASTS

Jasmin Stephens

While 'trophy' new media works have been readily absorbed into traditional institutional formats and have contributed to the attraction of larger and more diverse audiences, curators must continually strive to counter the weight of inherited exhibition protocols if visitors are to engage with emerging technologies in their fullest artistic sense – as subject, methodology and medium.

The attention given by the art world to 'new media' has recently escalated as evidenced by the more and more technically ambitious viewing experiences that are being staged by its institutions for our edification and delight. This 'turn' in exhibition making towards the kinaesthetic has coincided with the rise of neurological accounts of perception which are not only being popularised in all aspects of culture but which artistic organisations are now seeking and expected to apply in their civic roles as leaders of individual and collective creativity, learning and well-being.

Exhibition practices in general also reflect a re-emergence of a sense of wonder and the recuperation of non-logic based knowledge systems in the world's dominant societies. New media works which are prized for their 'immersive' and 'interactive' attributes are being installed in ways that set up a 'magical' space in which there is a disarming effect that offers a respite from 'disbelief'. Cultural and intellectual trajectories that are re-asserting a relationship to nature that emphasises the confluences between nature and technology are informing the practices of many of these artists.

The presentation of new media works is influencing the overall design of exhibitions. There has been a move away from the sparse exhibition layouts that reached their zenith with last century's High Modernism. The trend has been towards more crafted, theatrical spaces. Whether it is architectural practitioners being curated into biennales to stage interventions in the built fabric of the exhibition or the alignment of museum attendance with the 'experience economy' of leisure and shopping, institutions of all complexions are imagining the 'space' of the exhibition far more intently.

Exhibitions are being increasingly understood as sites of interchange in which the processes by which artists conceive of the reception of their work are built upon. Much curating is now predicated on the assumption that the relationships that coalesce around exhibitions are constantly shifting and is being explicated to varying degrees within exhibitions. In some cases, the distinctions between the production, presentation and the reception of work are blurring so that the notion of the exhibition is being simultaneously conceptualised as more fundamental and as more contingent across the art world.

The greater efficacy that is being ascribed to the form of the exhibition has meant that major institutions are committing larger and larger amounts of resources to their realisation, arguably to match mounting visitor expectations. In order to secure 'trophy' works, they are entering into joint commissioning and acquisition relationships with each other, and are re-developing their sites to accommodate them.

These kinds of works are being absorbed into traditional institutional formats while also contributing to the adaptation of these conventions to successfully attract larger and more diverse audiences. At the same time, the most spectacular of the works occupy a position in their institutions that has an equivalence to the status accorded 'old masters'. Often held up as evidence of an institution's contemporaneity, these works can be readily sidelined from an institution's necessary contestatory processes and have a consensualising effect because of the collective relief that accompanies 'everyone loving them'.

Consequently, they are installed so that there is an over-emphasis on their effect. My experience of volunteer and professional staff in galleries being able to explain transfer processes used in printmaking but not in digital works reflects the manner in which organisational factors support this 'splendid isolation'. In instances in which works are installed without the provision of a nuanced context that includes considerations of criticality, they can function in the manner that venerated objects were and still are displayed.

In such situations, curators continue to be highly selective in the way that they work with artists engaging with the materials and vocabularies of emerging technologies. These artists have practices that are performative, participatory, take up user-generated content, posit continuities between physical and virtual spaces, and arise out of a distributed rather than a single sensibility. Curators establish a dialogue with the object-based strands of an artist's practice while avoiding the less traditional aspects. More commonly, they present durational or relational aspects in such a way that audiences mistake them for documentation or interpretation of the artist's practice. Their curatorial approach cannot accommodate artists and audiences who insert themselves into the interpretative dimension of exhibitions. Even with the best intentions, the market will champion and audiences will continue to defer to the object unless curators continually strive to counter the weight of inherited exhibition protocols.

Exhibition formats have not kept up with the aspirations of many artists working in new media and traversing disciplines. These artists range across the formerly discrete sites of the studio, laboratory, workshop and gallery so that these locations become the spatial coordinates of an expanded field of relational energies. These energies are unwieldy and dispersed in character and do not observe opening hours. While compelling they are extremely difficult to curate into exhibitions. Nevertheless, artists of all persuasions continue to want to be in exhibitions no matter how critical they may be of institutions and audiences are drawn to this enduring form.

As institutions expand the range of technologically inflected practices that they present, visitors increasingly encounter technology in its fullest artistic sense - as subject, methodology and medium. It becomes more possible for the arresting sensations associated with new media installations, for example, to be positioned closer to rather than parallel with the complexities of networked digital technologies in our lives. The limitations of terms such as 'affect', 'perception' and 'attention' that have rapidly solidified around the term 'new media' can be tested as practices engaged with the technologies and perspectives of web 2.0 generate a raft of responses that cannot be summed up as either scopic or embodied. The mainstream art world's reliance on binary distinctions that simplistically associate 'contemplation' with the 'cognitive' and 'interaction' with the 'affective' can be more thoroughly questioned.

It exceeds the scope of this text to analyse where and why these cultural and institutional and ultimately aesthetic shifts are underway. My observations have arisen out of a practice that upholds the distinctiveness of the curatorial role and the form of the exhibition - although now extending beyond

gallery walls to encompass off-site and online spaces. Many exhibitions of new media work would be more incisive if there was greater investment in the relationship of curators and artists. As well as the technical skills associated with framing and facilitating a context for artists' work, curatorsbring historical, theoretical and audience considerations to the attention of artists in their ongoing relationships with them.

There is crucial work to be done to ensure that media artists are not cut off from opportunities associated with the market, critical writing and publishing. Curators have the capacity to assert the value of the small scale, the modest and the ephemeral whilst attending to the currency of spectacle and the spectacular in contemporary art. New approaches to exhibition making that allow emerging strands of practice to interpolate the discourse of aesthetics and that contribute to debate about what sorts of criteria traditionally associated with connoisseurship should be applied to new media are needed. Curatorial strategies have fallen too far behind theoretical discussion about the relationship between contextually-generated work and artistic considerations.

The form of the exhibition is, of course, culturally loaded and highly codified. With scrutiny, however, evolving exhibition formats can continue to do what exhibitions do best which is to link the display of artists' work to branches of philosophy such as aesthetics and ethics by stimulating curiosity and enjoyment, engendering contemplation, and fostering a sense of history and society. These convictions should in no way determine what exhibitions look like. It is about what they do. (1)

References and Notes:

(1) This text has been published as a companion to an illustrated presentation given during ISEA2011 that included examples of exhibitions. The research conducted within Australia and travel to Istanbul was supported by the Western Australian Department of Culture and the Arts. Additional research was undertaken as a Visiting Curator and Asialink Arts Management Resident during Singapore Biennale 2011 with support from the Department of Culture and the Arts and the Australia Council for the Arts.

@JUSPAR[1] AND NOW QUOTING GALLOWAY[2]: "CODE IS THE ONLY LANGUAGE THAT IS EXECUTABLE". DOES WHAT IT SAYS. #CODE #CHUN[3] #NETPOL1010[4]

Igor Stromajer

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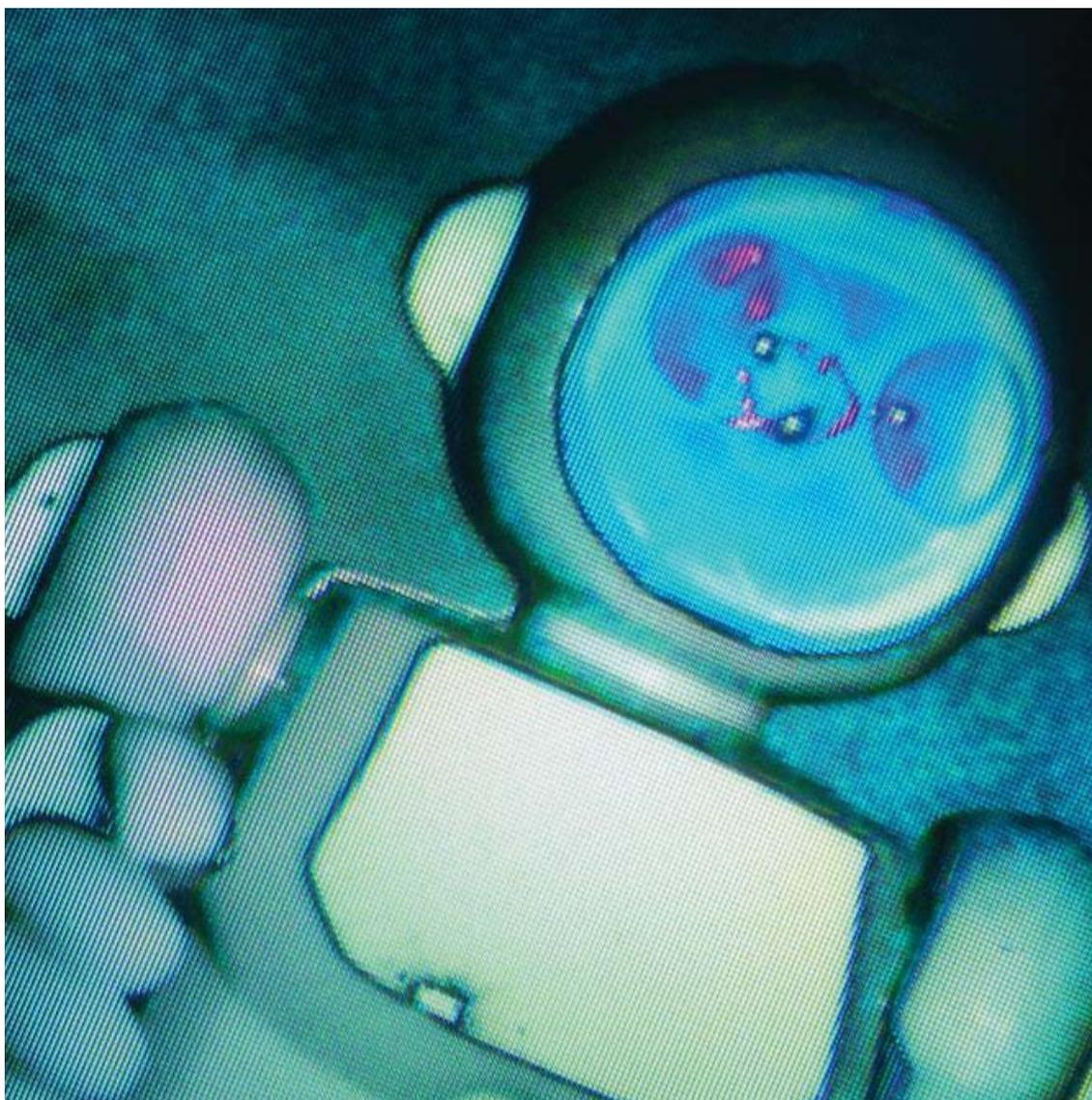
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CYVERS CITY

Susana Sulic

This work is a reflection of a poetical-scientific cosmology. Two new worlds: a macroscopic one and an invisible one develop before our eyes. The objective for this work in progress is to use a generative grammar, in using a similar grid as the one used in biotechnology. The general meaning of my project is that with Cyvers: poetry and techne, we can change the world.

Fig 1.Cyvers 2011, 2011, Susana Sulic, photographic media, copyright S S ALAP.

Fig 2.Cyvers Times, 2011, Susana Sulic, photographic media, copyright S S ALAP.
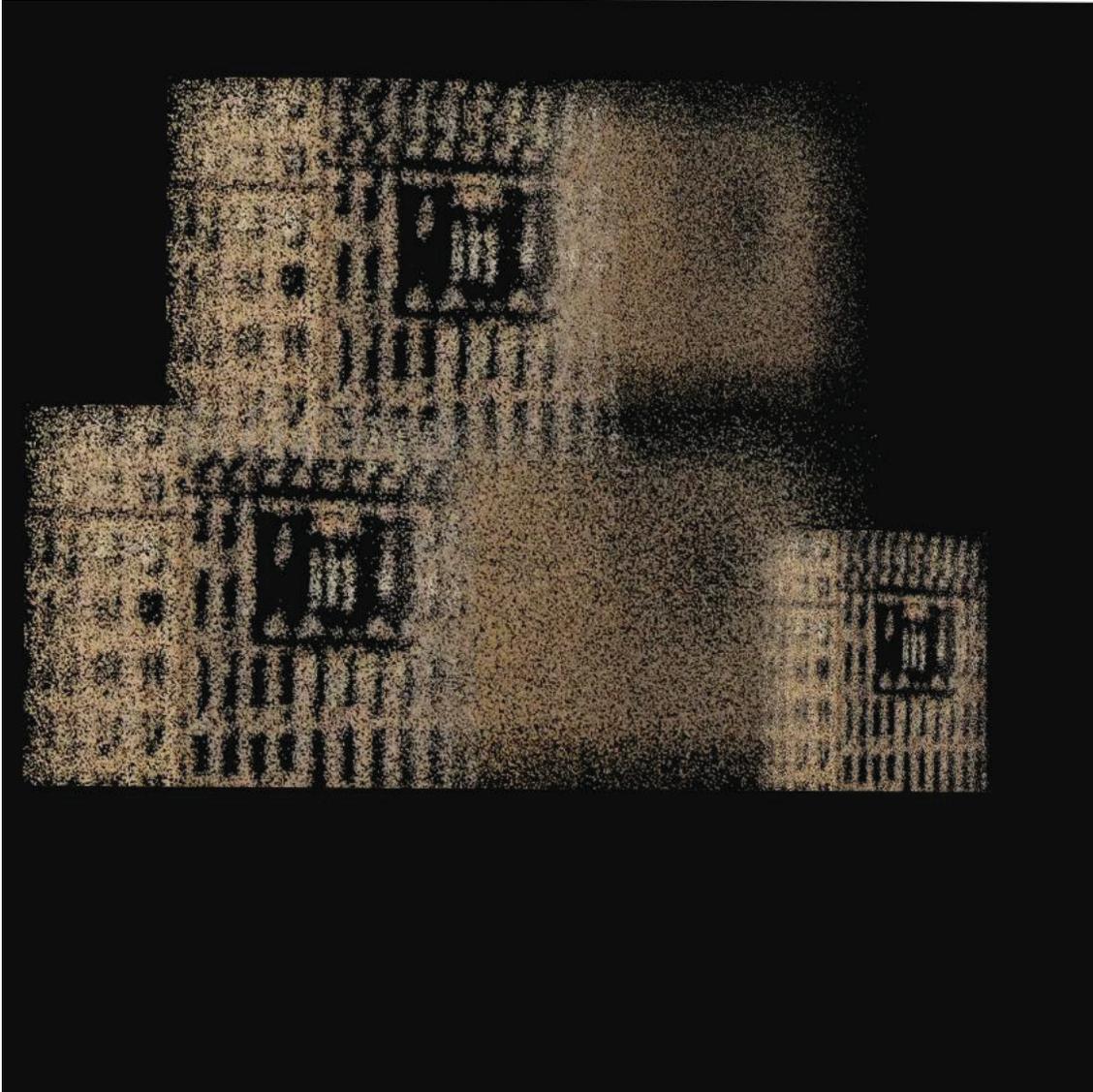
Fig 3.Cyvers carre, 2011, Susana Sulic, photographic media, copyright S S ALAP.

Cyvers city

INTRODUCTION

Cyvers is a synthesis of morphogenetics and physics contents, built after a process of research and multidisciplinary practice.

Cyvers is a concept I created to identify the relationship between poetry and technology in the cyberspace. Cyvers is a configuration of different words from french and english: verset, cyber, vers, verse, poetry and towards.

'Poiesis' and 'tekhne' form a loop in a digital feed-back and both synthesize the actual language of a digital civilization. It is also in this way that the neuronal network can be compared as a cloned weaving of a merging cyber - poetical - culture.

With cyber-space and cyber-electronics, we should reach the immersive environment, the synthesis of this huge totality of meaning and sensor-perception, sensitive knowledge in a high level of poetical substantiation. In this conception of technological art the consciousness is like a permeable skin.

It can be cloned and cultivated in a new extended gene-poetical way which would be the result of the development of technology.

CYVERS PRACTICE

The objective for this work in progress is to use a generative grammar, in using a similar grid as the one used in biotechnology.

This work is a reflection of a poetical-scientific cosmology. Two new worlds: a macroscopic one and an invisible one develop before our eyes. The values of technology and plasticity are questioned by a different sensitivity.

According to Plato, poetry is the principal exercise, a primordial practice: to produce, to build and to construct are synonyms of poetry. For Aristotle tekhné-poïetiké is an autonomous art.

Poetic is a field of creation and composition of works. In literature is a question of language, that it is at the same time the substance and the medium. But as far as we consider the development of the technology, we agree that we are at the beginning of a new approach.

The conjunction of science and human cleverness with intelligent machines and environments are the new windows that with the biggest open eyes let us go further in information and experience. In the global era, cyvers is a synthesis of morphogenetics, physiological, chemical and physics contents. As far as the human being increases his own capacity of transforming the world, new ways of perception and understanding arise.

But it is also creating new perceptions with haptic interfaces searching also for or synesthesia or new introspective meanings

Which can produce a challenge concerning the poetics contents.
DNA, virus and bacteria are considered actually normal subjects of art. The borders between visibility in invisibility are closer.

The bio-technology goes beyond the machine in the global society era and is an implement of war, an artistic tool, a philosophical reflexion, and has an unlimited capacity of mutation. There are artistic subjects that find its mutation between sign, image, text and the significant. The images mutation is also related to the epidemics that motives the scientific environment.

Receiving a digital feed-back we can also explore and activate an understanding of our cyber culture as an extended mind in a poetical way.

Looking for a total art work conceiving bio-cybernetic windows we've just abandoned the linear conception of both thinking and understanding. We've just gone further with the fractal movement, but with the quantum leap we are nearer of the qualitative jump.

The spectator travels from the past to the contemporary time and from the present to the virtual space.

Two radical revolutions allows us to enlarge the vision of our global world and open the door of a new scientific imaginary. Connexions between disciplines such as biotechnologies, physics and art are what need to be represented by making immaterial artworks located in the abstract space of communication.

As a result of these formal works, I become aware of a complex web, the cybernetic polyptic where each one can explore and experiment with the concept of expanded cyvers poetry. For these creations the events don't occur as a succesion, thus it is necessary to introduce a different concept of time. The related texts have no logical grammar, but a fragmented one, acquired through a cyber immersion determined by the perception and the role of the observer as co-author, as I mean.

While the arts and the topology of texts change, according to the observer, the narration opens itself to a natural fragmentation.

With the application of an algorithmic- poetical language, we reach the essential meaning of cyvers 1. That it means not only to write verse or poetry in a configuration of different words but also to behave, to act. From the text on the base, a peculiar dynamic in which the words are transformed into images is generate: letters, pixels, viruses, molecular and nano-structures melt in an hypothetic city.

Movements of evolution and degradation emerge from the text in a non-linear space-time, in an extra-temporal text-space. The spectator travels from the past to the contemporary time and from the present to the virtual space. Images are mixed with the words and therefore produce a poetical and scientific decontextualisation.

The decyphering of the genetic code as well as new applications such as the clonage of cells in order to create living creatures, show us the way to what seems to be essential components to understanding of the biological world.

I apply a formal genetics connecting living matter: as the objective is to create a kind of generative grammar, in using a similar grid as the one used in biotechnology. In my project *Autophagocytation* (1995-97) work in progress, the images are considered like informational ecosystems: they are generated by the activity and the movement of artificial entities. Cyberspace is a space where the self is manipulable: an intellectual artefact.

The human body is reconstructed through technology.

A result of these manipulations and process is the cyborg.

The cyborg can be defined as a kind of hybrid between human and machine where technology replaces and supplements the body, its flesh, its membranes, its tissues.

The so-created body-character endures several metamorphosis through a virtual space grid. In the literary text which is on the base: passing from one space to another transforms the character from actor to narrator. Each cell metamorphosises into a block, each block into pixels, and from these to a building. The text changes its topology like rotating windows. The verticality and the point of view evolves and the narration opens naturally to fragments. The sequences- pages- or better, the screen- sequences produce an open vision.

Following a temporal flux, we wander from one space to another through cybernetic windows. The text has no logical grammar, but a fragmented one, acquired through a cyber hypnotic immersion and poiesis. Poieetikee is the art of composing. Poetry and techne converge and generate cyvers poetry: the whole global-world is translated in algorithm like the projection of an expanded universe.

Those stories reflect a poetical - scientific cosmology. Two new worlds: a macroscopic one and an invisible one take life under our eyes. The values of technology and plasticity are questioned by a different sensitivity: a techno- scientific sensitivity in plastic arts is revealed. Science becomes a poetic: notions of dream and unknown heights in a fantasmagoric way.

In a peculiar dynamic pixels melt in a hypothetic city: the cyvers city and the informational one… A particular idea of space-time is generated by stretching the time.

Movements of evolution and degradation merge from the text in an ambiguous and apparently linear space. At the first sight, the spectator does not recognize the place or view of the city.

The first sequences that become visible concern changes that men produced in the environment. The images mutation is related to recent epidemics and environmental catastrophes that motives the scientific environment. After a while the signs and indications appear in a kind of loop, but in an extra-temporal text-space.

By technological means I create a metaphor of living processes and represent the historical changes produced in the environment.

In the hypertext open link, simultaneus direction of lecture are acceptable. If the notion of time resume specific aspects of the human experience, our perception and consciousness coordinate the relation of the elements. Cyvers events don't occur as a succession, and for this reason I introduce the concept of extra- temporality. This includes aspects of incertitude and also pluridimensionality of time. So, the basic structure of the text is under the influence of a virtual and order. The cyvers-poetry conception adds versatility and polyvalence as a result of the disembodying experience, better saying a sensible disembodying mind.

In this concept, the image - the permeable computer skin and digital flesh are part of the virtual body: a super- sensitive structure of reality.

Poetic hypnosis regardless of which medium we use, expands or amplifies the power of our brain. The creation of a poetical algorithm allows us to reach a new cyber-structure: the cyvers-perception. From the cyvers-perception we can find a new application in criss-crossing it with the concept of hypnosis. The hypnosis is a transitional mental state, in between the state of deep sleep and the state of awakeness.

Cyvers-hypnosis is a deliberate transitory mental condition comparable to a dream state. Cyvers-hypnosis is an amalgamation of virtual poetical immersion, cyvers-suggestion and organic paradigms.

Through an analogy between poetry and bio-technology, we reach the reversibility of living process. We know that cells placed in pelicular conditions reverse the aging. In the project, *Cloning Shapes* (1997-2002), the images are born of a flux created by a particular program.

The words are transformed into images, letters, viruses and pixels generated by a genetic, unpredictable and evolutive algorithm.

These are the artistic subjects which I work on, and I find its mutation between sign, image text and the significant as *Viral Icons* (1997).

That was the time that a title virus appeared using modelling scientific images of virus, DNA and enzymatic process as an art work in a laboratory at the ICGM (Cochin Institute of Molecular Genetics, France). During the residence the *Art and genetics Project* (95-99), was elaborate at the ICGM, in collaboration with the INSERM (National Institute for Health and Medical research, France) and Pasteur Institut in Paris.

The decyphering of the Human Genome should make us conscious of our nano essence: the strictly ancien inner aspects of our body that are visible throught augmented reality and with the methodological models of science. The project that determined the structure of DNA in 1953 and all the methods culminated in the sequencing of the human genome marked the life sciences as a major cultural paradigm; as the theories of Mendel did at the mid-19th century.

The inner body has been expanded with the decyphering of the genetic code and in the same way our understanding of the planetary system has been developed. We are exploring Mars by means of robotic applications and seeking for new planets.

But we are just as far from Pluto as from the whole functioning of our inner perception.

The conquest of space brings a new expectation to the accomplishment of acts and collective actions.

The group pronouncing itself in unison is also part of cyvers: the collective performance in the space within participation of remote observers in other cities or outer space bases. It is even in this way that I understand also the peer to peer network, in the construction of a new poetical and intelligent environment.

The relationship of art and science is not new.

The meeting of art and science is the result of a long social process of evolution. This it started with the human being organizing in groups to find an answer to the survival of the specie and took definitive shape under the Renaissance and the 19th century.

But today the creation of an augmented reality and as by consequence augmented metropolis and augmented consciousness should also cause to humans beings to lose part of the personality. The crisis of our times is also a result of the concentration of capital and technology.

Conclusion

The hypothetical city is raised in front of and in parallel to the real city but all this phenomena is part of a dystopia. Once again humans should create a new environment to seek answers for the survival of the specie. An interplanetary network should also merge and this is a part of a cyvers: which means that a real ideological substance is added to the poetical practise itself to create a desmystified reality. As the augmented reality evolves, contains itself the risk of bias: the goal becomes an impersonal aspect of technology concerning human beings living this particular crisis of the civilisation in a de-constructed system.

It is in this way that the neuronal network can also be compared to a cloned weaving of a merging cyber - poetical - organism in the global era. With cyber-space and cyber-electronics, we should reach the immersive environment, the synthesis of this huge totality of meaning and sensorio-perception, sensitive knowledge in a high level of abstraction and poetical substanciation (Cyvers).

In this conception the consciousness is like a permeable skin. It can be cloned and cultivated in a new extended gene-poetical way which would be the result of the development of technology. By technological means I represent the historical changes produced and creating a metaphor remake in a new cyvers-life the historical process.

Looking for an idea of totality, we can construct with a new value-added expanded cyber- poetry. The general meaning of my project is that with Cyvers: poetry and techne, we can change the world.

It is how we understand the peer to peer in the construction of a new poetical and intelligent environment that will feed up through a permeable network.

References and Notes:

Notes

- *In Latin America, is accepted that science education belongs to modernism as part of the emergence of the nations since the XIX century. The Cyvers concept is a consequence of a work in progress unifing physics and biological concepts, that was part of my early studies, poetry and research.*
- *'I. A.' it is the name of the collective and it was created to introduce a new concept concerning the intervention of technology and the role of artist related to advanced technological proceeded and ingeneering created in the early eighties by the author. Pierre Restany launched part of this production it in 1992 as he Language of energy.*

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NEURO-TECHNOLOGY AND AUGMENTED PERCEPTION

Amanda Tasse

Science fiction films suggest methods for contextualizing concepts and concerns surrounding new perceptual technologies. Through revisiting two films, I will highlight major themes of neurological perceptual representation and procedural translation associated with brain computer interfaces, while suggesting their relevance to contemporary trajectories in augmented perception and mixed reality.

Traditional science fiction films suggest methods for contextualizing concepts and concerns surrounding new perceptual technologies. Through revisiting two well-known science fiction films, *Brainstorm* (1983) and *Strange Days* (1995), I will highlight major themes of neurological perceptual representation and procedural translation associated with brain computer interfaces, while suggesting their relevance to contemporary trajectories in augmented perception and mixed reality.

Brain sensors are integrated into diverse contexts ranging from imaginative portrayal in films, actual use within interactive art works, and as scientific tools for investigation. Throughout each, the apparatus stimulates narratives of penetration, record, distribution, replication, simulation, and reproduction of interior perceptual experience. These narratives are not unique to brain sensors, but rather continue along a technological trajectory, including forms of perceptual instrumentation and methodology as diverse as the X-Ray and psychoanalysis.

Perception as Media

Brainstorm opens its trailer with the provocation: "Suppose it were possible to transfer from one mind to another the experience of another person, any person, any experience." This major fantasy surrounding this transfer of experience implies that the device will mediate an immersive experience that is paradoxically both immediate (1) and scientifically observed. The device's methods reflexively call attention to the neurological perceptual process as a mediating act that can be extended and replicated.

"Immersed in media experience, conscious of mediated experience, we no longer experience any realm of human existence as unmediated, immediate, "natural". We can only imagine such an experience (now aware that imagination, too, is an "imaging," a mode of mediated representation)." (2)

The physiological act of perception is presented as a cinematic media process, accessed computationally through a scientific device, such as a brain computer interface, and distributed cinematically. Sensory information is recorded as electrical data signal, stored, transmitted, and reconfigured from one processing center to the next along a one-to-one pathway. In *Brainstorm*, the biological brain is intercepted and translated by an electro- mechanical headset prosthesis. In *Strange Days*, the brain-computer-interface, called the SQUID (superconducting quantum interference device) references, at least in name, early brain imaging technology associated with clinical MEG (Magnetoencephalography), first developed in the 1960s. (3) Unlike actual SQUIDS, the devices in the film and in David Cronenberg films, such as *Existenz* (1999), are partially composed of biological matter. Nonetheless, processes of perception are still

treated as computational electrical sensory streams, transmitted via digital or analog media distribution channels (tapes or CD's).

Within scientific contexts, imaging of electro-magnetic data from the brain is most frequently used to dissect and understand sensory and perceptual processes. However, computational neuroscientists have also been working to simulate imagery directly from collected sensory data. (4) EEG (Electroencephalography) Neurofeedback is a process whereby electrical neurological data is recorded and re-played for a user, translated into audio-visual signals, or as with LENS (Low Energy Neurofeedback System), fed back to the brain as an electrical signal. While chemical brain alternations are widely accepted psychiatric therapies, active electrical stimulation systems such as DBS (Deep Brain Stimulation), ECT (electroconvulsive therapy), and TMS (transcranial magnetic stimulation), are more controversial. Other experimental researchers have directly stimulated the brain to induce and study perceptual phenomena, such as autoscopy, the sense of an out-of-body experience. (5)

Augmented Transpersonal Experience

In the films, the source of pleasure seems to arise from the expansion of perception achieved through adaptive integration of the implant of another's perception within oneself. Instead of striving for a complete substitution of perception or full cinematic immersion in the entertainment material, the devices promise a greater pleasure of going beyond both self and other into territory which can only be facilitated through integration with the device. The novelty of perceptual difference might increase awareness of one's own interpretive biases and filters, propelling the user into a state of augmented meta-awareness beyond the confines of the individual self.

Both films use the fantasy of experiencing another's perception to engage with the desire to know what happens at the moment of death and beyond. In *Brainstorm*, this ability to see beyond the confines of one's own perception culminates in a scientific and spiritual quest to experience extended frontiers beyond mortality and physiology itself. This desire to engage in the most forbidden of experiences, seeing death before actually dying, is presented as an alluring scientific, philosophical, and entertaining goal. In *Brainstorm*, the main protagonist scientist, Michael, excitingly exclaims: "I'm scared, but the thing is, I like it. I want more. It's a chance to look scientifically at the scariest thing a person ever has to face."

Representational Modes

Brainstorm maximized the special effects of its day, including extended 70mm show-scan projection technology and enhanced graphics, to represent the transcendent experience of dying first as a poetic reflection on the brain as computer database memory mainframe, before travelling through psychedelic abstraction, and then finally dissolving into hyper-space. Douglas Trumbull directed *Brainstorm* after producing other effects sequences representing the sublime through of technology and space, including *Close Encounters of the Third Kind, 2001: A Space Odyssey, Star Trek: The Motion Picture,* and *Blade Runner*.

Strange Days presents the perception of dying as a pleasurable desire in more pathological terms. Snuff tapes, in which an individual's perception is recorded as they die, are a prized form of entertainment. During the film's homicides, victims' deaths are shown on screen, while the perceptions of the perpetra-

tor are continually recorded and simulated for the victim - homage to the voyeuristic pleasure of augmented terror presented in Michael Powell's film, *Peeping Tom* (1960). Here, desire concentrates on an intensification of physiological expression associated with fear of death and the otherwise unrepeatable embodied terror of dying, rather than transcendence or dissolution of individual material experience.

In *Strange Days*, the clips end at death, asserting that perception is either an on/off binary, or ceases to be able to present information related to its own destruction. The clips are displayed in factual photorealistic form without attempt to treat perception subjectively or abstractly, even in moments intended to represent intense feeling and death. Instead, perception is displayed as classical first person point-of-view cinema. While the dominant movement within contemporary visual effects continues towards graphical photorealism, alternate trajectories do exist, emphasizing abstracted subjectivity, exaggerated hyper-realism, and other forms of stylization serving affective perceptual effect. (6) In terms of brain computer interfaces, movements of presentation might span the gamut from desires to replicate or simulate objective reality, to alternate attempts to diminish or amplify more affective, subjective, or thematic aspects of perception for narrative aim.

In conclusion, examining notable science fiction narratives is a valuable method for extrapolating conceptual trajectories of less traceable interactive media art forms. In particular, *Brainstorm* and *Strange Days* demonstrate how perceptual processes and mediation devices have been represented, contextualized, and integrated with popular media forms, while suggesting thematic issues relevant to working with augmented perceptual devices. If perception is framed, translated, taught, modified, and augmented in part through existing neural technologies, what new speculative design contexts might be employed to encourage the development of devices that augment perception in ways beneficial to society?

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SUPERDUTCH: NEW MEDIA, PHOTOGRAPHY AND THE INTERNET-POLDER

Jordan Tate

Functionally, there are a multitude of internets, or rather, internet-polders that isolate aesthetics, memes, and trends; it is these spaces, these poldernets, that allow medium-specific critique to function by temporally defining any given medium or subset of that medium. The schema I propose, or rather adapt, examines meta-photographic / meta-digital new media works through a deconstruction of the polder model.

Consider the following: all web space is reclaimed, artificially kept online through a series of routers, domain name servers, internet hubs, and server farms, all directing information and traffic to domains much like the dikes and damns route water away from a polder. [1] I submit that the creation and presentation of work on the internet-polder is a cooperative and collaborative act that surrenders all work to this shared space in order to establish a localized, specific, context. Functionally, there are a multitude of internets, or rather, internet-polders that isolate aesthetics, memes, and trends; it is these spaces, these poldernets, that allow medium-specific critique to function by temporally defining any given medium or subset of that medium.

Defining photography as a whole is an insurmountable task given the breadth, scope, and application of the medium, but through the aesthetic and conceptual isolation of similar works, we are able to provisionally define a given media, or function of the medium, through the establishment and isolation of the polder as a microcosm of the broader field.

I aim to define a structure that facilitates the consideration of medium specific inquiry in contemporary photography / new media. In this, I seek to position the internet as a crucial incubator for the foundations of the new modernist inquiry that is reflective of much contemporary art. The schema I propose, or rather adapt, examines meta-photographic / meta-digital new media works through a deconstruction of the polder model. [2] This is simultaneously a reference to their geographic-aesthetic origins and the ideas of meta-photographic / meta-digital works and process-based inquiry. This paper is couched in the framework of understanding the internet and screen based media as a method of production and comprehension as well as a means of image reproduction, dissemination, and a venue for defining a medium.

By placing this discourse in the context of the polder model, we can explore and illuminate the context of the concerns of my contemporaries while positioning the internet as a necessary collective space for these memetic, temporal, and dynamic inquiries into the form, structure, and purpose of media.

While both new media and photography can be a bit slippery to define, I propose that we use a (temporary) working definition that will help navigate some of the arguments set forth in the following paragraphs. I choose to define them in this fashion because these understandings are not, nor should they be, static. Since allowing for updates to these definitions is crucial, I will source the most current, open-source version widely available – Wikipedia. Regardless of the structural problems, issues of accuracy,

and lack of authority, the form and format of Wikipedia mirrors many of the crucial principles of the polder model.

new media (art) is a genre that encompasses artworks created with new media technologies, including digital art, computer graphics, computer animation, virtual art, Internet art, interactive art, computer robotics, and art as biotechnology. The term differentiates itself by its resulting cultural objects and social events, which can be seen in opposition to those deriving from old visual arts (i.e. traditional painting, sculpture, etc.). [3]

While new media inherently evolves and changes (as its appellation suggests), photography has a tendency to be bogged down by tradition and hold fast against any fundamental redefinition of the medium. That said, photography is historically a medium of fluidity and adaptation with regards to processes and technological development, while remaining steadfast in its dedication to the ideals of the photograph as a mechanical reproduction of reality In this paradigm, the function of photography is often as translation rather than an inquisition.

photography is the art, science, and practice of creating pictures by recording radiation on a radiation-sensitive medium, such as a photographic film, or electronic image sensors. [4]

In order to render this a functional argument, we must ignore the ever-present concern that photography is in crisis. That said, it is still important to address the medium as we have defined it so we are able to consider photography as a unified concept that we are then able to examine and critique. For this, we will adopt a modified version of the polder model.

Traditionally, polders are tracts of land that lie below sea level and are reclaimed by various hydrosculptive means for agricultural and settlement uses. Apart from the shared structure of the reclamation of land/information, one inherent necessity in the creation/maintenance of a polder is shared responsibility and consensus. In this argument, that collective mentality is a conceptual precursor to the necessary functionality of internet tropes to shape and define a framework that encourages self-reflexive inquiry.

At last we arrive at the idea of superdutch. This term, as I choose to use it, is both an homage to Bart Lootsma's *Superdutch: New Architecture in the Netherlands* (2000), [5] and an acknowledgement of the beginnings of a new modernist inquiry in contemporary art that I argue functions within the internet-polder model. The acknowledgement of Lootsma's text in this nomenclature is a derivation of his observation of modernist trends in contemporary Dutch architecture. There is an international groundswell of contemporary artists practicing in the densely populated no-man's-land between photography and new media who approach process (or work) as *the work*. These pieces revel in their simplicity and richness of memetic [6] reference by mirroring frenetic thought patterns evocative of an active message board. In order for these works to function, there must be a shared space, context, or point of reference. In this context, our shared space and the point of reference that bridges the gap between these two technology-based media is the internet. It is our hive mind, our collective understanding, our polder. It allows us to reclaim data from the ether and isolate, rather than elevate, information/images and distill stimuli into some sort of discourse that is at once separate, yet always on the precipice of falling back into the sea should we no longer agree on its purpose. It is in this action that we can establish a working definition, one that serves to illuminate our purpose rather than attempting to define the nature of the entire medium. We are reclaiming land from the sea, not attempting to define terra firma.

The function of art qua process when applied to superdutch works is to question the "aura" of the work while challenging the structure of media and allowing process to usurp product. By presenting examinations of process as the final product, these artists are engaging in a modernist critique of technological processes as medium rather than approaching the implications of the processes of medium.

Here is where we come to the ideas of McLuhan. [7] If one accepts the premise of the internet as a venue for the development, definition, and production of media, as well as the argument that an appropriate metaphor for this phenomenon is the polder model, then you must also concede that these poldernets are temporary. It is in this temporality that we find the new purpose of the vast majority of works that fall within the scope of this argument. These works function as an inquiry rather than a statement; they examine and take inventory of the contemporary landscape and impose themselves upon it.

In allowing works to be isolated from the sea of imagery, we are not only able to foster a dialogue on the message and function of media, but we are also on a smaller level able to reclaim a shore on which to stand to consider this process. It is important, however, to consider how new ground comes to exist and why the polder model is crucial to the understanding of myriad contemporary works. The aim of these works is not to elevate any given stance, aesthetic, or augmentation of the medium, but rather, to come to understand what ground we stand on.

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COLOUR DATA PROCESSING

Jordan Tate, Adam Tindale & Ryna Boatright

This paper discusses Colour Data Processing, a live-computing installation that explores contemporary relationships to data and colour representation through the analysis of the video signal of a customized colour rendition chart compared to its original referrant.

Colour Data Processing is a live-computing installation that explores contemporary relationships to data and colour representation through the analysis of the video signal of a customized colour rendition chart compared against the numerical values of each colour represented. The installation has three primary components: a 2m x 3m colour rendition chart, a webcam, and an exposed-circuit linux computer running a colour accuracy algorithm. The lynchpin of this project, both visually and conceptually is the colour rendition chart that situates Colour Data Processing within the realm of colour science and digital reproduction.

Our colour rendition chart is both an homage to, and a deviation from the form and intent of the original Gretag MacBeth ColorChecker1. The installation 2m x 3m colour rendition chart incorporates the 24 colour set intended to function as a broad/universal basis of representation while adding 40 carefully selected colours representative of the predicted palette of the skin-tones and wardrobes of our attendees.

Our proof-of-concept installation uses a webcam, custom-built computer, and a projector as a capture-processing-output device to implement the exploration and exposing of the colour representation. Processing2 was used to create custom software that determines the accuracy of colour by comparing RGB data to a pre-determined palette using Cartesian distance in three dimensional space. Two different representations are simultaneously processed and displayed by the system. The first feed shows a live representation of the viewers with their colours shifted to a colour palette consisting of 64 different colours. The second video feed displays a black and white representation of the amount of shifting (or error) that occurred when the colours were converted.

Colour Data Processing questions the veracity of photographic and digital reproduction, but not with the intent of challenging the context or state of photography, but rather establishing photography as a flawed method of reproduction.

Our system recontextualizes the functionality of the Gretag MacBeth ColorChecker, addressing the instance of digital reproduction and valuing data over the accuracy of reproducing the physical referent. However, our referent is collected data from a sensor rather than the colour rendition chart, removing our process from traditional calibrations by a full reproductive generation. We embrace the same deviations and error commonly found in digital reproduction to critique and analyze our current methods of digital photographic reproductions throughout the chain of custody of the digital image.

For example: if we reproduce the colour represented by the RGB values R113 G236 B27, the representation of those colours would be perceptibly different regardless of the consistency of data. The malleability of our perception is where we choose to investigate the shift from scientifically represented data to perceived data through translations from digital devices.

Our interests in the reification of this discrepancy arises from the invisibility of these processes. In a sense, these differences are never examined, as multiple versions of the same original are rarely compared to one another. Therefore, each viewer has their ownversion of the original that is an exact binary reproduction of every other original in existence, but visually and contextually each original is inherently different and unique to each individual viewer.

When a work of art exists first on screen, rather than in print (when reproduction precedes production), there is a lack of a perceptual referrant, a scientific control, if you will. Each instantiation, while an exact data replica, is merely one state of an infinite number of variations of the "original". Given that the technical reproduction of information is flawless, each presentation and viewing of the piece is still fundamentally unique, but not in a way that can be accounted for or controlled by the author of the image. Colour Data Processing examines this system through the perceptual replication of colour using a modified spectrophotographic method to calculate the numerical shift of perceptual color reproduction.

The first installation of our work was in October at TPTP Art Space in Paris, France. The space, approximately 6x6 meters, consisted of the four essential components: custom colour chart, webcam, custom computer, and projection. The space was designed so that viewers circulated directly in front of the large fields of colour while simultaneously confronting themselves in the two large digital reproductions on the opposing wall. The exposed-circuit computer and webcam (mounted to a tripod) were centrally positioned between the viewers and the projection and therefore was perceived as the nucleus of our work as well as seen an art object that encouraged introspection on the computer processes at work. The sole light source for the large colour target is the direct reflection from the projection of the new representations, providing an evenly lit space which allowed for consistent gathering of image data. Our installation is a closed loop reproductive system, where the viewers are cogs within the process itself.

The software evaluates every pixel in the image generated by comparing the pixel values for their proximity to the nearest colour in the pre-determined palette. The proximity is computed by calculating the Cartesian distance between the current pixel and every colour in the pre-determined palette. The colour in the palette with the smallest Cartesian distance from the current pixel is replaced in the modified image. Once this process is complete the colours in the modified image contain only colours in the pre-determined palette. Cartesian distance is computed as follows with r,g, and b corresponding to the red, green, and blue values of each pixel where each pixel is indicated by a subscript c indicating the current pixel and subscript p indicating the the pixel in the palette for comparison.

$d[n] = (r_c - r_p[n])2 + (g_c - g_p[n])2 + (b_c - b_p[n])2$

A second image is generated by using the smallest Cartesian distance and then mapping that value to a black and white colour palette. The result is that a colour close to the palette will have a darker colour and a colour that is distant from the colour palette will be brighter. This allows the viewer to have a representation of the accuracy of the colour matching algorithm. The threshold for the representation of the error was set to produce the best visual results. It was found through exhibiting the work in Paris, that even if all lighting variables were controlled (Color temperature, light evenness, etc.) and the control colours were adjusted within the software to reflect the actual colours perceived by the camera

within the space itself, our system still displays some amount of error. This underscores that variability and imperfection is inherent in any digital reproduction system.

Beyond the accuracy of reproduction, what are the implications of this phenomenon? Most importantly, when a work of art is first presented on the internet, every viewer has an equally authentic experience with the work. If, as Benjamin suggests, "The presence of the original is the prerequisite to the concept of authenticity" each viewer is experiencing a fundamentally different original while sharing in the collective experience of visualizing the exact same data. In this context, each experience is visually different in colour, quality, physical size, and context as well as the more subjective differences of perception.

We share an interest in questioning the representational nature of photography from technological, conceptual, and theoretical perspectives and what affect the instance of reproduction has on the perception of reality, or on the original. Colour Data Processing addresses the theoretical and practical implications of digital reproduction, colour sorting, and the function of algorithms (both practically and aesthetically) in image processing, reproduction, and manipulation.

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URBAN ECOLOGIES: DESIGNING FOR DYSTOPIA

Joni Taylor

This paper will address how the Australian landscape continually forces its way back into the built environment. It will attempt to examine how a new urban ecology can be nurtured by curating, one that does not define separate spaces for nature or architecture. In the blurry haze of utopia and dystopia, should the crisis not be averted, but adapted for a new futurology?

Dust Storm, Sydney, 2009. Photo credit: Joni Taylor.

1.

On a morning in 2009, Sydney awoke to a city enveloped in an eerie red light, the dust and sand of the desert had blown its way eastwards and was stopped only by its collision with the Pacific Ocean. The sensation of the familiar cityscape stained red in an impenetrable haze was unnerving. The Queensland floods early this year saw the Central Business District of Brisbane evacuated and the power cut, a Ballardian image of an abandoned metropolis slowly flooding filled our television screens.

The Australian landscape is continually forcing its way into our urban areas, and includes annual bush fires and flash river flooding.

But are these true crises or has nature merely manifested itself somewhere a bit too close to our hearths? Are these "natural disasters' only disasters because the cities we live in are at risk? Do buildings or perhaps particular architectures lend themselves to these crises?

My research begins by taking a wild and speculative look at possible future urban design, a design that incorporates the wild back into the built environment to form one dynamic Urban Ecology. This includes not just the climatic extremities at odds with our architecture, but the wild life already present in our cities. The nature that is not tamed and cultivated, but dirty and abject, that comes up through the cracks and spreads between the paving stones. It is disorderly, unfinished and dynamic. In this new Urban Ecology, the city and the unruly forces of nature would not be in conflict but work together.

Urban design has traditionally pushed nature away, the garden cities of suburbia and post war modernist ideals domesticating the extreme environment. More recently, it is an artificial nature manipulated by new technologies for our own benefits. These new ideal visions that promise clean, green, carbon neutral cities are simply another Utopian non-place, that have no connection to site or scale. This exclusion is reminiscent of former failed and unbuilt utopias ala La Corbusier's *Plan Voisin* for Paris – where nature is ordered and programmed as are all his Towers in the Park.

And unlike the natural landscape, which is adaptable and regenerates after extreme weather and rising waters, much current urban design and infrastructure is unadaptable and inflexible and without the capacity to be disrupted, disturbed or transformed.

The urge to build new utopias should be resisted. Instead Urbanism needs to allow the wild and the untamed back into its plan.

It is here that it is useful to look to the dark twin of utopia - Dystopia. If Dystopia is the chaotic, the unplanned and the uncontrolled, it is therefore vital to incorporate these attributes into the urban plan, or as utopian architect Cedric Price would call the "non-plan." [1] Instead of the top down planned utopia, cities must be designed with dystopia in mind - the chaos, the flood, the crisis. Instead of ideal and grand Master plans, future urban design needs to embrace time, contingency, dirt and above all the greater nature that not just surrounds it, but shares our spaces.

In order for a city to be truly sustainable, architecture needs to be open and adaptable to the chaos and surprises that the natural and unruly elements continue to throw at it.

In the blurry haze of utopia and dystopia, should the crisis not be averted, but adapted?

"When rust sets in on a razor blade, when moss grows in a corner of a room…..we should be glad because…life is moving into the house." Hundertwasser [2]

The writer Davis Gissen describes a whole new ecosystem of *subnature*, [3] where architecture instead of resisting the forces of weather and climate, actually embraces it into the design process. His definition also goes so far as to include pollution, exhaust fumes and smoke, as well as mud, insects and weeds.

2.

By incorporating nature into the urban fabric itself, cities are open to transformation and adaptation.

My work looks at how this can be achieved.

As a curator, I aim to present speculation and dreams, and experiment with urban spaces as places for growth and change. These experiments in the urban landscape, whether by artistic interventions or temporary design, can highlight and suggest new ways of designing spaces. Unlike rigorous urban planning these activities are safe-to-fail, and examine the city as a space that can take shape and grow.

One such example in response to this was the curated, public project entitled *Urban Wildlife Safari*, where participants traversed the city, exploring local spaces within the Sydney Central Business district and the flora and fauna that inhabit it. "It offers a unique glimpse into how the urban landscape acts as a backdrop for human/nature interaction and how this is changing. The project aims to resituate the city as one element of a living organism giving refuge and sanctuary to many forms of wildlife." [4] Ultimately it involved examining the city and its wildlife as one eco-system. Experts from different fields were invited to examine these often overlooked spaces and opportunities that the city offered. The artist Diego Bonetto studied the non-native or invasive species (weeds) that thrive in the abandoned parking lots and the *terrain vague* of harbourfront wharehouses. Here the residual areas or *drosscapes* act as fertile ground for new ecologies to develop uninterrupted. An ornithologist pointed out how birdlife uses architecture and the local terrain as a hunting ground. And the waste at the popular tourist spot of Circular Quay too provides ample food for ibis and seagulls in opposition to their native diet.

Another recent curatorial project *DIY Urbanism* [5] went deeper to specifically examine Sydney and its urban condition, and uncovered ideas for self initiated urban programming. The projects relied heavily on Sydney's unique environment and suggested bottom up approaches to the city's future design. Projects included fantastical recreations of a new harbour island to deal with polluted rainwater runoff (*waterways* by Josephine Starrs and Leon Cmielewski) and the adaptive reuse of McMansions to create sustainable housing (*Reincarnated McMansion* by Mathieu Gallois). Sydney's large inner city flying fox population is another contentious addition to our local ecosystem, on the one hand helping to pollinate the city's flora and on the other feasting on suburban gardens and destroying heritage trees. The project *Botanic Gardens Xtension* by Remnant Emergency Artlab speculated on relocating the bats from their current habitat in the Royal Botanic Gardens to a new controversial development site at Barangaroo, creating a native wetland there for them to roost.

In conclusion, future city design need not just develop new technologies that alienate nature further. The push towards carbon neutral skyscrapers and eco-friendly new towns often fails to cultivate the urban ecologies that are already present. The new urban ecology must incorporate the wild ecosystem into its own workings, where architecture and nature work as one dynamic system that embraces the ebbs and flows and impermanent spaces that Dystopia brings. By curating - one can act as an iterant urban planner - using the city as a testing ground for new prototypes.

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INTELLIGENT CONTENT AND SEMANTICS ALGORITHMS: THE NEXT DIGITAL ARTISTS?

Luis Teixeira

Information Technology continues to foster the confluence of multimedia, web technologies, and knowledge representation and reasoning. The goal is to promote original approaches and techniques for empowering creative usages and enabling interactive experiences based on an understanding of the content itself. This paper presents an overview of the of the projects on-going.

1. Introduction

New media has emerged as a distinct category in Art in the late twentieth and early twenty-first century. New media art practice is being refer as a new avant-garde, an art practice of the future, ahead of its time and, as yet, not fully capable of being recognized or accepted. Thus its role would be of pushing the boundaries of the medium of art itself.

In 2003, Christiane Paul proposed two classes of digital art, one that uses digital technologies as a tool for creating traditional art objects, and a second class that uses digital technology as the medium itself (works are stored and displayed exclusively in the a digital environment).

Cooperation between artists and scientists have been promoted as a way to grant access by artists to computational systems that are found in industrial research laboratories and university centers, where scientists carried out their work.

This cooperation has been intense due to the know-how that scientists hold in these areas. Nevertheless there is a lack of knowledge about the most recent advances that are radically transforming the artistic field, while IT experts often have little or no background in the humanities or the arts fields.

2. Intelligent storage and retrieval

The availability of digital media content such as video, audio, images and metadata (data that describes the content) increases the possibilities to create and share media. To efficiently support these new application techniques such as intelligent storage and retrieval have been further developed. To design these systems several issues are usually considered such as storing and preserving the content and metadata, search for the proper content, distributing content to local devices, guaranteeing property rights and content, and global system management.

The volume of digital media that has been produced and stored, and the exponential rate that keeps being produced and stored, has by now become uncontrollable without the support of computational systems. Low-level approaches, to describe digital content, based on signal analysis, have demonstrated to be particularly restrictive in allowing media database systems to be accessible and useful to computer

user. Also low-level descriptors based on content are distant from what users use as a means to recognize media description. Therefore, research has begun to center on semantics and fill the gap that subsists between the conceptual and the end-user regarding the content based on high-level descriptions.

One solution to overcome this gap is knowledge-based techniques based on Web ontologies. As formal and web-wide shared conceptualizations, ontologies facilitate the automated integration and meaningful retrieval of multimedia –both content and metadata– from different sources.

One limitation is that metadata is still limited and expensive to produce. MPEG-7 standard (Multimedia Content Description Interface), constitutes the greatest effort for multimedia description. MPEG-7 goal is to create a standard for the description of the multimedia content that supports some degree of interpretation of the information's meaning. Although MPEG-7 constitutes a valuable starting point for more specific developments, it lacks of explicit semantics that make MPEG-7 very difficult to extend in an independent way.

3.   Framework for Artistic Production

Ontologies are vital in order to enable the sharing of knowledge and reuse in various fields. Good domain ontology must retain all the crucial elements that conceptualize a domain, and the domain expert should be easily able to cross-examine the ontology.

An example of this tool in art is the ANSWER (Artistic-Notation-based Software Engineering for Film, Animation and Computer Games) ontology that model the semantics necessary "to interpret the process of film production consistently for all users (directors, producers, DOP's (Director of Photography), grips, post-production, lighting, etc)".

The ANSWER project has a dual goal: producing an artistic language for the recording of film-directing design and developing a semantic model of the film directing domain. The notation should allow the artist to record their ideas and also to formalize their own creative thought-process (designing the artistic notation will allow to serve as a guide in order to design an effective semantic model). A major part of the knowledge is the "tactic knowledge", that is, the artist inner skills that he uses when analyzing the ideas he has expressed in notation.

Although this is production knowledge, not film content knowledge, it still gives access to the technical awareness of how the process of filming takes place. Thus one may translate the notation, the description of content-design into the "tacit knowledge" level of understanding. Additionally, it is also necessary to formalize the semantics of the artistic notation itself with the risk incorrect expression due to ambiguities. This quest of orient research to automatically compute traditional artistic notations, such as music or dance, also has resulted in very difficult problems as notation allows subjective interpretation of its meaning. In the end, the entire model is based on this knowledge to explicitly model the artist's "tacit knowledge".

iMP (intelligent Metadata-driven Processing and distribution of audiovisual) aims to enable a 'Virtual Film Factory' in which creative professionals can work together to create and customise programmes from large digital repositories, using semantic technologies to organise data and drive its processing. The creative aim of the virtual film factory is to assist and encourage the interactive creation of itera-

tions and versions which enable a superior creative outcome. For the purpose of this research iMP project created Movie Post-processing Ontology (MPO), which is a set of modular ontologies providing a list of hundreds of relationships and concepts related to movie post-processing.

European project, FOCUS K3D, aims to exchange and disseminate novel ideas and techniques in the emerging research field of semantic 3D media. One of the application fields is Gaming and Simulation where frequently not only single objects have to be modeled, but as well whole virtual worlds including mutual relations between objects and this virtual world as well as among 3D characters. Nevertheless, knowledge technologies impact is rather limited. Only recently semantic issues like ontology development have been incorporated (for example, the AIM@SHAPE Ontology and Metadata Repository, MagnetarXSG or CORG- Collaboration Ontology Roles Game). Projects such as I3DPOST (intelligent 3D content extraction and manipulation for film and games) have started to research ways to integrate 3D information extracted from the visual scene into all stages of the postproduction pipeline, supported by semantic metadata, by the development of methods for recovering intelligent, structured content from on-set filming, and incorporating them in capture environments and software tools to enable the simple manipulation and reuse within post-production and the retargeting of content to interactive platforms. The impact of these efforts can be rather important if these efforts converge to a unify game ontology development effort occurs, and common procedures for managing 3D content for efficient re-use.

4.   **Remarks**

Recent technology advances and future scenarios that promises new tools and frameworks so that the role of an artist using digital technology as a tool for creating traditional art objects or as the medium itself will change. If the digital artist role maybe more passive in the first case (supporting the development of new tools that incorporates its process) there is an open new field in the case of the second scenario for the artist to explore, specifically the semantic gap issue (the difference between two descriptions of an object by different linguistic representations, for instance languages or symbols). Semantic gap expresses the difference between ambiguous formulation of contextual knowledge in a language and their sound, reproducible, and the computational representation in a formal language.

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RECONSIDERING MEDIA ART DYNAMICS

Nell Tenhaaf

Push/Pull is an interactive artwork for exhibition, but also an object of study. The paper considers the social dynamics specific to the reception of such a research-based artwork, including its gaming dynamics. The collaborators on the project are interested in the role of user experience interviews in the development of such works, and in general how making artwork in a research context might best be reflected in its presentation.
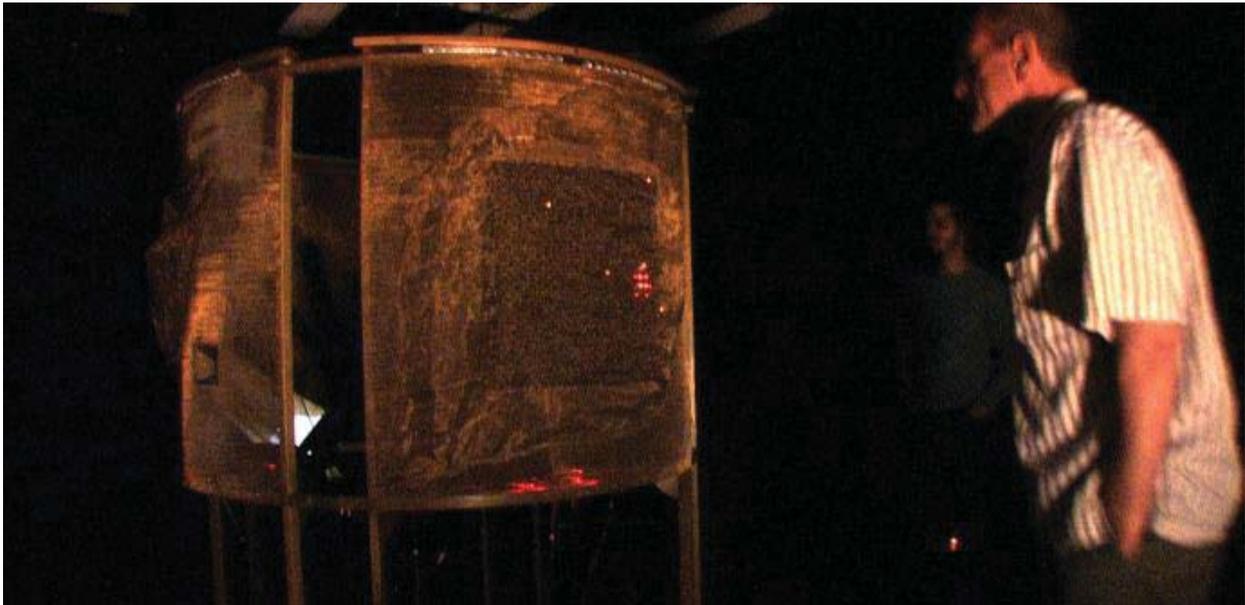
Fig 1. Push/Pull, 2009, Nell Tenhaaf – with Java programming by Melanie Baljko, 4-channel sound by John Kamevaar, custom LED boards and electronics by Nick Stedman; wood, wire mesh, LCD screens; sculpture 5 ft. diameter, 18 x 18 ft. overall dimension. Photo: still from video by Zev Farber.
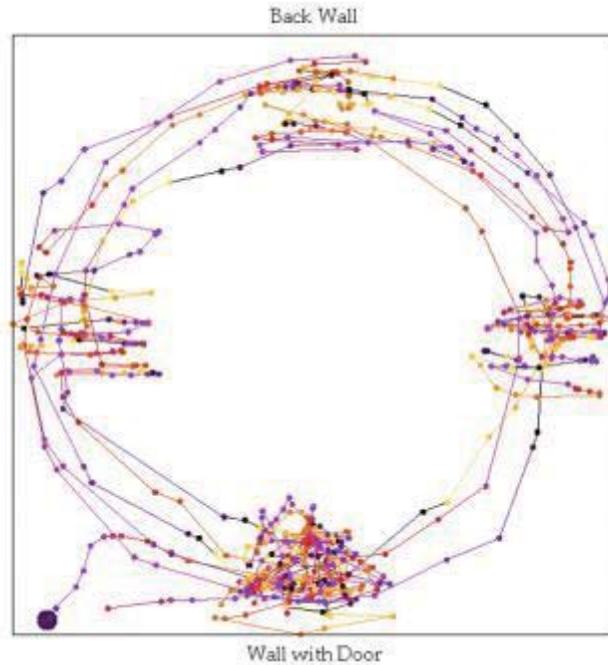
Fig 2. Tracing of interaction with Push/Pull. See Note 6 for information. This "baseline" tracing shows Tenhaaf interacting with the work. Direction and rate of movement are recorded, resulting in a portrait of time spent at a particular place.
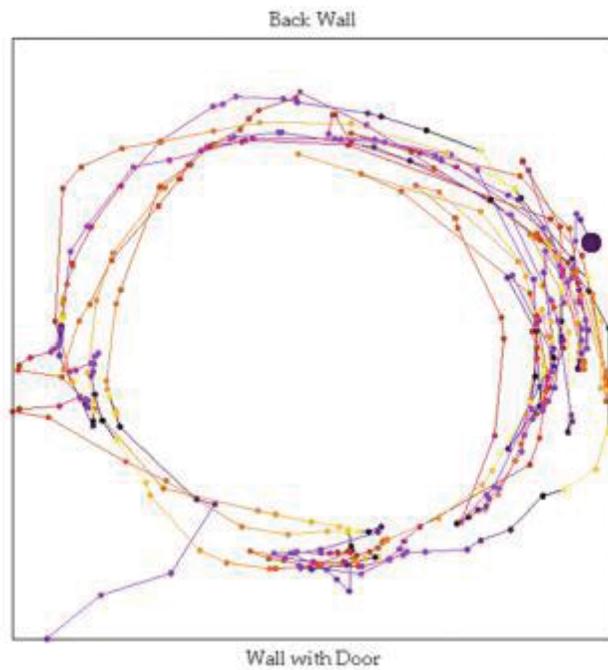
Fig 3. Tracing of interaction with Push/Pull. See Note 6 for information. This tracing shows a visitor interacting with the work. "Wall with door" is the location of the most game-like interaction.

Push/Pull is an interactive artwork conceived and executed between 2005 and 2009, with Melanie Baljko, John Kamevaar and a team of people in the context of a collaborative research project under the rubric "Lo-fi". Kim Sawchuk has also collaborated in the project in designing user experience protocols and carrying out interviews with us on a number of occasions. [1] *Push/Pull* is an artwork for exhibition, but also an object of study through which we examine some of the social dynamics specific to the reception of research-based artworks. In particular, we are interested in the role of user experience interviews in the development of such works, and also how the multi-step progression of making artwork in a research context might best be reflected in its mode of presentation. *Push/Pull* was built through a process that included several user-tested prototypes, and what we learned at each stage was incorporated into the work. The prototypes were interactive scenarios staged predominantly at the Ontario Science Centre in Toronto. They were very task-oriented in comparison to the final artwork, but the movement dynamic of the interaction carried over to *Push/Pull*: physically moving around the circular sculpture, as well as back and forth in front of its four panels, is required to activate the visual and aural expressions of the work. At the panel that is most like a game, the interactant has to virtually dance around to stay connected with her or his moving cluster of LEDs.

The strengths of the Lo-fi collaborators have shaped *Push/Pull*. Because of the modeling and computational processes that subtend biotechnology research, the topic of my art practice in the 1980s, by the mid-1990s the focus of the work shifted toward artificial life. The resulting body of work concentrates on artificial agency, and is largely interactive, both features of *Push/Pull*. Melanie Baljko's principal focus of research is computational models of conversation, a sub-specialty within computational linguistics. Modes and strategies of human conversation are used as the model for the complex interactivity of *Push/Pull*. The Lo-fi project also includes the expertise of communications scholar Kim Sawchuk, specifically, her work on audience response to new media art. Dr. Sawchuk's work traverses the humanities, social science and the arts community. Dr. Baljko and Dr. Sawchuk have developed multi-methodological evaluation that merges qualitative and quantitative approaches. John Kamevaar brings to Lo-fi a noise aesthetic and a history of live performance, through the experimental sound group Kaiser Nietzsche that he formed in the mid-80s, and many years of performing with the Toronto-based improvisation ensemble CCMC.

Social Intelligence and Gaming in *Push/Pull*

Push/Pull is programmed in such a way that layers of artificial agencies are presented to participants – from the agency of the system itself to abstract entities composed of a few lights and electroacoustic sounds. In effect, *Push/Pull* invokes a heterogeneous population of low-fidelity agents: human-representative agents are differentiated from artificial agents by colour in the LED displays and by sound, or their "voice" (the sounds are taken from the natural and media world, but micro-sampled and extensively processed).

Representation of artificial agents in interactive artwork invokes the topic of artificial social intelligence – the study of social relations that include artificial entities. Social intelligence in general means the capacity to understand experience in direct relation to how others understand it. Thus, for example, empathy plays an important role because it is the imagining of another's experience. Empathy has had a strong presence in modeling social intelligence in artificial media; it is considered by many robotics researchers to be a core feature of modeling both life-like emotional response and embodied learning, and thus essential in making more "realistic" robots. But characteristics of artificial social agents are not meant to appear simply to mimic humans or other animals. Rather, these agents when they interact

with humans in a mixed social world have to develop their own unique kinds of "mental images" of the human participants they interact with: sensor data enables the agents, whether robotic or software-based, to recognize humans and locate them within a set of co-relations. Lo-fi proposes that such a heterogeneous system of agents calls on biomimicry, because it plays out as a conversational exchange, but with the virtual agents themselves as far away as possible from mimicking humans.

The intention in our modeling of social intelligence is to shed light on issues such as the threshold of representation required to assign agency and to invoke artificial sociality. Because the interactant appears in *Push/Pull* as an agent in the same form as the artificial agents, all of the agents have an elemental subjectivity that is attributed by the human interactant, and the interactant-representative agent is a rudimentary avatar. Gaming theory is very a propos to the dynamic in the work, because modes of inter-subjectivity in game play necessarily take into account the avatar as social agent. Since video games are built on the premise of a first-person player (in combat games, the FPS or first person shooter) the avatar is the quintessential artificial other, in that it represents the self as other and psychically embeds the player within the game action. This is also the entry point to sociality in *Push/Pull*. Unlike high-definition reality video games, the game-like aspect of *Push/Pull* doesn't give a more literal presence for the interactant in the work, but it does evoke similar subjective and intersubjective dynamics in the imaginary of the interactant.

In fact the agents in *Push/Pull* align closely with very early minimalist gaming representations – think *Pac-Man* or *Tetris* from the 1980s. This kind of abstraction within the gaming paradigm is especially pertinent to exploring questions of how people can be induced to enter intersubjectivity with artificial agents in the first place. Mark J.P. Wolf postulates that, although marketing values that relate gaming to familiar media such as television and film are major factors in the push toward ever more realistic game characters, in essence an abstract representational mode in gaming is historically too hard to teach people, who want intuitive understanding of game rules. [2] A parallel problem applies to the abstract game as a feature in an artwork. But it is appealing to revive abstraction, as *Push/Pull* does, for its potential to self-reflexively focus interactants' attention on their enactment of the work they are with, not on external narrative or discursive elements. The trade-off of provoking a perplexed response might be well worth it because of the immersion factor, shifting the response of feeling lost in the sense of cognitive confusion to getting lost in the sense of losing oneself in an experience. Although it would be possible to demo the mode of interaction at the most game-like panel of *Push/Pull*, for example through video shown in the exhibition space, that would foreground gaming as the core topic of the work, whereas the overall abstraction of light and sound interaction in *Push/Pull* is not secondary to the exchange with artificial agents.

Given the instantaneous call-response paradigm that dominates interactivity, it is useful to remember that one hallmark of an interesting artwork is that many more things are going on than are evident on the surface. Ever in reserve for plumbing these depths of the imaginary realm is psychoanalysis, rather sidelined in the culture world since its heyday in the 1980s but always satisfying for its ability to describe inner life. Subjectivity located in the interplay between one's self and one's otherness to oneself, and the allure of (mis)recognizing oneself in an image or representation, are game features that invoke a psychoanalytic reading. Focused on Lacan's mirror stage and on Freud's pleasure principle it could go thus:

… players pleasurably experiment with the surprising, often counterintuitive articulation between their manipulation of the interface and the avatar's obedient response. If anything, such pleasures seem am-

plified by the uncanny difference between reality and reflection: an alterity enabling players both to embrace the avatar as an ideal and to reject it as an inferior other. … The avatar is not simply a means of access to desired outcomes, but an end in itself – a desired and resented lost object, existing in endless cycles of renunciation and reclamation. [3]

In the game, whatever the avatar (simple avatars are contained within all subsequent ones), the ego struggling ceaselessly to reconcile itself with the ideal and the abject can dominate the avatar as problematic other simply by controlling it. And the loss of this identification allows, in Lacanian terms, a momentary loss of ego, since ego is formed through - and as - identification with an externalized image of oneself. What feminist film theorist Kaja Silverman has described as "radical self-loss" can be experienced as pleasure in a gaming format, playing out the Freudian acquisition/loss repetition in a mode of sheer fun. [4]

Such repetition is certainly a dominant feature of *Push/Pull*. We imagined that the part of *Push/Pull*'s interaction overtly based on gaming would be most accessible to viewers, but the opposite turned out to be true: according to our observations of interactants' unwillingness both to pursue the game action or to say much about it afterwards, they are reluctant to shift from perceiving light and sound as a play of abstraction to perceiving autonomous agents that are composed from the same elements. Complicating the gaming interaction is the fact that the artwork as a whole system seems to be an autonomous entity that knows its environment, even though this is not strongly modeled but operates as a secondary effect. While in gaming the interactant's avatar has in a sense become the interface and the player has an assurance that it remains even when it goes off screen, in *Push/Pull* it is very evanescent, with multiple instantiations and also there and then gone. It is a problematized, misbehaving avatar.

Or maybe we are misreading what we have perceived as the interactant's unwillingness to game play. Maybe it is just that the experience is very interior and personal, a play of power and desire that acts out in the order of the imaginary, difficult for the interactant to access or articulate even when they do become very immersed in it.

Social Understanding and Commonality of Experience

Some key aspects of reception of interactive artworks are not in smooth synch with the modalities of artworld exhibition. For example, how the interaction works should be very overt and transparent so that most people succeed at it, and in a short span of time. In some ways this is a frustrating syndrome (although clearly many artists resolve the dilemma very well). In research-based work there can be additional layers of intention and meaning that the artist would prefer to reveal to interactants, and extra-discursive modes of presentation like demos, drawings, texts, or live guides are all possible strategies. Some interactive artists perform their works to get around this limitation and tease out the layers of meaning in a work for an audience, whether one by one or in groups. There may be a threshold at which a work needs to be performed by a non-novice interactant for an audience, so as to be fully revealed – we have been experimenting with *Push/Pull* in this mode.

Moreover, an aesthetics of interactivity that can be communicated to the public at large needs to be developed, so as to foster a learning curve about several issues: the role of systems themselves in such works; the interplay of task and reward with more ineffable, qualitative features; and the relationship of interactants to passive observers. Interactivity requires an aware or awake user: the interactive work always speaks to the interactant in some way and launches an identificatory process that some would

argue is even stronger than that of cinema. It is at the very least different from cinema – a new paradigm that is not well theorized or understood. The HCI (Human Computer Interaction) community has been making some inroads in this respect. [5] Artificial life art brings in questions about imputing intelligence and goals to computer systems, as well as an investigation into the mechanisms of assigning agency to non-living entities.

A direct parallel is obvious between social understanding and aesthetics: the deliciously impossible task of aesthetics is to describe experience in a language that can be common to as broad a group of people as possible, and the project of social understanding is to achieve among a group of people a shared interpretation, response, or even an agreement to disagree. Traditionally, the emphasis has been on the construction of the art object using conventionally held aesthetic principles that can assure a common ground for interpretation. This process already involves intensive feedback loops, because the reading of artworks by experts has over centuries constantly pushed the rules of how they are to be made and understood. A further loop with great potential for media art is the incorporation of knowledge about interactivity experience gathered from interactants, into a common social understanding of such experiences. The development of aesthetics for interactive media art absolutely requires user experience to be absorbed into both development and documentation of the work. [6]

The founding concept of the Lo-fi project was to take attention away from mimicry of human features and divert it to a different representational tension: that between uniqueness of experience (what is internal to the viewer or interactant, solitary) and commonality of experience. We propose that in *Push/Pull*, commonality is triggered by the sculpture's recognition of the interactant, as noted above. This is enhanced by the interaction eliciting for the interactant the belief that the sculpture's behaviours work in tandem with his or her own behaviour. That is, the participatory mode created in the interaction is such that the sculpture and the interactant clearly have unique but interdependent roles. These common understandings are complementary to the individualized process of interaction for each person. Our user interviews have shown that this balance of forces is clear to some interactants and not to others – the key interference in understanding the dynamic is the urge for more feedback, and precise feedback. Letting oneself go with the flow it is not the familiar mode for interactive art. We are interested in how an abstract, non-goal-oriented mode can inform public interpretation through art discourse, and loop back into artistic production. We caution that discourse doesn't (and should never) override experience in our staging of the dynamics of social intelligence; an interactant's personal, private experience with nothing more added is enough. There is no easy recipe for aesthetics: artists will continue to construct what they perceive to be the best qualities in an experience, and aim for awareness and understanding in the recipient of those qualities.

As an aspect of this aesthetics project, we are interested in contributing to guidelines for artists to develop user experience documentation. Preservation of new media artworks, media art histories and archives, and public understanding of these works are all bound up together in the concept of "user experience" and "usability studies" – for example in the work of The Variable Media Network and the Capturing Unstable Media project. There is space made in these structures for experiential documentation gathered by the media artist her or himself, but not yet methods for the artist to address how it can feed back into productions.

References and Notes:

1. *Dr. Baljko (York University, Toronto) and Dr. Sawchuk (Concordia University, Montreal) contributed to the development of this paper. See www.lo-fi.ca for information on the team and on "Lo-fi embodiment," which Dr. Baljko and I developed to explore the threshold of agency attribution.*
2. *Mark J.P. Wolf, "Abstraction in the Video Game" in The Video Game Theory Reader, eds. M.J.P. Wolf and B. Perron (New York-London: Routledge, 2003), 47-65.*
3. *Bob Rehak, "Playing at Being: Psychoanalysis and the Avatar" in The Video Game Theory Reader, eds. M.J.P. Wolf and B. Perron (New York-London: Routledge, 2003), 107.*
4. *Ibid., 110.*
5. *See ACM TOCHI – Special Double Issue on the Aesthetics of Interaction 15, no. 3 (2008), which includes Baljko and Tenhaaf, "The Aesthetics of Emergence: Co-constructed Interactions."*
6. *Baljko, Sawchuk and Tenhaaf shot video and interviewed about a dozen interactants in December 2010 during thelivingeffect exhibition curated by Caroline Langill at the Ottawa Art Gallery (Canada). Baljko translated interactants' movement in the videos into graphic images, two of which are reproduced here.*

FUTURE GUIDES FOR CITIES

Michelle Teran

Participation on social networks through location-aware devices has created an intriguing relation between online information and physical location. However, does this potential invade our homes or create the possibility of a more playful, chance encounter? My presentation investigates this question by probing city maps created through online videos people produce and upload.

Above the earth, I am scanning. I travel a landscape of images, formed by the occupiers of the city of E–Maps created by amateurs. I have a bird's eye view of a neighbourhood and search for moments of video wedged into the terrain, video fragments that tell me where to go. Weightlessness leads to orientation. I'm looking for something, I am looking for someone to meet.

I start this essay with a personal experience, observing a private moment now made public. Starting with a personal experience, this text examines private narratives in public spaces and the relation of information to city. The text and my experience explore the spatial and social constructions of the relationship between private and public, the notion of stranger and strangeness, and how social and spatial homogeneity are constructed and mediated by the potential social impacts of disclosing information online. The critical locus of this project emerges from my role as an artist working with media and performance over the last decade, creating site-specific performance and urban interventions that explore the relations which occur during the self-production of media and city.

I sit in front of a computer screen and observe the physical construction of a house. From an apartment in Berlin, I watch a collection of 24 YouTube videos of an event that takes place in a different city, in another part of the country. A woman and a man, Antje and Carsten, begin to build a life together. The creation of a home, and what eventually takes place inside it, is dutifully recorded on camera and put online for a global audience. The videos are superimposed on a satellite image of the city, which is how I have found the videos and now watch them. Over the course of a year, a house emerges from a vacant lot on the edge of the city, and is eventually painted and then furnished. Parties take place there. Friends are invited inside. I observe the social construction of a home. I am in the home, and they invite me inside by making and posting these videos. It is a publication of privacy, a state of being private in a public, digital space. As I watch the house go up, I wonder where the house is and what it would be like to live there. I wonder how it would feel to be invited into this space, what it would be like to meet them.

I am now in the house.

video title: House of C & A is rapidly going forward. Work is being done on the heating, plumbing, walls and electricity[1]

He walks, breathless. The walls are up but still lack drywall and paint. The floors are wet from the rain; there is no glass in the windows. She is alone, all of the men have gone. She takes over the camera, records abstract forms and cavities that will soon be a home. A stairway goes to the next floor. We are

now on the first floor in the children's room, next to the hallway, near the stairs that lead up to the attic. Below is the ground floor. Next we come to the bedroom. From the long hallway we end up in the bathroom. There's the toilet. A moment later we are in small guest room, still without a floor.

The exponential surge in the production of online video and their migration from private to public archives began in the very recent past. The availability of affordable cameras, bandwidth, production and distribution technologies have made it relatively simple to create, publish and distribute moving images online–generating an immense and ever-increasing collection of personal narratives, self-representative acts and both conscious and unconscious performances that emerge through the self-production of media and are available to anybody with an Internet connection. Depictions of birthday celebrations, fondue parties, the construction of new homes, barbecues and birthdays, feeding babies and holidays, performances, speeches and other testimonials take place in the private home, and yet can and do now have a global audience–of strangers. The willingness of people to publicly broadcast themselves suggests different social phenomena. On one hand it creates an inquiry into the kinds documented actions that emerge through self-produced media. On the other, it points to the shifting boundaries between the public and private realms, creating a tension between the public archive and private experience, between the 'boundaryless home' and outside world.

The tension between the private and the public is made even more evident through the contemporary practice of geotagging information. Videos found on the information space of the web, and associated with a URL, are now finding themselves in the real world as well. This happens through the process called geotagging, or attaching spatial coordinates to pieces of data, such as a video clips and photographs. Geo-tags can be used to explore a city, in much the same way that search engines are used to explore the virtual, digitized space of the Web. Spatial coordinates can be added to data deliberately by the user; however, many times people do not even realize that location information is added to their files. For example, current generation Apple 3G iPhones automatically embed highly detailed geo-coordinates whenever an image or video is taken with the camera. Concurrently, Public APIs–Application Protocol Interfaces–provided by YouTube, Twitter and Flickr, make it relatively easy to call up, compile and categorize publicly available data that is generated by these software platforms.

Several articles and research projects by concerned computer security experts and hackers have addressed the potential dangers of–deliberately or inadvertently–adding location information to data. Please Rob Me[2] I Can Stalk U[3] and Creepy[4] are examples of software projects that illustrate how easy it is to collect location-specific digital data and display it on a map–providing useful information, such as a person's daily routine, for the would-be stalker or home robber. In "Cybercasing the Joint: On the Privacy Implications of Geo-Tagging",[5] Gerald Friedland and Robin Summer try to raise critical awareness of emerging privacy threats that they term 'cybercasing' in which geotagged information can be used to lead to real-world invasions, stalking events, or attacks. In one cybercasing scenario, they attempt to identify the home addresses of people away on vacation. Working with a script they wrote using a YouTube API, they used a keyword 'kids' to locate home videos that people publish of their children. Using a sampling site of downtown Berkeley, CA and a radius of 60 miles (approximately 96 km), they were able to find 1000 videos of children–the maximum number allowed by YouTube. Expanding the vacation range to 1000 miles (approximately 1600km) they increased the initial amount to 50,000 videos. By comparing the two data sets and identifying only those videos made by corresponding users, they were able to find 106 videos that showed people who were away on vacation. From the 106, 12 videos looked like suitable candidates for 'cybercasing' and potential home robbery. One video was uploaded by a man vacationing in the Caribbean, who had posted several videos from a beach within a period of several days. When not vacationing on the beach, he lived with his children in Albany, CA.[6]

The scene of a home invasion that Friedland and Summer describe plays out a recurring image where a contested space which is emblematic of the tension between the private and public is made evident. A stranger comes to someone's home with nothing but bad intentions. The public, as something external and unknown, is thus, or at least potentially, a malevolent entity and threat to the private domain. Anthony Vidler refers to this as an uncanny moment, where the home which "pretends to afford the utmost security, opens itself up to a secret intrusion of terror". [7] To understand this fear, it is perhaps useful to first provide a historical analysis of where this fear comes from. For this we must return to the 19th century. Scenes of home invasion make their first appearances within the uncanny stories of E.T.A. Hoffmann.[8] In a recurring theme a secure, intimate domestic environment is invaded by a foreign and threatening presence, rendering a familiar setting now unfamiliar and strange. Hoffmann's stories, written in the late 19th century, mirror the socio-economic traumas experienced during the rise of Industrial Capitalism and subsequent emergence of modern cities, which occurred in throughout the 18th and 19th century. The transition to Capitalism created an emerging bourgeois class, "the by-products of industrial capitalism",[9] who were still insecure in terms of their social identity and position,[10] as well as a working class with whom they had an adversarial relationship. The transition to a capitalist system introduced new forms of buildings and involved a fundamental change in how public and private lives were both lived and perceived.[11]

European capitals were being physically transformed in the latter half of the 19th Century, reorganized to reflect new bourgeois values: the control of flow, and visibility of people and public display based on public spectacle of the commodity.[12] The total redesign of Paris, which was carried out by Baron Hausmann and Emperor Napoleon III after the revolution of 1848, defined by the building of straight, wide boulevards, [13] was carried out to promote the flow of people, traffic and commerce. But this was undertaken also to control the working class and assert the power of the state through the monumental architecture to "celebrate the values of the new bourgeoisie by prominently housing this class along the boulevards". As Richard Sennett notes,[14] the "right to the city" was defined as something for the bourgeois class, who shopped in department stores, sat in cafes whose windows faced the street, and strolled down Hausmann's expansive boulevards. Public spaces were therefore redesigned to promote a certain type of display and homogenous mix of people, and to make it very clear that some individuals did not belong within the new 'public'. The commodified world became one of appearances, where interactions in public space were not continuous, but based on silent observation. Sennett[15] describes the middle class 'public' experience of this time as one of being within crowd of strangers that are of the same socio-economic class and yet observe each other in silence, without interaction.

Faced with a complete erosion and radical shifting of the parameters of public life, the private, middle-class, home became increasingly seen as an idealized refuge, as well as a morally superior space compared with the impersonal and threatening outside world of strangers.[16] The bourgeois home became a protected domain of domestic intimacy from where the first 'real' relationships originated, which made both the transgression and potential invasion of the private home by the outside world as an ever-present source of anxiety and fear. As Sennett concludes, "By contrast, 'private' meant a world where one could express oneself directly as one was touched by another person; private meant a world where interaction reigned, but it must be in secret [. . .] In the spectacle, few men play an active role".[17]

The social and economic construction of the identity of places has have been further challenged by the emergence of the global economic networks within local geographies. The precariousness of work and identity of the worker, generated by the post-Industrial traumas of the late 20th century, has created a renewed value for place, but in a manner that follows the logic of exclusion and intolerance.[18] This creates new architectures and social formations and paradigms that are based on design paradigms of

sameness, and that impede and possibly prohibit mixing with strangers. Modern fear plays out in home security systems, gated communities and public surveillance as well as "unending reports of danger emitted by the mass-media". Nan Ellin [19] also suggests that "retribalization" and "nostalgia" are modern responses to this fear. Retribalization is a "desire to preserve (or invent) differences", through the formation of distinct groups that identify with each other and have similar intentions and interests, be they regional, ethnic, cultural or ideological. These formations have been "assisted by transnational culture flows of products, capital, people, and ideas, as well as media". Ellin further elaborates that an accompaniment to retribalization is a sense of nostalgia, a return to the past, to the womb, to the mother, manifested in a renewed interest in architectures that represent the return to 'traditional' values and institutions, such as the return to domesticity and the single family dwelling, a reconstruction of the notion of home. The establishment of a community based on shared interests and desires and a growing 'privatism' therefore conspires to produce homogenized social spaces, in which individuals do not mix with others.

Eli Pariser [20] elaborates on these paradigms of sameness when he describes how personalization works in determining what kind of information we become exposed to on the Web. Google, news sources, and social media platforms utilize algorithms that tailor results according to 'relevance' based on previous user habits, creating 'gated communities' of information by filtering out access to new ideas, people and information. This creates a shift in how information flows online and generates "your own personal unique universe of information that you live online". Faced with digitized information gatekeepers it is difficult to have any sense of public life, because the possibility of encountering people and phenomena that do not necessarily fit into what a search engine decides is one's worldview is hindered, and perhaps denied.

Friedland and Summer's cybercasing study, though developed to promote public awareness, has the unintended effect of perpetuating an 'architecture of fear' (from Nan Ellin), bringing the 19th Century uncanny experience of the home invasion into a 21st century unease about the revelatory power of technology, the risk of personal disclosure and insecurity over identity, the notion of borders and a general sense of place. By making people fear each other, what occurs is reemphasis on the problematic notion of a public that is a strange and malevolent threat to the individual and private domain.

Media theorist Geert Lovink,[21] when recently asked to comment on the future of Net politics, both challenges social and informational homogeneity and actively seeks out the foreign and strange when he says: "Let's dream up unlikely relations, spontaneous encounters (and how to solidify them) and technologies that actively derail everyday routines [...] What's missing is the 'sweet stranger' element [. . .] What's out there are random encounters with a cause. Networks are not just replicates of old ties. They bear the potential of something other, of becoming society. Let's leave the remediation age behind us and start to fool around with dangerous design". By taking up this position, Lovink embraces the potential of the uncanny within a networked society, by looking at the experience of disorientation upon encountering something that resides outside the comfortable notion of the everyday. Spontaneity, randomness and even elements of danger can possibly lead toward something that is unlike the self as well as the communities of which people are part.

Thinking about Lovink's statement, I cannot help but imagine how dangerous design could be mapped onto cities. Going back to the contemporary practice of geotagging media, if online information is becoming ever more merged with physical geography, and being produced by people actually living in the city, how could unlikely encounters be experienced in urban space using this media? If media is now connected back onto the city, what could future, alternate ways of exploring urban spaces be?

Perhaps mapping information on the web and transposing or layering back onto the city can lead to un-expected journeys towards places and people, and in way that embrace the risk, subversion, playfulness and the potential of something other these potential encounters could entail. This could be described as a type of dangerous design–media that acts as guides towards strangers.

At the risk of leaving these questions hanging, and possibly lead to even more, I want to return to a personal experience of traveling through a city and trying to find the house that I have watched being built. Having already–virtually–been in the home, I am now traveling towards it. I have a computer on my lap; the satellite imagery and video tell me where to go. After a few dead ends, a wrong turn down a road, a false ending at a cow pasture, I finally end up at the geotagged, recently-constructed family house. The house is now completely finished, lace-curtains fitted within the windows, the outside façade painted a cheerful color of yellow. There is no car parked outside but I am hoping that they are at home. I deliberately transgress the ethical, critical, geotagged space by standing at a threshold of the most contested space of conflict between private and public space, the social and physical border between the private family home and the outside world. Following Friedland and Summer, I have become a 'cybercaser', but this time I am benevolent. I am standing on the threshold and ready to transgress it.

I stand on the doorstep and ring the doorbell.

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BETWEEN PAST AND FUTURE: COLLABORATING IN THE CITY SPACE

Mikkel Thelle

As most european cities and towns, the danish capital Copenhagen has many different layers. These spaces and their meaning is of interest to many different positions: planners, artists, historians, urban developers, museums, researchers etc. Through a web-based 3D-environment and mobile technology, the parties involved in the city can collaborate in a way that visions, history and existing rules will impregnate each other.

In cities, and especially in the cities of modernity that grew rapidly during the industrialization, the change of physical form is one of the key characteristics. Old streets become part of mundane shopping malls, buildings are torn down to give space for new, former industrial areas become sites for creative classes, and so on.

This change is happening more and more quickly, at least when the forces of the market are strong, and they have a deep connection to our cultural history. Some changes, like the implementation of infrastructural networks, can last for decades, maybe centuries, while other come and go so fast we might not even notice it as ordinary dwellers of the city. So the modern city is a complex interplay of more or less resistant layers, all the time changing in different speeds and influencing each other. In Judith Butlers words, the world is a knot in motion. But how are we to capture, let alone understand this complexity?[i].

Furthermore, the city involves a range of groups that all have part in the culture and physical changes of the past, and all have an interest in the changes towards the future. The politicians of every period has left traces and will want to influence the city in all future; the urban planners that are trying to provide an orderly city within the political framework; developing firms and others carrying out large projects to change urban space for long periods of time; social groups defending their local or general interests; and so on. What is the pattern of this whole influencing and how does it affect our physical surroundings[ii].

What is interesting here is that there is a large amount of sources to this history of change and influence in the urban cultural history. Piles of technical documents fill the municipal departments in the major cities; Libraries have lots of press material, posters, drawings and pamphlets on the city; local and national archives keep accounts of life in the city, of riots, markets, dance halls, marriages and funerals. And for each year, more and more of this material is digitized. In Copenhagen where I come from, the city archive will undertake a total digitization within the next years of the most popular material; the national library has already taken part in this process, since only 10 percent of their loans are still "real" books – the rest is digital. So these sources are reaching an overwhelming size, and a problem of the future will be how to make them understandable for ordinary people who has no training or interest in archival techniques.

As Istanbul and most other cities and towns, the danish capital Copenhagen has many different layers of physical buildings and structures, but also of stories and meaning attached to the spaces and places of the city. As the streets of Istanbul and Copenhagen was probably clad with aspalt at the same time, a

thing like the tram system was implemented in Copenhagen just before the first World War and in Istanbul I think just after. Most modern cities share these experiences[iii].

One of the profound changes in Copenhagen was the establishment of a new city center around a space that would become the Town Hall Square, and where around 1900 people, traffic and prominent buildings were attracted around the new, monumental Town Hall in national romantic style. Just a little more than a hundred years ago, this place was just a places of scattered buildings on the western gate of the city wall. Almost impossible to understand for people who do not know the story[iv].

Today the square is a hub of thousands of people, cars and public buses, soon also a subway. Large events such as TV shows, music awards and rock concerts are held at the square on a regular basis.

What happened in the meantime? Years has passed, two world wars, at least one depression, technological revolutions, political demonstrations and much more. In the search for ways to understand the change, and not least try to pass that understanding on to an interested public, I think an effective tool could be digital media. One of the characteristics of these media and the ways they have developed in the last years are the easy and yet sophisticated ways of collaboration they provide – and which could be a motivation for a public to actually get involved in the cultural history of the city. Furthermore, collaboration through visual, digital media could be an alternative way of discussing the development of the city.

First of all, if the multiple sources to the urban cultural history should be able to provide any insight for the public, they should be organized dynamically and intuitively. The systems used for storing and finding them in archives are developed by and for professionals, and they become a barrier for people without training. If the information, then was organized and mapped around well-known objects, that could activate them, this would make it easier. If these objects were also the ones the sources were about, a double goal would be reached: a general accessibility for the public would be in place, and an element in a powerful collaboration tool could be developed[v].

Just a few years ago, technologies for visualizing information digitally was about getting Geographical Information Systems to work on the Internet. This has changed dramatically. Constantly updated mappings of complex data sets are streamed directly through broadband or optical fibres into the living room of ordinary people. One of the technologies that has been revolutionized, as we shall see in another of the day's papers, is 3D representations. Through the active community of massively multiplayer games like Second Life and free applications like Google SketchUp, the 3D technology is now possible to use in a variety of practices on an intuitive and qualitatively high level[vi].

Another cluster of technologies that has become part of everyday practice for many people is the localized technologies. Geocaching, GPS, mobile gameplay and Foursquare are just a few of the activities that has been blossoming the last few years. Everyone with a smartphone is by now well aquainted with either mobile maps or pervasive layers, where information has been pasted over the experience of the real world in front of your eyes. One potential for this technology in relation to cultural history could be in the combination of the real space experience and the access to information about that exact space[vii].

A third form of technology, or rather technological idea, that i would emphasize is the concept of object history. If you go to Wikipedia and look up a phenomenon, you can follow the creation of the specific

post step by step to see how it has emerged and who was responsible for the changes. In a digital representation of the built environment of a city, this concept is extremely central, conveying the steps by which this space has been created.

And imagine if this history could be organized in a 3D space, so that the different elements of an urban structure would have attached the date and, for example the planner or architect responsible. If also the bulk of evidence I mentioned earlier would be accessible in this framework, it would begin to be interesting. And finally, if at any step in the framework, you, the user could step in and leave comments, share images or discuss future problems like for example urban development projects.

If, furthermore the 3D-version of the city space could have a corresponding, mobile interface, where people in the specific space could experience the past and future city in layers that were accessible, it would, I think, have a long-lasting potential for developing smart cities where the city builders, artists and cultural historians could collaborate.

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PLAYING WITH THE CITY

Iouliani Theona & Dimitris Charitos

This paper aims at exploring the nature of the spatial experience that emerges when actively pursuing the goals of a pervasive game, in order to inform the design of pervasive gaming experiences.

This paper aims at exploring the nature of the spatial experience that emerges when actively pursuing the goals of a pervasive game. Pervasive games engage the player in intense and rich activities that spill out of the screen of their technological medium into the real world, creating thus hybrid and mixed reality environments that bear similarities with those afforded by other non ludic platforms, such as mobile and locative media. This research expects pervasive games to be an integral facet of future urban condition and considers the study of their spatial characteristics, as offering useful insight into spatial design in the urban context.

Being part of an ongoing research, this paper will not seek to reach concrete categorizations of pervasive games according to their spatial features. Instead, it will proceed by analyzing four materialized pervasive games, in order to investigate how such playful activity transforms and enriches the spatial experience. The examples are chosen with regards to the manners in which they incorporate the urban landscape into their design and the forms of interaction with the built environment that the players engage in. These games are being perceived as a means of urban re-discovery and spatial exploration. Approaching the built environment through such a playful context can lead to revealing appropriations, changing of perception and destabilization of spatial preconceptions. The player can make use of the architecture and the technological infrastructure of the city in original, unforeseen ways. She can play with the city itself.

This paper adopts the definition of pervasive games suggested by Montola, Stenros and Waern, according to which these games blur the 'magic circle' and expand it spatially, temporally and socially. [1] The term 'magic circle' introduced by Salen and Zimmerman, [2] echoes the notion of Huizinga that games are closed systems which unfold within a defined play space – a board for instance. So by challenging the boundaries of the 'magic circle' Montola, Stenros and Waern imply that in a pervasive game the participant can play with anyone, anytime, anywhere, usually in urban settlements.

"BotFighters", launched in 2001, is one of the first commercial attempts of this category of games. In "BotFighters", the player tries to destroy her enemies by shooting them. The mobile platform deploys GSM networks, so when an enemy moves within a certain radius close to the player, the game begins. The communication of the position of the enemy, as well as the shooting, occurs through the dispatch of sms. [3] Also, text messages notify players on the existence of virtual objects, dispersed throughout the city by the developers, which may be helpful in the progress of the game. For instance, while a player is walking down a street, she may be notified and thus discover a weapon or a first aid kit. Efficiency in destroying ones enemies is based on proximity and the amount of imaginary objects a player has collected. Physical positions as well as game actions are described solely through text, yet at the same time the game presents a bodily challenge. The player roams in the city looking for opponents or avoiding ones, largely based on her imagination to enhance the gameplay. Concurrently, she explores an invisible layer,

on top of the built one, that of the GSM network, trying to figure out its coverage and its weaknesses, areas where she can hide, or be seen.

In the case of "PacManhattan" ludic action takes place in a 5x6 block area of Manhattan. This example is based on the concept and the aesthetics of the original computer game. One player assumes the role of Pacman, while three others those of ghosts. All four players circulate in that certain physical game area, with the use of a printed simplified representation, a map. No location tracking technology is available. Every player is in constant communication with a controller through a mobile phone, informing about her position when she reaches a crossroad. Subsequently, the controllers update a networked map, visible only to them. There is an interesting asymmetry in the disposal of information. Pacman is aware of the positions of all the players, while the ghosts are only told their positions, and can only assume where Pacman is based on the presence or absence of virtual dots at their location, that signifies whether Pacman has been there before. "PacManhattan" can be said to create two adjacent worlds, none of which has a complete perception of the gaming situation. Instead, controllers and street players must communicate and work together, so as to combine both perspectives in a coherent whole.

"Can You See Me Now" (CYSMN) is a game of catch, where online players are navigating in a virtual model of a specific city, each time, while being virtually chased by street players, actually running around in the built environment. Both groups of players are represented by avatars and have access to a digital map that reveals their positions. The online players can move within this abstract representation at a fixed speed. They can identify buildings but cannot enter in them, so they are limited to the streets of the model which are bereft of people, vehicles, traffic lights, in general the nuisances and the hazards of everyday city life. On the contrary, street players, while running equipped with portable devices and GPS receivers, have to overcome real obstacles. The players can exchange text messages with each other, and the runners can communicate via a walkie-talkie channel that is available as a real time audio stream to the online players. [4] "CYSMN" creates a hybrid reality, combining the physical world and its virtual representation. These two worlds do not overlap completely. Rather, there are points of connection, of superimposition where the various modes of information and communication devices create a novel experience. The online mode of participation enabled players from different cities, let alone countries, engage in the game. The most challenging and fulfilling aspect for those players, who weren't familiar with the particular area where the game took place, was to try to understand, to decode the city's physical characteristics and constraints and manipulate their movements and consequently the game actions of the runners, for their benefit.

"Epidemic Menace" is the last case under analysis here. The plot of the game involves agents that need to track down lethal viruses which have escaped a lab, before they spread and multiply. "Epidemic Menace" is a research prototype aiming to explore how various interfaces and devices contribute to the gameplay. It makes use of desktop computers, mobile and augmented reality technologies. Contrary to multiplatform games, "Epidemic Menace" associates different functionalities and also views and representations, with each interface, so players can alternate between them and obtain a more coherent and complete experience. [5] "Epidemic Menace" took place in a specific site, in a university campus, where virtual viruses were located and had a specific duration. Still, with regards to its spatial characteristics, this game didn't only augment physical environment, but was also adaptable to the change of its conditions. For instance, environmental factors such as wind strength influenced the way the viruses move, or temperature, the way they multiplied. It can be suggested that "Epidemic Menace" was important because by incorporating degrees of uncertainty in the design, this game revealed the creative and entertaining potential of such practices.

To conclude, pervasive games embed the game play within the pre–existing built environment, as well as within a digital layer of information which is superimposed on top of this physical realm. This ongoing investigation currently explores the implications of this integration, in order to understand the nature of the spatial experience afforded by this category of games. Furthermore, it focuses on the following relevant issues:

- The way people navigate and move in such a hybrid environment.
- How participants in a pervasive game access information while playing.
- How locative technologies influence the way public, urban space is perceived.

Ultimately, this study aims to inform the design of pervasive gaming experiences.

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MAPPING BY OURSELVES: TOWARDS A MEDIA HISTORY OF GEOMOBILITY

Tristan Thielmann

Using the example of three different augmented reality and social media navigation applications, this paper demonstrates the importance of choosing the genuine mobile, rather than the stationary, as the starting point of media historical examination.
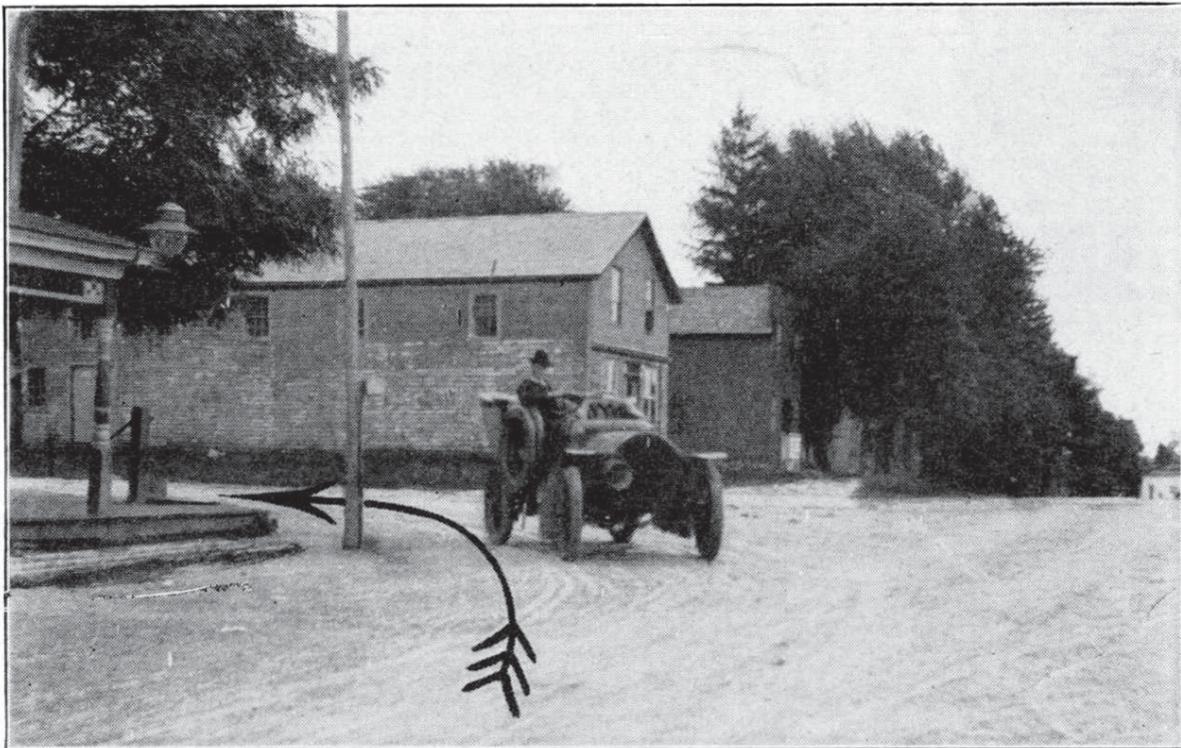
TO LEFT, EAST

Half Day. Next turn C. & N. W. tracks. Highwood, six and one-half miles.

Fig. 1. Photo no. 18 of The Rand McNally Photo-auto Guide: Lake Geneva to Chicago (Chicago, New York: Rand McNally & Company, 1909).
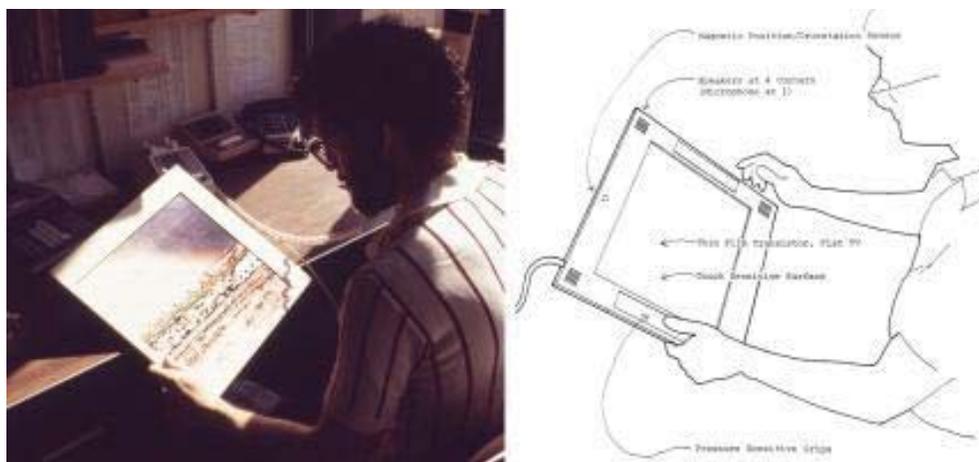
Fig. 2. Dummy (left) and conceptual diagram (right) of equipment for hand-held mapping window.
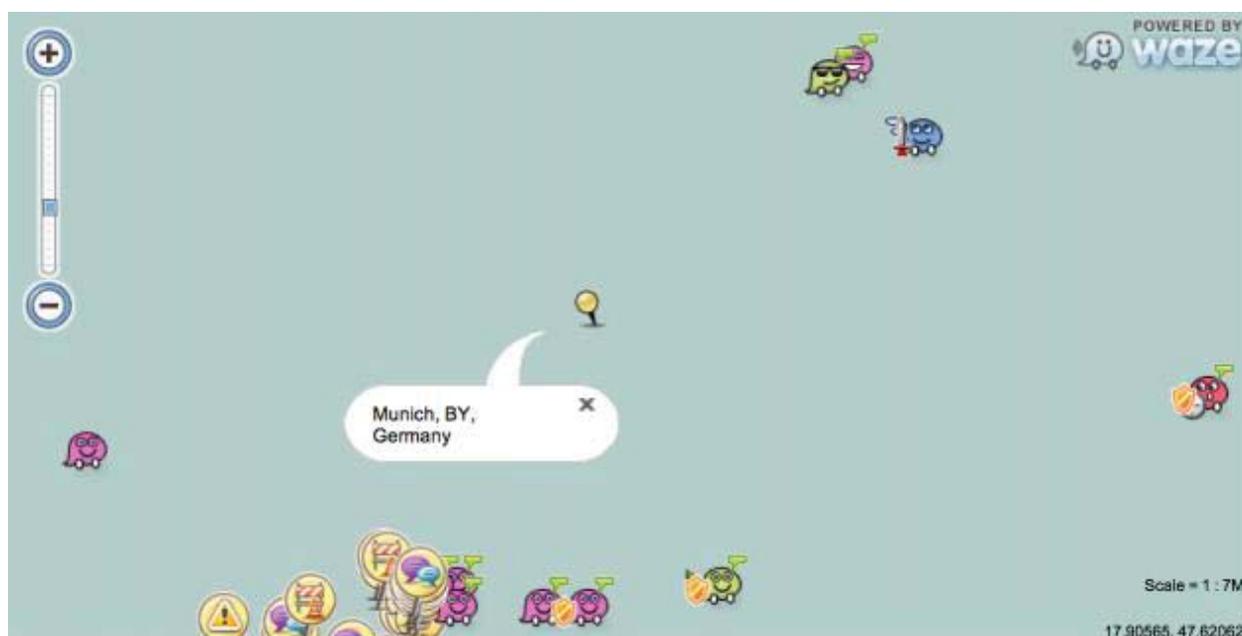
Fig. 3. (No) live map of Waze in the area around Munich (http://world.waze.com).

0. Introduction

In general, there is an understanding in media theory (for instance, in the interpretation of Paul Virilio and others) that implies a logical continuance in a sustained acceleration from the immobile to the mobile, from the stationary PC to the laptop, to the mobile smartphone, to some nanotechnical device in our brains, and so and forth. This paper aims to show that it is worthwhile to take the opposite view: to take the mobility of media as an antecedent, and the stationary as a transitional stage, because these heuristics return data (Latin 'dare': as something given) to their ontological status.

Although augmented reality navigation apps like 'Wikitude Drive' (www.wikitude.com/en/drive), which can be downloaded from the Apple App Store or the Android Market, appear at first glance to be something completely new, they are in fact based on a very old cultural technique.

1. Navigation in 1907: Photo-auto guides

Virtual travel through pre-recorded spaces can look back at least to the year 1907, when the first at-tempt at capturing residential streets of select routes in photographs took place. The idea was to make them available as 'photo-auto guides,' with textual and pictographical route instructions superimposed.

Photo-auto guides lasted for only a couple of years before they were displaced by route books and, later, by road maps. But photo-auto guides existed before road maps were publicly available, and they were widely distributed. [1] Why did they fail? Why couldn't they accumulate collective knowledge? This is, to use a term of Bruno Latour's, a question of "optical consistency." [2]

Part of the answer lies in the fact that, while photo-auto guides placed a great deal of emphasis on es-tablishing a kind of navigational first-person experience, this was not sustained, not standardized, and could lead to frictions. Figure 1 makes clear that the visual language was not maintained. While the navi-gation instructions were layered within a series of photographs as if arrows had been drawn in the dust of the streets, some photographs showed ghost drivers who were driving in the opposite direction to that indicated.

In addition to this, there was a problem with the medium itself, and its mimetic qualities, which also caused disadvantages. In Europe, where nearly all roads had macadam and had been surfaced for years, it was possible to issue maps that did not go out of date. But in the U.S., people were only just beginning to realize the value of good roads at the beginning of the 20th century.

"Often one notices a new highway where a year before another one has been used to get to the same point. This shows the uncertainty of routing," stated John P. Dods in his article "Advancement in Art of Pathfinding" (1911). The roads themselves were constantly changing, so there was uncertainty about the accepted routes.

As the infrastructure as well as the tracers/vehicles moving about on it were mobile at that point in time, the use of photographs or maps could not result in the creation of "immutable mobiles," a con-stancy in form across variation, that allows organizations to collect information and to exert control over spatial distances. In order to understand the relevance of these mobile fixations, we initially need to take a step back and look at the big picture.

In his studies in media ethnology and the sociology of technology, Bruno Latour traces the transmission of signs and the linking of people, artifacts and signs via mediators, delineating the logistics that make changes of scale possible. Seen from a media studies perspective, this enables the writing of a media his-tory founded on the concept of mediation and drawing on the comparative analysis of multiple short chains of media translations, as well as on the tracing of cumulative technological developments.

For the history of inscription devices, this means that you have to focus on the invention of "objects which have the properties of being *mobile* but also *immutable*, *presentable*, *readable* and *combin-able* with one another," [3] because the more artificial and abstract the inscriptions, the greater their capacity to be associated with others and thus to approach reality more closely. The degree of similarity serves as an index in a chain of association, which leads, seemingly unavoidably, to standardization and institutionalization within "centres of calculation." [4]

Coming back to our case study: As the roads as well as the vehicles moving about on it were mobile, and therefore no 'immutable mobiles' could be generated, how could knowledge be gained? It was difficult with established epistemic methods, and so the publishers took up a new idea: they would produce maps that contradicted the scientific geodesy and cartography of the time – just as neogeography and other grassroots movements do today.

To produce these maps, cars were sent out to gather the information for route directions. In each car was a sketch maker who had to be able:

1. to record "all route matter in the form of a sketch showing their proper relations in the road being traveled all intersecting roads, landmarks, schools, churches, railroad crossings, telephone poles, etc." while driving in a moving car on rough roads; and
2. "to imagine himself traveling above the road in a flying machine as it were, looking down, in order to get an accurate idea of the angle at which two roads intersect." [5]

So there was already a combination of real-time recording and a planimetric a-perspectival view, something digital mapping companies are trying to accomplish with GPS survey cars today.

To make the sketches usable for navigation, they were first transformed into texts, then diluted and reduced into the essential information on the route. The factors that emerged as essential were: how great is the distance to where I need to turn off and what landmarks tell me that I should not turn off (in other words, that I am on the correct route)? In this way, the topological structure was georeferenced through a human actor.

Photo-auto guides therefore thwart Latour's media historical observation: The more artificial and abstract the inscriptions, the greater their capacity to be associated with others and thus to approach reality more closely. In place of photo-auto guides, a standard without layering techniques developed that used photographs simply as illustrations, or was purely textual. It was constructed in such a way that for each change in route, all the navigator needed to read out was: 'After ... miles at ... turn ....'

The intermediate result of this observation is that the problem with photo-auto guides was, among other things (e.g. the absence of scalability), their lack of optical consistency, as they were not in a position to follow an abstraction process and create 'immutable mobiles.'

2. Navigation in 1977: Mapping by Yourself

'Mapping by Yourself' was the MIT Architecture Machine Group's forerunner to the 'Aspen Movie Map,' which is acknowledged as "the first publicly shown interactive virtual navigable space." [6] The 'Aspen Movie Map' offered virtual travel through pre-recorded spaces. A videodisc-driven program, it allowed the user to navigate on-screen through the streets of Aspen by choosing new directions at each displayed crossroad. To do this, the user touched left/right arrows that were graphically overlaid on a touch-sensitive screen. It was also possible to stop, view houses, meet people, or even to change the season.

However, the original project, 'Mapping by Yourself,' was even more ambitious. The first DARPA-funded project of the Architecture Machine Group was designed in 1977 as a flat, hand-held PC with a touch-sensitive display that knew its own perspective and position and worked with a 6'' x 6'' Westinghouse

display (Fig. 2). The technique for sensing the panel's orientation and position was initially based on ultra-sonic sound ranging, but later switched to a position/orientation sensing system produced by Polhemus Navigation Sciences and based on measurements made of a neutating magnetic field. This system was implemented within MIT's media room.

There are, of course, many similarities between this device and tablet computers. However, the initial idea of 'Mapping by Yourself' went far beyond what an Apple iPad, for example, is able to do nowadays: "The resultant display would give a user the sense of holding a 'magic window' through which he could observe an otherwise invisible world about which he could move in 'real' world fashion." [7] One idea for an application was "to move the window to any vantage point for 3-D views onto a 3-D geographical model. This will permit the user to look down on an environment in conventional map format, then to move the window for an aerial perspective or even to position the screen vertically, so as to see surface features in elevation and subsurface strata in section." [8] A guided tour application that could be used by soldiers in unfamiliar territory was also envisaged.

'Mapping by Yourself' should be been as part of a series of 1970s technological inventions at MIT that had new graphical user interfaces specially developed for laymen, such as 'Architecture by Yourself' or 'Camouflage by Yourself.' However, the objective of 'Mapping by Yourself,' "to make map reading at one with map making," was not accomplished [9]. Why was this the case? The reason lay not so much in the technical difficulties experienced within the Architecture Machine Group as in the lack of consideration that was given to incorporating the accumulated information into a center of calculation. There was no immutability.

We have a similar problem today: It is a misunderstanding to think that it is the locality itself that matters, if we talk about 'locative media' or 'netlocality.' Instead, it is the form, the inscription into a grid, that makes the difference. And this is what was not considered in 'Mapping by Yourself.'

Considering the two examples presented in this paper, we have now seen:

1. centers of calculation without optical consistency in the layering process, and
2. optically consistent layering without immutability, without centers of calculation, without inscription into a social structure.

3. Navigation in 2011: Waze

The final example is the social mobile app 'Waze,' which relies on crowdsourcing to build and update road maps. The basic idea of Waze is that in order to get wherever they need to go to as quickly as possible, people can download the application onto any smart phone with GPS functionality, and it will provide a driving service including real-time traffic and accident alerts, as well as free turn-by-turn navigation.

However, the specific is not the media product itself, but the embedding of its form of production. "The live maps, updated in real-time, are the heart of the system." [10] The company generates these maps by tracking GPS on users' phones. In the beginning, there is most often no map at all (Fig. 3). When there are at least three users driving along the same route, the platform takes this data and uses it to create a road map and traffic information. A one-way street, for example, is recognized as long as there is no one driving the other way.

Di-Ann Eisnor, community geographer of Waze, describes the system as follows: "Just by turning it on and driving, we are able to collect information on the GPS traces, the time stamps, the road directions – essentially to create a fairly accurate grid of information, and we are turning it into a navigable base map that has traffic as well as social layers and special driving attributes on the top of it, all from the mobile device." [11]

Thus far, Waze resembles the geodetic knowledge gaining outlined by Latour: The medium gains in accuracy by maximizing mobilization and immutability. The more drivers use the application, the more up-to-date and accurate the maps and the associated data become. "The many places where these texts are synoptically assembled offer many counterexamples [...] These counterexamples can be added to the old texts and, in turn, are spread without modification to all the other settings where this process of comparison may be resumed. [...] So, at the end, the accuracy *shifts from the medium to the message* [...]." [12]

Therefore, Latour's mediation theory not only has the potential to explain the phenomenon of the time-lag between the introduction of a medium and the point at which visual representations within this medium become precise, it also contains a media-historical narrative that passes right across analogue and digital media, right across human and non-human beings.

However, there is one difference in the accumulation process, and this has a lot to do with the difference between analogue and digital media: If you read Latour carefully, you will recognize a shift from media as "centres of calculation" to media as "platforms of calculation interfaces." This indicates a general shift in Latour's thinking from BC to AC, 'before the computer' to 'after the computer' – a shift that can be very well explained by looking at the evolution of digital cartography, as Latour does in his paper "Entering a Risky Territory." [13]

The difference lies in a fundamental ontological distinction between "looking at a medium" and "logging into a media platform," e.g., a databank inquiry, a Web search, etc. It is in fact making a distinction between parasitic mimetic media usage and practical navigational usage. Latour asserts that digital technologies have reconfigured our understanding of mapping, such that navigational interpretation of digital maps is increasingly taking precedence over their mimetic interpretation.

Media are thus no longer just mediators, but platforms that permit both mimetic and navigational usage, platforms that create a bridge between the different oligoptica. Even if Latour takes a stance against a mimetic interpretation, his understanding of the option of a retrospective distinction between mimetic and navigational use of digital mapping assumes that both conditions can always also exist in action. This understanding is, indeed, substantially different from that of Latour's early papers.

The term 'platform' thus represents a modification of Latour's media understanding, a turning away from "centres of calculation" towards "platforms of calculation interface" that rely on different closely neighboring "stepping stones in order to achieve the miracle of reference." [14] This interpretation allow us not only to call for a theoretical conception of interfaces as Latourian quasi-things (inscribed with programs of action) that are dealing via Facebook and other social media platforms with quasi-people (prototypically demographic types), but also to mark a general conceptual shift in perspective.

So far, media have been seen as something immobile and 'still framing' in media history and media theory, as processing immutable mobiles (data) and retaining (storing) them. Even the notion that today's

media practices are the apparent logical continuance of a sustained acceleration only supports the assumption that an alleged deceleration would lead us back to the basis of the statical. Rather, the establishment of mobile media allows seeing data (software) as something given to mobilize media. This heuristic returns data to their ontological status. Even more: If it is not the stationary (PC, TV, etc.) that is chosen as the starting point of examination, but rather the genuine mobile (hand-held devices, paper, etc.), a new disciplinary field of Software Studies opens up, and media history realigns. From that perspective, the mobility of media consequently appears as an antecedent, and the stationary as a transitional stage.

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TOWARS A NEW SYMBIOSIS IN THE MEXICAN ENVIRONMENT: ART & SCIENCE

Reynaldo Thompson & Juan Angel Mejia

In contemporary art the most recent artwork of Gilberto Esparza deals with microorganisms, environmental issues and electronic media. His project *Plantas Nómadas* navigates the everyday life urban ecosystem. His work is based on the recycling of consumption technology, human wastes and a robotic mechanism that survives from served waters and solar energy.

Introduction

From the outset of civilization, human beings have tried to express some of their ideas, fears and emotions through art. One of our deepest fears today is the continuous destruction of nature and the irreversible alteration of the ecosystem. This concern has reached the art arena together with the sciences, both of which, in cooperation, create tools for new expressions, perhaps as solutions for the apparently uncontrollable problem. The results are broadening the limits of art and science beyond unrecognized limits. The artworks we study in this context are examples of this process.

The evolution of informatics systems, hardware, and the arts have revolutionized the way we perceive the world and by consequence the aesthetics of arts itself. Few are the cases in daily life where digital process is not playing a role in modern existence and thereby enabling us to fulfill our tasks in the world.

With the use of these new tools, many human activities have undergone changes, sometimes, not in the right direction: uncontrolled materialistic consumption may be one of the causes. The development of the web has become a tool and a weapon for globalization, a concept strongly tied to those concerns. Today, the global frontiers are blurred, time is relative, and perhaps the only limitation is the capacity of reception and transmission of data, depending on the levels of technological advancement in the region.

Antecedents of *the Project Plantas Nómadas*

For instance, to observe the robotic creatures *Parásitos Urbanos* (Urban Parasites) of Gilberto Esparza is to pass through the lens of the future, and believe that the most disturbing images like those found in the painting *The Garden of Earthly Delights* of Hieronymus Bosch have become true. It makes us feel, in a way, that we are entering a sort of the *Gate of Hell* in Dante's *Inferno* or into the space of a science fiction novel. This is not because the goal of the artist is to intimidate the viewer, but rather the opposite: his works pretend to become a saver device of humanity after the damage already done to earth.

The physicality and size of *Parásitos Urbanos* are not like the microscopic organisms that enter our body and which we are not able to see; nor are they like the new invented sicknesses that are globally widespread today; and neither are visible to the so called viruses made to affect computers. It is true that not all parasites are microorganisms; however, Esparza's mimetic parasites are depictions of living creatures

that are mechanized and autonomous to some extent. In this case, they have not evolved in nature as the rest of living species, but in the creative mind of the artist. The devices are designed to obtain their requirements of energy from existing sources like electric lines, solar energy or batteries - in order to move and call the attention of viewers - while at the same time emitting sounds, like animals that roar, sing or tweet in order to call the attention of their partners. The artist's robot emits sound in order to call the attention of the viewer by emulating zoosemiotics.

At first glance the devices seem to be part of the ecosystem in which they inhabit but once we pay close attention to their movement, we realize that they have an independent mechanism.

Esparza is not only working with scarce technology within the arts, creating quasi-mechanized creatures living from the wastes of the city, he is as well, tackling one of the most destructive problems faced by humanity, the destruction of the environment and the problems generated by the overpopulation of humans.

The Biological Side of the Robot

Plantas Nómadas is a concept that includes micro-organic plants contained in unhealthy waters (Geobacter) and a robot living in an environment, which has been rendered hostile after transformation by means of human activity. The plants have been transplanted from the soil and adapted to the new ecosystem. Its nomadic condition allows it to adapt and find nutrients with the help of the robot.

This artwork is an example of the lack of human consciousness destroying the planet, and the persistence of care for the planet. By observing the piece in its environment we can contemplate how the robot takes residual water, separates its elements and ignites the motor of the robot by providing energy.

The piece is a prototype of a hybrid organism developed in symbiosis by being constituted out of electro-mechanic, kinetic and biotic systems. Its electro-mechanical construction works with the help of biological cells cultivating a diverse spectrum of bacteria that transforms the glucose and the amino acids, releasing microvolts of energy. The energy is accumulated inside a harvest system, providing autonomy to the whole device. The design of the system uses cybernetics in order to protect the system itself and keep it alive.

The power cycle nourishes the bacterial culture that feeds the electronic system. The purified water that is irrigated to a plant comprises its existential cycle. *Plantas Nómadas* were created in earnest of a concern for the deteriorated environment caused by human activity and its irreversible consequences. These changes are directly hitting all sorts of life on the planet making it imminent that organisms have to, either, adapt faster or perish. During the mission of *Plantas Nómadas*, several organisms adapt themselves to the new environment in order to survive in a symbiotic way, taking advantage from the nutrients found in polluted surroundings. The paradoxical thing is that this symbiosis manages to start off the union of a robot whose origins are in the human imagination and which is yet manufactured in a system that is bound to the modifying surroundings of the natural Earth. *Plantas Nómadas* are a species that come indeed from the alienated processes that the planet is undergoing. It is a robot of inverse understanding, whose vital processes do not need to obey or be in agreement with the structure of capital production. Their behavior, movement and times, are determined by their vital cycle of existence, it is

an organism that exists in contradiction to the acceleration of the world that has been imposed by human dynamics.

The goal of Esparza´s research seems to open the possibility of reversing the alterations of ecosystems and therefore the killing of other species. The pretension is to learn the habits that other species have accumulated throughout millions of years of adaptation and reintegration to the environment and to give back to the Earth, in different form, the energy that it rendered to us. The idea may allow the human species to survive on the surface of the planet.

It is our concern to highlight the lack of water and its pollution all around the world and the possible solutions through the use of a new hybrid organism, which are products of alienated processes. It appears - by the simple act of coexistence in those zones of ecological disaster, to represent, a serious manifestation of social and environmental impacts in the communities that depends on clean water of the rivers.

Ecological Concerns

Plantas Nómadas is a utopian dream of healing the earth, where the waste of uncontrolled human consumption and growth deteriorates and destroys nature. The long known Malthusian theories on overpopulation, [1] demonized by the Catholic Church are not far from truth.

The damage to biodiversity in modern times (in the name of progress) ends up in the paying of a high price. Some solutions may be found with the ethical consumption of resources, an anti- Malthusian consciousness about human reproduction or a strict birth control and a respectful behavior towards nature. If that happens, the earth will continue to feed the living creatures on its surface for many more generations to come.

The united system of knowledge of the sciences and the humanities to which [2] it appeals in his book *Consilience* have found a point of convergence in Esparza's *Plantas Nómadas*.

It appears that the Enlightenment ideals have collapsed not because of a continuous progress in the name of social development but because of capitalist wastefulness. It will be suitable that the work of art in focus will be made for mass circulation, like cars, in order to save the planet. A utopian desire rooted in ecological initiatives.

In formal terms *Plantas Nómadas* is like a Kafkaesque cockroach, nevertheless instead of the human becoming an insect turned upside down, it seems that Esparza's dream is to contribute to reverse a future natural catastrophe. It is a sort of crusade against the evident disregard of nature.

It is quite revealing in the first two lines of the introduction by Ian Pindar and Paul Sutton, of Samuel Beckett's *Endgame*, where Hamm exclaims: "Nature has forgotten us" and Clove replies: "there is no more nature." [3]

In analyzing Esparza's device, we realize that it is a conjunction of nature and machine living together, a proposal for new ecosystems and symbiosis of nature and culture, art and science, and last, the creation and destruction as one of the conditions of nature but nowadays most importantly with ecological balance. In that sense, Guattari argues:

 "The earth is undergoing a period of intense techno-scientific transformations. If no remedy is found, the ecological disequilibrium this has generated will ultimately threaten the continuation of life on the planet's surface. Alongside these upheavals, human mode of life, both individual and collective, are progressively deteriorating. Kinship networks tend to be reduced to a bare minimum; domestic life is being poisoned by the gangrene of mass-media consumption; family and married life are frequently 'ossified' by a sort of standardization reduced to their meanest expression….. It is the relationship between subjectivity and exteriority –be is social, animal, vegetable or Cosmic–that is compromised in this way, in a sort of general movement of implosion and regressive infantalization. Otherness [l'altérité] tends to lose all its asperità." [4]

The symbiosis of robot, plants and microscopic organism may therefore appeal to opposites, the Apollonian and Dionysian concepts in the *Birth of Tragedy*, [5] where the author argues that "Man is no longer an artist, he has become a work of art; man himself now moves with the same ecstasy and sublimity with which, in dream, he once saw the gods talk" and in this case we may say that it is not man who became a work of art but a fusion of nature and machine creating new organisms. *Plantas Nómadas* is a piece where ethics became an unquestionable component of the artwork itself and more than an aesthetical constituent to what art pleaded long time back. Here the artwork is closely connected with scientific thinking rather than with gestural process of painting or sculpting characteristic of traditional art. Postmodern times have favored the development of new expressive forms concerned with the earth itself distancing at the same time from the inaction of the land art in the sense that it uses its components by transforming it, but does not questioning the human effects on the earth.

The natural and the technological

Nowadays the scandals centered in some religious institutions concerning material wealth and libertine morals of the leaders, make it possible for a nihilistic society to flourish, a society closer to nature's demands and its protection. Technology became important to contemporary knowledge only through the mediation of a generalized spirit of performativity. Even today, progress in knowledge is not totally subordinated to technological investment as Lyotard, claims. In many art works produced nowadays, some artists need the newest discoveries and inventions produced in science to achieve their ideas, while scientists are more open to intuitive thinking that had characterized the arts. In *Plantas Nómadas* both processes go hand in hand, looking for an equilibrium that keeps both the mechanism and the organic system in symbiosis while producing an artistic experience. The goal in the artist's mind is to keep the machine working through the recycling of served water and the bacteria contained in it. The mimesis of nature, for instance, is emphasized with the sound produced by the robot when it has excess of energy - - it becomes a kind of animal in its aspiration to reproduce itself. *Plantas Nómadas* the sound may have as its goal to spread the benefits of the robot on a wounded earth. A question arises, Is it possible to envisage and build an autonomous community of robots that could reproduce themselves? Deleuze' concerns about the reproduction of machines was as follows:

"It is said that machines do not reproduce themselves, or that they only reproduce themselves through the intermediary of man, but "does anyone say that the red clover has not reproductive system because the bumble bee (and the bumble bee only) must aid and abet it before it can reproduce? No one. The bumble bee is a part of the reproductive system of the clover. Each one of ourselves has sprung form minute animalcules whose entity was entirely distinct form our own...These creates are part of our reproductive system; then why not we part of that of the machines?" [6]

Deleuze's question is fundamental on metaphysical issues. An approximation was made some time back with hybrids between human and machine approached in creative writing such as Mary Shelley's novel *Frankenstein* or analysis like the *Cyborg Manifesto* of Donna Haraway.

Esparza's work is promoting an interdisciplinary study of ecological perspective in a profound scientific engagement. The interstitial piece is on one hand mimicking amphibians, living partly in aquatic sediments and soil, while there is also another concern for land involving the process of restoring nature after being abused, by the seven thousand millions of humans inhabiting its surface.

Plantas Nómadas show us that through the exploration of the intersections of art and science many imaginable worlds can be reached, by originality, producing a state of fascination and enchantment. Paul Virilio quoted the architect Kasuo Shinohara who claimed that "the city of the future will express the beauty of confusion" to what Virilio reacted: "I am, on the other hand, quite convinced that it will in the near future illustrate the tragedy of the fusion of 'biological' and the 'technological.'" [7]

Here the artist is not far from what Virilio fortell. It is also important to mention the recent work of the Brazilian-American bio-artist Eduardo Kacs with his project *Natural History of the Enigma* that consisted of the hybridization of his DNA and a petunia plant (The *Edunia*).

In Esparza's work, the green plant is provided with a locomotive system that at the same time is ignited with clean energies, solar and micro biotic combustion cells. A previous work of his used a similar principle of solar photocell, though it was far more simple and tremendously poetic, the artwork was produced in 2008 and was named *Perejil buscando al sol* (Parsley looking for the sun).

The idea in Perejil buscando al sol as much as in *Plantas Nómadas* is that the artist in a way is altering the evolution of the plant by adapting a locomotion system in the first case, and locomotion and nutrients to a symbiotic system in the second.

An article of Victoria Gill, that appeared in the BBC news, affirmed that "plants can think and remember, based on the founds of the scientist Karpinski Stanislaw (2010), chemical signals could be passed throughout whole plants - allowing them to respond to and survive changes and stresses in their environment, included in his study was a discovery that when light stimulated a chemical reaction in one leaf cell, this caused a "cascade" of events and that this was immediately signaled to the rest of the plant via a specific type of cell called a "bundle sheath cell." [8]

From this perspective, the apparent symbiosis of the plant and the machine, the artificial intelligence and the chemical signals of the plant complement each other. The machine becomes the perfect object, where the movements of the machine, like human gestures, or the locomotion of a turtle, are replicated in the piece, but the automata is just an object. As Baudrillard wrote:

"The strictly practical object acquires a social status: this is the case with the machine. At the opposite extreme, the pure object, devoid of any function or completely abstracted from its use, takes on a strictly subjective status: it becomes part of a collection." [9]

The piece may look like an animal-machine or a toy, but it is not. Its complexity goes further because it is an art piece and falls into a new classification called *Device Art*, We quote:

"What we call device art is a form of media art that integrates art and technology as well as design, entertainment, and popular culture. *Device Art* is a concept that pushes the boundaries of media art and inherits the legacy of the experiments artists have been conducting with media technologies. By raising questions regarding possible relationships between art and technology, the role of hardware-based devices, and the borders between art and its related fields, and creating a common ground for artists and engineers to work together as equals, we might find some answers with regard to future directions rather than the past." [10]

In a sense, the robot reflects the spirit of his creator, it is the perfect mirror or pet, the object is the perfect domestic animal. It is the only 'being' with such qualities that exalts my personality instead of restrained. [11]

Baudrillard compared the robot to a mirror because the robot does not produce real images but only desired ones; it assumes the image of the perfect domestic animal because it highlights the character of its owner. *Plantas Nómadas* incarnates the myth of functionality, where its efficiency is in direct relation with the amount of nutrients contained in the water and the sun that hits the photocells. The robot, as Baudrillard makes a case, [12] is a symbol of a completely functionalized and personalized world that at the same time embodies the abstract power of men *in extremes* and without plunging into identification.

Conclusions

Esparza's robots draw attention to our relations with the environment allowing us to see the fragility of the machine, like nature, that at some point will stop running, perhaps destroyed, or become a part of the museum cemetery.

The creation of Esparza's piece questions the human excesses in consumerism, wastefulness and the lack of control of the public administration to handle the problem of the residues produced.

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[I-METRO] UNIVERSAL ACCESS TO INFORMATION

Therese Tierney

This locative media project takes the position that information, as both a resource and an integral component of the public sphere, should be equally available to all. In response, the URL: Urban Research Lab at the University of Illinois Urbana Champaign designed [i-metro], an interactive information portal to be situated within metro stations, providing locative and comprehensive travel-related information in realtime.

Locative media installations such as this could become an important feature of public transit spaces accessible to multiple users simultaneously. © Tierney.

Introduction

Navigating through an unfamiliar city and gaining access to its many services presents challenges for visitors and new residents alike. As more location-based information moves online, however, mobile communication devices are becoming increasingly important as wayfinding tools. Yet, while such devices (e.g., blackberries, i-phones, droids, and in-dash GPS systems) provide instant access to maps and directories, their price and monthly service fees are frequently prohibitive. Thus, while many urban residents own cellphones, a lack of mobile Internet access may create a tiered system of information privilege. This condition may be particularly acute among those who rely on public transportation, such as job seekers, tourists, low-wage workers, and students. To live without a car in a major American city is often to live without full awareness of one's options and possibilities, limited by unnecessary wayfinding challenges.

For the last two years, URL: the Urban Research Lab at the University of Illinois, Urbana-Champaign, has worked to address this problem through the design of a public interactive information portal, "i-metro." Beta testing is expected in Los Angeles transit stations in 2012 (Fig.1). URL's i-metro project envisions a series of installations whose engaging physical design will combine with interactive features to make

them vastly more useful and empowering than old-line transit maps. Through i-metro, transit riders will be able to freely access GPS and other Internet-based applications, assisting them with wayfinding and emergency communication, while offering access to service directories and providing broad-based messaging capabilities. [1]

Theory and Background

With the expansion of computing and ambient intelligence into many aspects of everyday social life, it has become critical to reexamine the potential and objectives of locative media. This effort has sparked discussion of the contemporary urban condition and how people interact with it.

Over the last decade the increasing power of Information Communication Technologies (ICT) has opened the traditional concept of locative media (printed maps) to new dimensions of interactivity. Yet, whether interactive or old-school, a map remains a representational system; never socially inert, it operates as a stand-in for the city, describing how a particular social group imagines it to be. Since a map is thus both interpretive and productive, it prefigures user experience by structuring a navigational regime.

As a model of Lacan's social imaginary, a map engenders a larger set of questions about how people visualize a city. What do we want our cities to be? How can we employ representational systems and strategies to further those objectives? How might a networked organization dissolve certain barriers and strengthen others? Moreover, if we acknowledge that participatory practices are an integral and important aspect of location-based media, it stands to reason that "scribbling on the map" might actually change the territory. [2]

Since cartographic methods derive their conceptual underpinnings from both spatial and urban theory, the design of locative media is more than a technical problem. Considering the spread of ICT, it also follows that contemporary planners and analysts might focus less on physical boundaries than on shared resources and informational linkages.
Melvin Webber, an urban planner at UC Berkeley in the 1960s, once argued that "the urbane" might be defined less by buildings than by a rich exchange of information; he described communities of people joined by affinities, not by physical proximity. [3] Such a notion of informationally connected communities is compelling, but it fails to address many realities of urban life as they developed in the latter part of twentieth century. For example, the social theorist David Harvey has noted how, during the 1970s, market forces, expressed through new means of accumulation and distribution, began to pressure the historical city, reshaping its borders and diffusing its boundaries. [4] One result was the diminution of public space. Today, however, the adoption of universally accessible locative media suggests the possibility of reembedding the public sphere into a broader or different set of institutions.

A key aspect of URL's work is concern for the public realm — in particular, leveraging existing technologies to create more equitable systems of urban infrastructure. In this regard, the i-metro project is positioned within Kevin Lynch's notion of "The Image of the City," emphasizing the establishment of clearly legible urban environments to facilitate the inclusion of all residents. [5] Lynch wrote in the 1960s, a time when many ideas related to the establishment of socially just societies derived from a discourse of "spatial practice." More recently, the urban sociologist Manuel Castells observed how cities may be better understood as cultural networks. [6] With this in mind, the architect Carlo Ratti of the MIT Media Lab has since called for the establishment of an "Open Source City" based

on collaboration and knowledge sharing. [7] As Malcolm McCollough has further observed, "The notion of a commons . . . has moved beyond the desktop into many more formats and physical contexts, demanding new approaches to shared resources. The genre of 'urban computing' has arisen to explore this. How might the architectures of ambient information enrich urban experience, operate architectures, cultivate environmental sensibilities, or renew responsibility to some idea of a commons?" [8]

I-metro takes up McCollough's challenge by reviving the notion of a commons, working to strengthen information access as an element of the public domain.

Research

I-metro envisions a socially just and civil society, in which information, as a resource, is available to all. Current ICT product development, however, is increasingly oriented toward individualized and hierarchically structured access through personal mobile devices, generically known as smart phones. A working hypothesis for our research therefore was that, while the vast majority of a city's residents own cellphones, the increased power of information acquisition that comes with them does not extend equally across all income levels.

To test this hypothesis and evaluate possible design responses, our research was divided into three parts. In one part, graduate students sought to determine the potential utility of permanent installations for location-based information services within the space of public transit. They traced the historical emergence of ICT as it related to physical mobility from the 1990s to the present, including issues of social equity, accessibility, interactive technology, and the development of participatory media practices. Another part of the research involved review of ethnographic studies concerning the use of public space by the social geographer Claire Cooper Marcus, as well as a literature review of recent sociological work on transit use in urban areas. A third part entailed collection and analysis of demographic data, primarily from the U.S. Census and government surveys, to determine possible correlations between public transit use and lack of access to digital technologies, specifically mobile Internet.

The statistical analysis pointed to just such a correlation between demographic factors, income, and accessibility. For example, 80 percent of smart-phone users earn more than $50 thousand per year, while 34 percent earn more than $100 thousand, reinforcing an already existing digital, economic, and social divide. [9] Such data can be seen to intersect with findings from the report "Public Transit in America: Results from the 2006-2011 National Household Travel Survey," which revealed how strong differences in "household" and "workplace access to transit" are a function of race, income, auto ownership, and urban area size. [10] In general, low vehicle availability predicts high public transit use within the following groups: college students; newly employed 21 to 32 year olds; recent residents; under-represented women; older adults; non-national tourists; and other under-represented groups.

Not surprisingly, some of these groups also have less access to digital technology through computers, the Internet, and smart phones — a phenomenon that has come to be known as the "digital divide." The term refers to the gap between people with effective access to digital and information technology and people with very limited or no access, both in physical and economic terms and in terms of the knowledge and skills to use it. The gap reflects such characteristics as gender, income, race, ethnicity, and location, and is part of a broader divide contributing to social and economic exclusion.

While the digital divide is traditionally defined in terms of access to computers and the Internet, the Census also points to a correlation between income level, education, public transit use, and lack of access to digital technologies. In this case, the missing link is mobile wireless Internet. While smart phones can provide travelers with maps, directions, and information about local services, their cost may effectively create zones of information privilege. Free information portals located within public transit hubs would serve as an educational and wayfinding resource, contributing to a more livable and accessible city.

Project Description

Historically, communication and transportation infrastructures have been strategically paired. For example, the Southern Pacific Railroad built its own communication system using its rights of way, which later evolved to become the telecommunications giant Sprint. Within urban areas metro stations and other enclosed transit hubs are strategic locations to introduce such a public wireless infrastructure because they present fewer problems related to security, weather, and maintenance. Unlike a bus stop, a metro or subway station is an enclosed, supervised space, frequented by great numbers of people.

To attract people's attention, our design envisions a crumpled analogue subway map approximately 6.5 ft. high by 7 ft. wide. Each unique installation would be generated from its specific context, with the overall goal of enticing travelers to examine them and discover the wealth of information they provide.

In functional terms, the i-metro interface will provide a hybrid data input system: a touchscreen surface for primary information retrieval similar to a smart-phone screen, and a motion-detecting sensor to record the user's position in two directions relative to the interacting surface. The surface will also be partitioned graphically to accommodate multiple, simultaneous users, enabling them to share information with each other on-site as well as with others through the Internet.

To enable smooth connections between different modes of transportation, i-metro will provide comprehensive travel information in real time. But the world of digital maps is far more interactive and powerful than can be understood through analogies to printed resources. Additional services such as Google maps, foursquare, Goby, and AroundMe produce another city — one of layered opportunities and data, access to which is most useful when people are on the go. Transit riders might thus query i-metro not only about nearby bus routes and schedules but about the local availability of zipcars and citybikes. Or they might make hotel reservations, purchase event tickets, or find an inexpensive sushi bar.

With its fixed central location, transit riders might also use the interactive map as a messaging board, a digital version of LOck in Seoul or Juliet's Wall in Verona. It might further encompass a gamelike structure, enabling the user to explore, participate, and play, as well as connect with others.

The combination of participatory with locative media will enable i-metro to make visible the connections between individuals and the cultural resources of surrounding neighborhoods. Through social media a neighborhood becomes a location-based network with nodes for eating, drinking, clubbing, dog-walking, etc. Such a locative social network was established on a temporary basis at the 2011 SXSW festival in Austin, Texas. Through i-metro, user-generated content such as narratives and images might not only situate each individual but also acknowledge common interests among transit riders and urban residents, binding them into a greater whole.

Design Process

As part of i-metro's design, demographic data was used to create various scenarios to determine the information that might be most useful to incorporate. During scenario planning, one objective was to establish the personal identity as the anchor in the map. Using the i-metro interface, each user should be able to "find" his- or herself in e-space as well as participate in the construction of a local resource map by uploading content and feedback. Thus the map would change over time, creating a metacommentary on the surrounding environment.

Scenario One: Student Study Group. How an interactive locative messaging board could be used to connect people between e-space and street-space.

In New York, John is extremely stressed. With an exam coming up, he needs to find a place to study because there are too many distractions at home. Judy is on the other side of town, looking for a classmate to study with. On the way to his local coffee shop, John uses twitter on his cellphone to check in/announce his plans. Meanwhile, at her subway stop, Judy runs into another classmate, Jeff, and they decide to study together. While Jeff looks for a coffee shop on i-metro, Judy casually notices on its foursquare feed that John is already on his way to one. Judy shares the message with Jeff by swiping onto his screen. She then texts John to ask if it's okay for them to join him. John, cellphone in hand, notices Judy's request and texts her the address. Judy and Jeff then use i-metro's mapping capabilities to figure out the best way to get there, using its directories of bus schedules, zipcar drop-off points, and subway routes. Judy and Jeff decide the cheapest way is by subway. Boarding the next train, they head off to join him.

Scenario Two: Lost Tourist. How two people with different languages might access wayfinding information, and in the process discover a shared interest and possible unplanned destination.

In Chicago an international tourist is lost; she did not apply for global cellphone service before coming to the U.S. Now, not only does she not speak much English but her smart phone does not work. A native Chicagoan passing by assists her. During translation efforts using the i-metro interface, the two serendipitously discover they have similar interests — baseball, anime comic books, and obscure hip-hop vinyl. The resident places a location tag and uploads comments onto the map, so they will be stored there for future like-minded tourists.

Scenario Three: Vehicle-less Job Seeker. How a job seeker might avoid an embarrassing mistake that might make him late for his appointment.

On route to a job interview, a new Los Angeles resident remembers he forgot to ask directions to the company headquarters. Although he owns a conventional cellphone, he does not wish to call the prospective employer and admit his mistake. Instead, he heads back to the subway station and queries i-metro by entering the business address on its touch screen. The map graphically displays the route and concurrently sends a text to his cellphone with directions. Happy job seeker is on his way!

Conclusion

The project began with the hypothesis that the acquisition and use of smart-phone technology is creating zones of information privilege that exclude many public transit riders. This aspect of the

"digital divide" will become ever more problematic as more locative information moves online. As a design response, i-metro proposes to subvert the inherited navigational regime by offering an interactive, layered method of wayfinding, enabling the user to explore and consider multiple opportunities.

As an urban intervention, i-metro demonstrates how design research might be applied to observe, document, and analyze the embedded politics of unequal information access within a prescribed context and go beyond those constraints to develop a more egalitarian means of information distribution. According to the late William Mitchell: "The task before us is not one of prioritizing technological solutions over human solutions, but rather one of imagining and creating digitally mediated environments for the kind of lives we want to lead and the sorts of communities we want to have." [11]

ACKNOWLEDGEMENTS

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THE NATURE OF (IN) PERFECTION

Kevin Todd

While digital technology can be considered postmodern and progressive from a technological viewpoint, it nevertheless raises issues that have a longer history evident in art and science and an awareness of these can help our understanding and engagement with the technology/medium.

The prefix post (as in postmodern) can sometimes suggest the redundancy of ideas that are surprisingly persistent despite the aesthetic changes that come with the new ideology/technology. Looks can be deceiving!

Precision, perfection and beauty have a persistent presence in art, science and religion and a contemporary presence in digital technology, which *carries* these attributes/attitudes. Although the desire for and promise of progress can lead to image content that appears to supersede the preceding idiom, digital technology has a metaphysical character that has more in common with a pre-modern sensibility.

Another characteristic of digital technology is the extent to which the supposed separation of physical form and content actually masks its inherent qualities. Global communication suggests a transcendence of analogue imaging media such as photography and there is a sense that digital images are *free* or have gone *beyond* the physical limitations of older media. A photograph has intrinsic visual qualities inherent in the medium whereas a digital image does not; it can appear like it wants, even masquerade as a photograph. Measured against the standards of older media digital media can be thought of as trans-media.

However, digital media do have qualities inherent in the technology, although these only become visible if the operator/artist chooses to acknowledge them. Digitisation primarily involves the management and manipulation of data, underpinned by rationalism, precision and a relationship to space. The organizing principle of digitisation is mathematical and the *appearance* or pictorial content of the image is of no consequence to it. Like science, the *method* can be divorced from the outcome and the medium is indifferent to the consequences of image content. Mathematics like science can imply objectivity, lead to a sense of detachment and the loss of responsibility that comes with this. There is an aesthetic *and* ethical quality to the rationalisation inherent in digitisation and the difference between the aesthetic character of the medium/technology and the aesthetic relating to form/content of the image is therefore a significant quality of digital media. Umberto Eco addresses the "aesthetics of number" in his book *Art and Beauty in the Middle Ages*;

".....since number, or order or proportion, is as much ontological as it is ethical and aesthetic. Aesthetic qualities predominate if one adopts a contemplative perspective on something, rather than an active role." [1]

There is a case then for an active engagement with digital media, one that does not accept that technological progress involves the redundancy of older ideas and media; a refusal to be duped by the prefix "post". This engagement needs to explore digital media through an acknowledgement that, like science it has a longer history and can't be neatly quarantined from an imperfect past.

Margaret Boden identifies three types of creativity in her book *Creativity and Art: Three Roads to Surprise* "each distinguished by the types of psychological process that are involved in generating the new idea." [2] These are;

- Combinational - unfamiliar combinations of familiar ideas.
- Exploratory - exploring (existing) conceptual spaces.
- Transformational - transforming the space.

We generally think for digital media in the transformational context and this fits with Boden's hypothesis where the new media has "impossibilist" characteristics in relation to the preceding media but "with both structural continuities and structural discontinuities between the transformed space and the impossible successor." [3]

Transformational creativity is seen as progressive and there is often an emphasis on this when we teach art history. The transformation from representational to more abstract art that occurred in the later part of the 19th and early 20th century is a good example as is the development of perspective during the Renaissance. An important point in both these instances is that although paintings may have *looked* radically different the actual medium itself didn't change, allowing the transformation to be easily positioned in an art historical context. However, Paul Crowther in his paper *Ontology and Aesthetics of Digital Art* suggests that traditional idioms had reached their limits at a formal or structural level in terms of the semantics of likeness and the spatial coherence of space such as through perspective;

"The exhaustion of large-scale artistic innovation is due, rather, to the fact that the *structural* conventions and properties that constitute pictorial representation are unable to sustain further significant development at the structural level itself.*"* [4]

Although he acknowledges that abstract art offered new possibilities he suggests that it too has been "exhaustively developed in structural terms." [5] Crowther places an emphasis on the structural/formal innovation of media as opposed to the pictorial content and its connection to the individual artist. There is a danger here that technological innovation becomes the primary factor in the artistic relevance of work created with digital media and its attitude toward the "exhausted" work of the past. Digital media involve a transformation of both medium (technology) and content but I would suggest that there are also exploratory and combinational aspects in relation to other media and art history in general. The extent of the transformation may not be as radical as we think.

Perhaps the most significant and comparable transformative medium prior to digitisation was the development of photography where technology and image also combined. Indeed it has been suggested that photography's emphasis on representation was a contributing factor in the development of abstract art and photographic representation is still considered the "standard" means of depicting the world; so much so that digital media sometimes mimic this. Interestingly, there were stylistic similarities between early photographs and paintings, particularly in the poses for photographic portraiture where long exposures were possibly a factor. Photography too was initially seen as primarily a technical achievement, although the technology needs to be positioned in the context of the desire for a particular type of picture, that; "….was not a bastard left by science on the doorstep of art, but a legitimate child of the Western pictorial tradition." [6]

The archaeology of photography has been explored where the development of the medium is considered in the historical context of for example, the camera (camera obscura), optics, chemical processes, industrialisation and the psychology/history of pictorial representation. If photography was the defining medium of the modern then the characteristics of digital media can be considered definitive of the postmodern. In this context we could consider digital media as the development of the *contained* image and a relationship to light - a history of the image in a box, including; the camera obscura, photographic camera, television and computer. Yet there is a sense in which digital media are thought to have superceded history and Erkki Huhtamo and Jussi Parikka address this in the introduction to their recent book on media archaeology.

"……..studies of new media often share a disregard for the past. The challenges posed by contemporary media culture are complex, but the past has been considered to have little to contribute toward their untangling. The new media have been treated as an all-encompassing and "timeless" realm that can be explained from within……..The past has been visited for facts… but .. their relationship to the observer and the temporal and ideological platform he or she occupies left unproblematized." [7]

Perhaps the most profound claims made in relation to digital media concern the materiality of information, the relationship to space and to the human body. At a basic level digitization is considered as a type of casting-off of the physical in that the number (code) involved is presented as if it were a concept, an idea. This dematerialized information can then be communicated independent of its physical carrier (its materiality) thus reconfiguring a relationship to space and time. In addition, the lack of perceived physicality allows for plasticity in relation to content and any media specific mode/style of representation. This desire to transcend the physical might have a religious impulse as Margaret Wertheim writes;

"Here, contemporary dreams of cyberspace parallel the age-old Platonic desire to escape from the "cloddishness" of the body into a "transcendent" realm of disembodied perfection –the realm of the soul. Western culture carries this seed deep within it, inherited both from the Greeks and Judeo-Christianity." [8]

However, just as an idea requires embodiment in the human body or in an artefact in order to exist and be communicated (notwithstanding Plato's ideal forms), digital information requires a technological apparatus in order to exist. The basic element of digitisation is the expression of code electronically – the control and manipulation of electricity in the creation of light on a screen to display image or text. Computer code evolved as a means of *performing* electronically and the code is active because it relies on electricity to execute itself. The astounding achievement of digital media is in the precision/perfection required to actively control the billions of electrical signals needed to generate information/images.

We could also consider digital media in the context of the psychology of content, both in terms of the individual user/creator and in a collective sense. Indeed it has been suggested that cyberspace and the internet are a manifestation of our collective subconscious, complete with archetypes and gods - Mark Stefik explores this in the book, *Internet Dreams: Archetypes, Myths and Metaphors*. However, we can also consider the creation of the technology itself as a reflection of a collective culture or psychology, particularly now that the intrinsic (analogue) link between medium and message, between physical form and content has been broken for the sake of manipulation. Does precision stem from the desire for perfection and the feeling that we can/must escape the physical and might this attitude have a history that would better help us to understand digital media? Also, would this approach help position digital art in a broader historical context and more importantly, would it relieve digital artists of the pressure and iso-

lation of working in an "all-encompassing and timeless realm that can be explained from within." An interesting point here is the extent to which the quality of work produced by my undergraduate students has not "improved" over the past ten or fifteen years despite the significant improvement in the performance of the technology they are using. Their artwork isn't any "better" despite the increased sophistication of the tool and I wonder if technological development places a pressure on the art/artist to also be transformative.

The computer code underpinning digitisation is actually the means by which we interact with the machines we build to control. This code needs to be rational and unambiguous and all inputs or content needs to be expressed in a mathematical/electrical form in order to be processed. Because there are no intrinsic visual characteristics to this reduction the machine/process is ambivalent about the image content. Digitisation intervenes in the relationship between the image and the object and it breaks the connection between images and objects such as exists with photography, where the medium receives and accepts something external to its self. This breaking of representation in the image-object relationship is significant in that the visual integrity of the source (the object) and its part in a dialogue with a component of an external (fixed?) reality is preplaced by the monologue of the virtual in the man-made machine. There is a kind of *turning away* from the external, from the representation of a fixed reality; a turning to the screen. The passive objectivity of the camera is replaced by the active and subjective character of the computer-based image, which is readily available for manipulation.

There is an interesting correlation here with debates regarding images prior to the Enlightenment when intromission and extramission were competing theories for the source of meaning. David C. Lindberg discusses this at length in his book, *Theories of Vision: from Al-Kindi to Kepler* where he explores vision, optics and light. In broad terms intromission accepted that images were external and received by the viewer whereas extramission involved the subject projecting light in order to produce the image. Although proponents of the theories did not approach the problem in the context of our current understanding of psychology, nevertheless there is a correlation between meaning that is fixed and external and that which is subjective and generated by the viewer. Images and light are problematic because we conceive of them as somehow being on the border of the physical/non-physical interface; metaphysical mediators if you like. Lucretius pondered this problem in the first century B.C. when he conceived of films emanating from the object as physical entities.

"Finally, Lucretius (ca. 55 B.C.) attempts to clarify the nature of the films (which he calls simularcra) coming from the visual object, through several comparisons: "among visible things many throw off bodies, sometimes loosely diffused abroad, as wood throws off smoke and fire heat.."..Vision, then, is reduced to a species of touch …If this intromission theory leaves many unanswered questions…it nevertheless answers the principal question: namely, the soul of the observer and the visible object make contact." [9]

Because Lucretius was an atomist he believed that sensation must be caused by physical contact and that all matter consists of small particles called atoms, which can be considered analogous of the atoms later discovered by scientists. However, these atoms coalesce to "form coherent units-films or simularcra" [10] so that the film has an integrity/continuity without gaps between the atoms — much like comparing the continuity of a photograph with the pixilation of a digital image. However, the photographic image is connected with optics and perspective and indeed the "laws" of perspective apply to photographs because the light rays from the object pass through a single point in the lens. Both photogra-

phy and perspective presuppose that light rays, travelling in straight lines connect the image and the object or the eye and the object. This presupposes a world of multiple point sources, a concept that mathematically fragments coherence. Lindberg addresses this;

 "…before Alhazen, the intromission theory *was* the theory of coherent images or forms. Alhazen was the first to utilize the analysis of the visible object into point sources, each of which sent forth its ray, as the basis of an intromission theory of vision. If such a step seems trivial today, that is because we are Alhazen's intellectual progeny." [11]

This concept of fragmenting the world into multiple geometric points involves a similar attitude to its fragmentation into multiple pixels for digitisation. Both seek to establish a reductive mathematical relationship based on rational data and although the digital data results from this process, its performative character and plasticity in relation to image content allows it to mask its rationalism. Digital media maintain their technical/rational character despite image content even when they seek to mimic other media such as painting for example. The benefit of this technical interaction with the world is control, a characteristic addressed by Michael Eldred in his paper *Digital Being, the Real Continuum, the Rational and the Irrational*;

 "The unique hallmark of specifically digital technology is that it is binarily encoded productive understanding of a segment of the world *outsourced* to an electromagnetic medium to control a machine." [12]

The segmentation of reality is further discussed by Eldred specifically in relation to the abstraction of time and he concludes that there is an ontological limit to the *calculation* of the continuum of reality; "Physical reality, even on a banal macroscopic level, therefore always exceeds what can be logically, mathematically, rationally calculated."[13] This *calculation* of reality has a long history, for example in the fifth century B.C. Philolaos stated that "All things that are known have a number: without number it would not be possible to know or think anything whatsoever." [14]

While we might conceive of an authentic reality (the original) and an inauthentic representation of it (the image), our experience of the image/technology is real and using a computer is *part of* reality even if we critique the ontology of the technology as somehow being a surrogate for our relationship to the world; the relationship between mind and nature.

Eldred states that there is no way to discuss digital being without reference to Heidegger and perhaps in this context it is worth considering Heidegger's three types of representation; "bodily presence", "empty intending" and the "perception of a picture". These categories presuppose an *original* object either actually present (bodily presence), dreamed/imagined (empty intending) or physically depicted (perception of a picture). The sculptures of Greek gods referred to earlier do not fit easily into this classification as the original is imagined – we have "bodily presence" in the form of the actual sculpture of something that began as "empty intending". However, a photograph of the sculpture would involve "perception of a picture" of something with a "bodily presence" and we would be once-removed from the original "empty intending." But, what would a digital scan of the photograph be?

A digital image, which may be virtual or representative of something external to the computer, does not fit with a system that invests the original with authority in relation to meaning. A computer-generated fractal for example may have no physical correlation beyond the computer and the image on the screen

would thus involve "perception of a picture" of something that may have begun close to "empty intending" but needed the processing power of the computer to be realized as an image – an outsourcing of imagination perhaps!

However, the fractal image on the screen must have a "bodily presence" to be visible to another viewer; otherwise it would be "empty intending." Its "bodily presence" is something not intrinsically linked to the image as the millions of pixels or points of light can be reconfigured to represent anything. Perhaps this causes us to feel there is an inauthentic character to the digital image, but this would only be the case if we seek a link to something authentic (the original), whereas the digital image doesn't necessarily do this; it has a disregard for the original.

While digital technology can be considered postmodern and progressive from a technological viewpoint, it nevertheless raises issues that have a longer history and an awareness of these can help in our understanding and engagement with the technology/medium. To quote, Margaret Wertheim again from *The Medieval Return of Cyberspace*; "Through the medium of the computer a loophole has been found in the materialist metaphysics that has dominated Western culture for the past three centuries..." [15]

Perhaps I should leave the last word to Goethe who comments on reason and reality; "They were rational, clever, lively people who saw very well that the sum of our existence, divided by reason, never goes evenly, but always leaves the remainder of a queer fraction." [16] Of course Goethe means queer in the sense of odd or strange and my dictionary also lists queer as meaning; dubious, shady, giddy, slightly mad and counterfeit, which is possibly why I enjoy digital media so much!

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CAPTURING GESTURES FOR EXPRESSIVE SOUND CONTROL

Todor Todoroff, Cécile Picard-Limpens, Julien Leroy & Alain Crevoisier

We present different tools that give musicians extended control for live performances. We developed at Numediart a wireless system of light wearable MARG sensors. We also developed tools to align the orientation of each performer's limb with the skeleton from the Microsoft Kinect camera. The Surface Editor is used to easily and intuitively map sensor data to OpenSoundControl or MIDI messages.
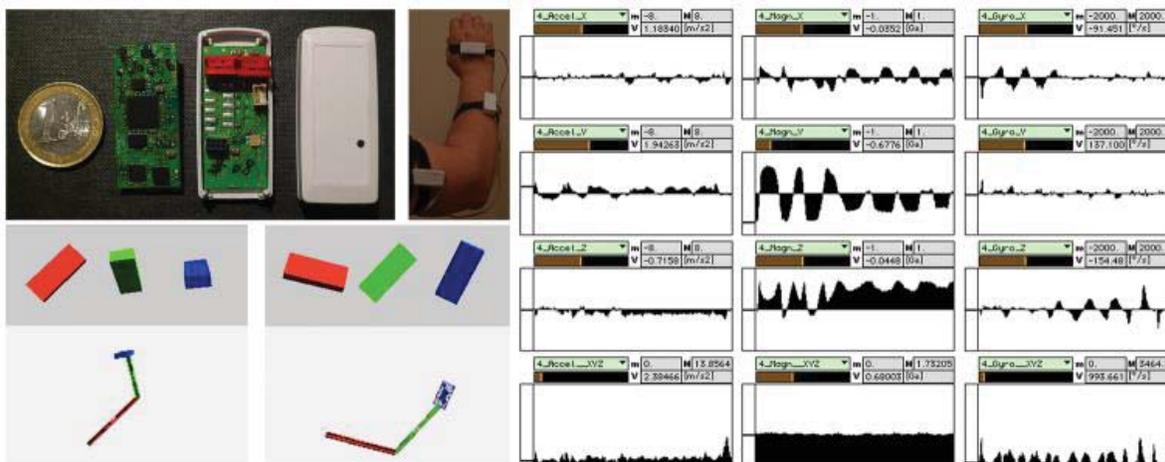
Fig 1. Top left: Sensor node, from left to right: 1 Euro coin, bottom, top PCB views and boxed, with hole for control LED; Bottom left: Attitude of the upper arm (red), lower arm (green) and hand (blue), and reconstructed skeleton in Jitter; Right: Max/MSP Display of the 3 axes of the accelerometer, magnetometer and gyroscope, with total amplitude.
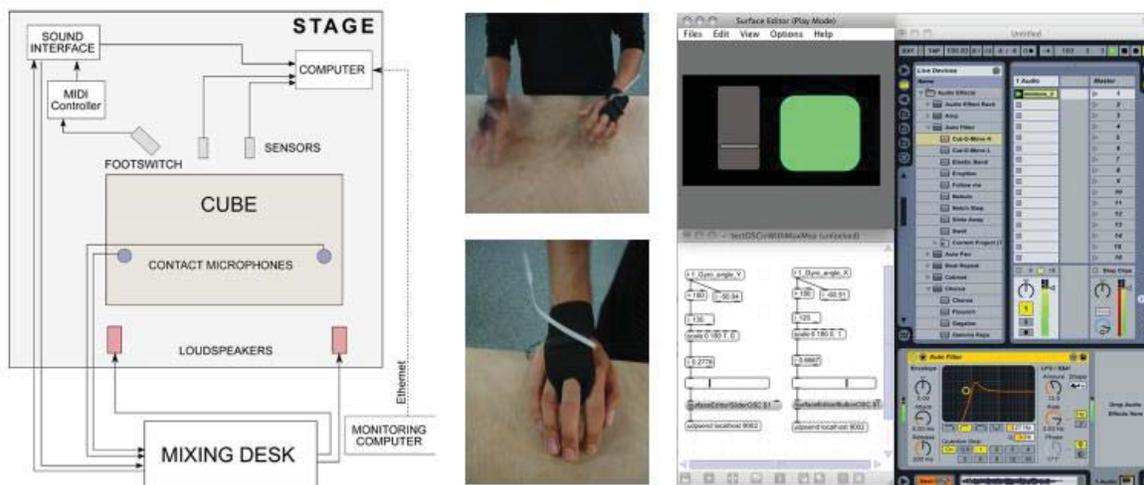
Fig 2. Left: Augmented percussion ("CUBE") with sensors: scheme of set-up; Center: The percussionist wears the sensors on its hands. Gestures orientation are mapped to specific sound modulation parameters; Right: Parameters of the device in Ableton Live applied on Track 1 are controlled by the sensors through the Surface Editor.
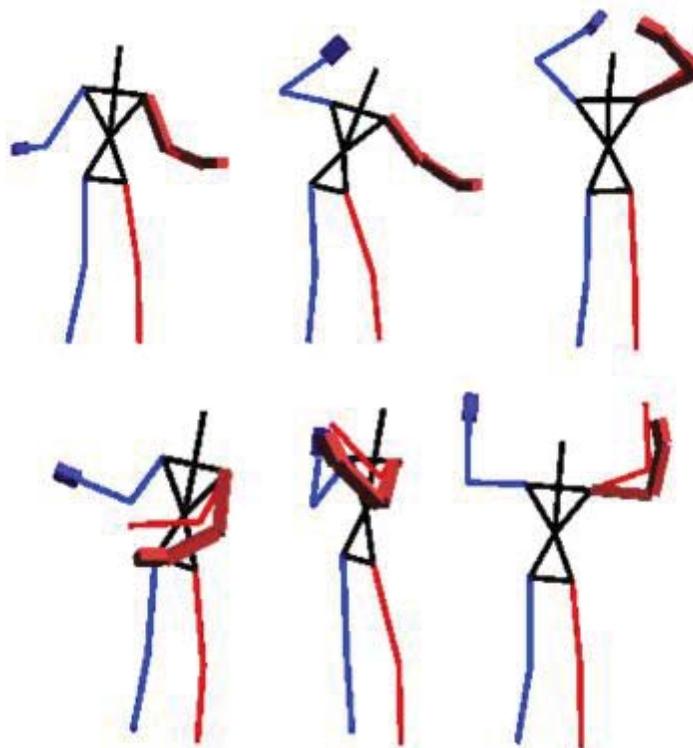
Fig 3. Fusion between the Kinect skeleton (thin lines) and the "sensor" limbs (left hand and right arm, solid bodies) in Jitter, aligned in top pictures, while bottom pictures show misalignments due to Kinect latency and its approximative evaluation of elbow and wrist positions.

1. Introduction - Musical Gestures and Interfaces

Musical communication between musicians and listeners, is based on movement: performers control instruments through body movements, which are encoded through audio, and finally analyzed by listeners [Godoy and Leman, 2009]. The concept of gesture, defined as "a movement of part of the body to express an idea or a meaning", and the extensive presentation of its relationships with sound in music have emerged [Godoy and Leman, 2009]. [Cadoz, 1988] proposes a classification of instrumental gestures depending on their function: excitation, modification and selection gestures. New technologies used for musical performance should therefore build meaningful combinations of sound and movement, in order not only to ensure coherence in the musical experience of the performer, but also to preserve the musical communication between musicians and listeners.

We focus here on the idea of "augmented instruments", i.e. acoustic instruments with additional technology capabilities [Miranda and Wanderley, 2006]. It relates to some of the Hyperinstrument projects (http://opera.media.mit.edu/projects.html) at MIT. We aim at extending musical playing techniques digitally in meaningful andintuitive ways while minimizing the performer's constraints. This approach relies heavily on technologies that are able to track the gestures of the performers.

We present in section 2 the MARG (Magnetic, Angular Rate and Gravity) sensors we developed at Numediart [Todoroff, 2011]. The attitude of each sensor can be computed, giving the orientation of each

performer's limb they are attached to. We developed tools to align those orientations with the skeleton obtained with the Microsoft Kinect camera (http://www.xbox.com). It becomes then possible to replace some limbs of the Kinect skeleton by faster and more accurate limbs computed from the sensor data, while keeping the absolute position of the torso given by the Kinect. Our gesture recognition algorithms [Bettens and Todoroff, 2009] show improved performances when used with orientations rather than raw sensor data. The first prototype of these Numediart sensors was used in 2010 in a project with a viola player who dances while playing the viola [Todoroff et al., 2011]. This on-going project explores gestures beyond the usual augmented instrument focus, like leg movements, as it aims to transform the whole body of the performer into a sound body, extending the traditional sound body of the acoustic instruments to the combination performer + instrument. In section 3, we describe the Surface Editor, a mapping tool originally developed to create control interfaces with a tactile surface. We used the Surface Editor for interfacing the sensor data to sound devices through MIDI or OSC (http://opensoundcontrol.org/) protocols. We finally present a project at HEM intended to focus on the percussionist's movements, and, in particular, those movements that do not directly produce sounds but are performed when preparing or exiting a sound producing gesture (section 4).

A well-formatted pdf version of this paper can be downloaded at http://www.numediart.org/files/capturing_gestures_for_expressive_sound_control.pdf

2. Tracking and recognizing gestures

2.1. Numediart sensors

We started in 2009 at Numediart the design of small wearable sensor nodes that include 3-axial accelerometers, gyroscopes and magnetometers. Our latest design, in 2010, offers 6 additional analog inputs to connect optional sensors (pressure, flexion, light, ...). The 17x38 mm circuit board fits into a tiny USB key plastic box and weights only 5 grams, box included. The nodes may be used as such with a wired USB interface, using a cheap serial to USB bridge. But they were designed to be connected, through a digital I2C Bus, to a dedicated Master node/WiFi transmitter that includes a LiPo battery and a charger in a small 70x55x18mm box, offering about 10 hours autonomy. Up to 8 sensors may be connected at 100Hz sampling rate. More details about the sensors specifications and the Master/Slave node architecture can be found in [Todoroff, 2011].

2.2. Software tools

Sensor data, received either as serial bytes over USB or as UDP packets over WiFi, is decoded by a custom-made Max external that outputs values in meaningful units: acceleration in g, rotational speed in deg/s and magnetic field in Gauss. These values can easily be mapped, within the Max/MSP environment, to sound attributes. And additional processing may be done to extract other features, like hit detection from the accelerometer data.

Having MARG sensors, we use the [Madgwick et al., 2010] method to compute the attitude in quaternions. Attitude is the absolute orientation in the 3D space defined by the earth gravity and magnetic fields. We offer the user a two step procedure: a calibration step, facing magnetic North, to compensate for sensors misalignments on the body, followed by a rotation around the vertical axis, to define the chosen direction for the performance. Quaternions can then be transformed to equivalent Euler sequences of rotations and those angles may be mapped to sound parameters.

If enough sensors are placed on a limb, quaternions can be used to animate a skeleton, giving the relative positions of joints. We may also easily compute the angle between any two given segments, like the angle of the elbow, a very useful feature to map to sound.

2.3. Fusing Numediart sensors and Kinect skeleton

Knowing its position, the Kinect from Microsoft (http://www.xbox.com) is able to reconstruct a 3D scene that provides an absolute reference to the real world. Our application, built on OpenNI libraries and drivers, detects users, tracks their skeleton, transforms camera-centered coordinates to stage-related coordinates, and sends the individual joint positions as OSC messages. The Kinect tracking lacks precision as some joints, like wrists or ankles, are not detected. The skeleton therefore doesn't provide individual segments for lower arm and hand, or lower leg and foot, but "virtual" segments that combine both.

Connecting limbs from our sensors to the Kinect skeleton, we keep the good absolute position of the torso and shoulders from the Kinect, as well as a useful approximation of limbs not equipped with sensors. And we track, with sensors, body parts (like hands or feet) or rotations of limbs around their own axis (like arm or wrist twists) that cannot be tracked with the Kinect. With their lower latency and higher 100Hz sampling frequency, sensors follow more accurately those body parts that, because of their lower inertia, are able to move faster. While accelerometer and gyroscope data may still be mapped directly to sound processes, independently of the attitude and skeleton.

2.4. Gesture recognition

We presented in [Bettens and Todoroff, 2009] a multigrid implementation of Dynamic Time Warping (DTW), adapted to sensor data and available as Max/MSP/Jitter (http://cycling74.com/products/maxmspjitter/) external objects and patches. It allowed to recognize gestures, from a user bank of pre-recorded reference gestures, without prior segmentation, i. e. on the fly, not knowing when a gesture starts or ends. We implemented new distance estimators directly from the quaternions defining the attitude in 3D space. It has many advantages over the estimation of distances from acceleration and gyroscopic data as we did previously:

- attitude does not depend on the speed of execution of a gesture, giving consistent distances at all speeds;
- the orientation in the horizontal plane allows better discrimination between similar gestures;
- as attitude data varies slower that raw data, the computation may be downsampled by a significant factor without loosing useful information, reducing the processing load by the same factor;
- distance estimation from attitude data is more efficient, as only one distance, between the reference and the incoming quaternions, needs to be computed;

We recorded for instance one reference gesture for each letter of the alphabet, using 3 sensors. We could then write a text by drawing each individual letters in the air, with a downsampling factor of 8, with hardly no false positives or negatives. We found this test conclusive, as discriminating all the letters of the alphabet is a more complex task than recognizing the reference gestures that would usually be defined for a musical performance.

3. Mapping Gesture Data to Sound Effects

The Surface Editor (http://www.surface-editor.net/) has been developed as a flexible mapping tool [Kellum and Crevoisier, 2009]. It enables users to create interfaces between inputs, e.g. gestures, and outputs, e.g. sound attributes, by configuring components (zones, buttons, sliders, etc.) and attaching actions to them. Those actions will be processed when specific user-defined conditions are met: for instance, an action attached to a slider can be triggered continuously or only when the slider value changes. Originally conceived for a tactile interface, the Surface Editor has been extended to support the input of any device sending OpenSoundControl (OSC) information. In that way, the Surface Editor is able to gather different input variables from external hardware controllers, such as sensors, in a coherent manner. In addition, it is possible for one controller to change the behavior of another one.

We set the communication from our sensors to Ableton Live (http://www.ableton.com/) using the Surface Editor. Signals from the sensors are sent from the Max/Msp environment via OSC as input parameters to the Surface Editor. The Surface Editor supports LiveOSC (http://liine.net/livecontrol/ableton-liveapi/liveosc/), allowing Ableton Live to inform it of all the available destinations: volume, clips (audio samples) and devices with all their parameters. The user can then map a sensor input action to the desired Live destination simply by selecting it from a dropdown menu. This greatly simplifies the mapping workflow.

4. Experiment with students at HEM

4.1. Approach

We distinguish between sound effects that concern the sound source and those that are related to the sound propagation. In the case of the percussion instrument, the attributes of the instrument (geometry, size and material), the position of the hit on the surface and the characteristics of the excitation strike (i.e., the 'rigidity' of the striking finger(s)) affect the sound production. For example, we can extend the sound production possibilities of the given musical instrument by applying an effect that simulates the acoustic characteristics of other resonant objects. This may be mainly done by acting on the frequencies, amplitudes and decay rates of the resonance modes of the instrument. On the other hand, the sound propagation is mainly depending on the acoustic environment, i.e., the space configuration and the potential secondary sources that affect the amount of reverberation. These elements are rather fixed during a 'classical' performance, but we can add sound effects that simulates a virtual acoustic space where sounds appear to originate from a specific direction in space.
The sensors allows to detect static data such as the angle of the hand in the three directions, but also dynamic data such as the amount of energy of a movement (deduced from the output of the accelerometer). These elements can be used as gesture attributes for mapping sound effects. Having a sensor on each hand can allow enabling/disabling one sound effect with one hand, whereas the other act on modulation parameters. Also, sound effects including several parameters can be better controlled by the use of two hands, such as the reverberation effect where the amount of delay and filtering can be treated separately. If we focus on the percussionist's movements, there are several gestures that do not directly produce sounds and can be used for sound modulation. When exiting a striking movement, the hand movement of the percussionist is progressively slowed down. This movement decrease can be easily used to modulate the amount of an effect. On the other hand, the preparing gesture, e.g., the impetus of a strike, can be handled to set a specific sound layer before the effective strike sound.

4.2. Performance

We collaborated with two students of the Haute Ecole de Musique de Genève (HEM), one in the composition class and the second in the percussion class, both with a contemporary music aesthetic. Our purpose was to provide a technology that can not only be easily integrated by the instrumentalist, but that also allows new trends and ways of composition. The development and configuration of this new musical tool was the result of a constant dialogue with the composer and the percussionist, providing an added musical dimension, straightforward for the composer and non-intrusive for the performer.

The sensors were attached to the hands of the percussionist in a way that doesn't hinder his movements, a very important factor for the performance. The composer defined specific ways to notate the new musical gestures in the score. The percussionist was not asked to perform unusual gestures. The composer focused instead on investigating percussionist's gestures that do not sound in reality, and used those to modulate the sound.
The percussion instrument is a simple wooden cube, referred to as the "CUBE". The signals of the contact microphones are used to amplify or modulate sound. A footswitch allows the percussionist to switch between playing modes.

5. Discussion and Conclusion

We presented solutions for musicians to augment musical performances. We proposed a wireless wearable sensor system and a Max external object that delivers the attitude of each body part equipped with a sensor. Sensors don't provide absolute positions. But we showed how data from a Kinect camera can be combined to give the absolute position of the torso and "sensor" limbs attached to it, as well as the approximate position and orientation of limbs not equipped with sensors. The user can record a bank of reference gestures he wishes to recognize and use our multigrid DTW implementation to do so. We then introduced a software tool, the Surface Editor that allows to map sensor data to sound attributes, while preserving the close relation between musical gestures and sound processing.
In the future, we plan to combine the sensors with the Airplane [Crevoisier and Kellum, 2008], a previously introduced device that uses computer vision to track the interaction on a 2D surface, wether with hands, mallets or sticks. This alternative to the Kinect would allow to combine the attitudes of percussionist gestures with precise absolute location of contact points on the performing surface.

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TOWARDS GEOSPATIAL CULTURAL PLANNING: STRATEGIES FOR LOCAL CULTURAL INNOVATION WITH LOCATIVE NEW MEDIA ART

Tanya Toft

This paper explores locative new media art in a contextual framework of cultural urban revitalization. I characterize two kinds of "site-specifics" in considering locative media art as a tool of "geospatial cultural planning". I propose the application of "location-based media" to the "mediated locality" in a "performative program" of locative media art, which facilitates a platform for cultural innovation among citizens.

This paper explores a conceptualization of locative new media art in a contextual framework of revitalization of urban spaces. The intersection of urban and new media studies has opened up a dynamic field of practice and research. The engagement of citizens and urban environments through mobile activities is explored in practices of urban planning and community development; for example, in experiments of mobilizing people to use their mobile devices to collect data in the urban for re-constructing a sense of cultural community around data maps, and, of mediating a locality through virtual overlays of augmented reality, or in site-specific multimedia installations. The significant attention toward site-specificity and locality in multidisciplinary practices of urban revitalization is the topic of consideration in this paper; in particular, the application of locative media art to strategic urban revitalization and community development. The paper asks: How can we consider the "program" of the locative media art project as facilitating socio-spatial relationships in a way that cultivates a site and the activities in it?

Meaning and Matter in Space and Place

I will begin this paper by considering a conceptualization of the structures of the environment in which locative media art projects "work," which is a condition for considering such projects as intervention strategies for urban revitalization. New media technologies, including mobile media, ambiguous and pervasive computing, have come to reconfigure our understandings and experiences of space and culture in between the microcosm of the everyday and the macrocosm of spatial flows. As noted by Scott McQuire: "If urban space has historically been defined by the relation between static structures and mobile subjects, this dichotomy is fast giving way to a hybrid spatiality characterized by dynamic flows which not only dissolve the fixity of traditional modes of spatial enclosure, but problematize the unified presence of the subject traversing the contours." [1] Manuel Castells' concept of the spaces of flow refers to "the material organization of time-sharing social practices that work through flows" and to the interrelated linkages across an infinite amount of local and global relationships. [2] In the spaces of flow, cities develop in between material and immaterial organizations as dynamic fields of shifting intensities and immersive environments, in which hybrid spatialities are formulating and reformulating new rhetoric's for its urban spaces.

 With the development of spaces of flow, we moved from one kind of conceptual, spatial geographical structure to another. We moved from what Gilles Deleuze and Felix Guattari describes in "A Thousand Plateaus" (2004) as "striated space," which is delimited, organized and has rules, to "smooth space",

which is "flat" and contains no fixed elements, no barriers, and is unprogrammed. [3] In this conception, the spaces of flow has "smoothened" space, as it has broken down the fixed organizations of form, function and meaning. It is in this condition of smooth space, with a lack of consistency and pre-scribed functions, that locative media art projects become powerful in re-formulating the possibilities for appropriation, negotiation and imagination about locality, because site-specific media operates in the immaterial level of the spaces of flow but gains its matter from the space of places.

The Construction of Situations of Resistance

The mobile construction of situations was the program of the psychogeographic explorations of the 1960s (between 1957-1972) avant-garde movement, the Situationist International. Through the "dérive", a technique of rapid passage through varied ambiances, the Situationists explored a different appropriation of the city by navigating its psychogeography in a playful-constructive behavior of "drifting". The dérive is the route in locative media art projects. For example, in the second location-aware album of the music band Bluebrain's entitled "Listen to the Light", this uses a cell phone's built-in GPS-capabilities to let the music change as one moves around Central Park in New York City in a form of dérive (the project is to be released on October 4 2011) (www.bluebrainmusic.blogspot.com). The drift follows a psychogeographic map, which shows which locations are tagged with sound. In the dérive, a situation is constructed in the drift; in the re-composition of parts of experience by which an experienced "map" of the city is reformulated.

The Situationist intention was not just to interpret situations but also to transform them. Their ideas of resistance toward the homogenizing and disciplining effects of the functional urban planning ideas of the 1950s and 1960s called for the metro stations to be opened at night, for roofs to be available and designed for people to use them, for churches to be used as children's playgrounds, and for the distribution of artworks in cafés and pubs rather than museums. This was to be done within the aesthetic notion of the détournement, which the Situationists Guy Debord and Gil J. Wolman characterize in *Détournement as Negation and Prelude* as "the re-employment in a new unity of pre-existing artistic elements." [4] Characteristic of all instances of détournements is that they emerge from people's urges to appropriate and use the city in a desired way, which to different extents become expressions of claiming the city's urban territories. The Situationists apply the aesthetic concept of détournement to a vision of a "unitary urbanism" of social and everyday life, a form of unification of space and architecture with the social and individual body, of resistance toward the organizational form of the built environment. When we think of locative media art projects as détournements, they become site-specific explorations of a human geography and seeks to "reclaim the street" through experiments with methods for navigating, exploring and experiencing the city. This is a creation of site-specific, artistic re-claimed situations in urban space. These acts of appropriating urban environments form the conception of places to become more mobile in their composition as urban constructs, because their use changes and so does the system of practice they become a part of, which their future use is eventually thought into. The détournement constructs a situation in the reformulation, or re-employment, of an environment.

The situations of resistance found in the dérive and the détournement might "work" in two different, perceptual levels of city. These are illustrated in the two perspectives characterized by Michel De Certeau in the essay *Walking in the City*. De Certeau report from his position on top of the high-rise building of the World Trade Center, which gives him a birds-eye perspective on Manhattan, and sees how the city is laid out, legible and resolved, and how things relate to each other. [5] This is a particular logic of rationality of seeing in the city. In particular, if we consider Guy Debord's illustration of the

dérive in his psychogeographic map, although this is performed at the street level, it gains its significance from the re-composition of urban environments in the psychogeographic map on a mental level above the street – where the experienced urban elements are brought together to form a new map. The contrasting view, which he then describes, is explored in the act of walking in the city, of moving around on the street level. In the street-level perspective, the urban environment is a site of practice, embodiment, and sense-experience. The détournement "operates" from a street-level perspective, which is the level where the city is experienced and physically appropriated.

Location-based Media and Mediated Localities

The two perspectives sketched by De Certeau characterize two directions of spatial thinking in mapping and GIS technologies; as two directions in "the spatial turn," which with the developments in technologies and new mobile media came to change spatial conceptions and geographical imaginations. Edward Soja defines "the spatial turn" as "…fundamentally an attempt to develop a more creative and critically effecting balancing of the spatial/geographical and the temporal/historical imaginations." [6] Thielman characterizes the two parallel developments in the spatial turn as 1) a spatial turn in media studies, which can be characterized as concerned with how geographies shape and explain social processes and social action, and 2) a media turn in geography, characteristically concerned with how social processes shape and explain geographies. [7] These diverging approaches compose a double determination of the idea of "site-specificity" in the "genre" of locative media art projects.

The spatial turn in media studies is characterized by "location-based media", which is often explored through tagging and tracking with GPS and Wi-Fi. This is the spatial situation of the "geo-tagger," in which media documents geography, and by which our handling of space and place is reorganized sociotechnically. [8] Examples of this notion of locative media is found in the project "A Map of Our Own: Kwun Tong Culture and Histories," which is a multimedia project programmed for a discussion of urban renewal while Kwun Tong, a town in East Kowloon of Hong Kong, is undergoing a large urban renewal plan. The project started in 2009 and is scheduled to end with the end of the renewal in 2021 (www. kwuntongculture.hk). The project uses locative media in an audio-visual mix and rendering of sound, still image and moving image, which are documented on site and collected in a digital map of Kwun Tong. The project traces history, documents unique parts of culture and spatial practices, and raises public attention to the changes in the town in period of renewal. The collected media comes to compose a culturally shared narrative of Kwun Tong. The videos and images of Kwun Tong are collected in an online forum, which comes to formulate site-specificity in a birds-eye perspective, from which enactment (of mediating a form of cultural coherency) has been overlaid on the city. In this form of site-specificity, time becomes in a sense superior to space, which is literally illustrated in the organization of the project in a time line in the online forum.

The connection of people's geo-tagged urban experiences in a map of Kwun Tong online forms into what Scott McQuire refers to as "network logic." This follows the logic of interconnection in "the rhizome", in which every point is connected to innumerable numbers. [9] The connection of urban experiences and narratives in this network forms into situations of possibilities for negotiating urban practices and relationships in a mode of inter-subjectivity, in a Habermasian sense of community. Christine Satchell identifies a potential in the culturally loaded, social nature of using the mobile phone and the "mobile iden-

tity" around such practices, to be re-contextualized into a notion that includes involvement in the collective enhancement of one' physical community and environment. She points at an opportunity of re-contextualizing the mobile phone as an artifact that encourages users to identify themselves as culturally and civically aware individuals of urban citizens. [10] Through the shared memories of Kwun Tong, the city's citizens are invited to discuss and negotiate the future of the city, based on their shared memories of the city's past, during the urban renewal process. I will point at a significant potential in this network logic, when considering how "program aspects" of locative media art might apply to a framework of urban revitalization. The network, and the logic among participants that forms it, for example about a place's history and cultural narrative as in the given example, can enhance an intercultural sense of citizenship and foster a *shared* sense of meaning in the local, and a platform for cultural innovation.

The second direction of practice in the spatial turn, which followed the media turn in geography, is found in the "mediated locality." This is explored in a phenomenological mode of sense-experience, in a sense of re-animating a place. [11] The mediation of a locality or urban environment is for example found in projects of augmented reality – in which the subject is enacting with the physical world through a virtual overlay. The project "Museum of the Phantom City" (2009) by Irene Cheng and Brett Snyder is a locative media art project that displays could-have-been architecture in urban spaces of Manhattan, New York City, in an augmented layer that is only visible through one's phone, and only as one goes by the physical location where the architecture was supposed to have been built (www.phantomcity. org). The form of site-specificity formulated in this project depends on the content that plays out in a particular physical environment. Another example of augmented reality is the "MoMA AR Exhibition" by Sander Veenhof and Mark Skwarek, which was part of the Conflux Festival program in 2010 (www.layar. com/layers/moma). In this project, the physical space inside the MoMA in New York City hosts a virtual exhibition, which is only visible through people's cell phones. In the mediated situation in this and similar projects of mediated localities, the real-place experience can be considered as superior to the real-time experience.

Perhaps we can think of mediated localities with support from Anders Fogh Jensen's Deleuze-inspired concept of "the groove," proposed in his dissertation "The Project Society" (2010). The "grooved space" is a marking of an environment in the "smooth" space of the digitalized society. The groove invites for people to stop up and join a "projectary activity," which Fogh Jensen characterizes as a structure of organization in the project society. This has followed the hierarchical organization of the disciplinary society as the key organizational mode of the contemporary developed society. [12] The groove of the mediated locality, mediated through locative media art projects, can be considered a "marking" in the meeting between the material and the immaterial urban level. Locative media art projects conceptualized as grooves interrupt the form of appearance and mode of experience of the urban fabric and invite for a re-appropriation of a location, if only on an imaginary level. This echoes the Situationist quest for liberation from the pre-scribed organization of the city's urban environment in the détournement. Grooves can apply new goals to a place, by inviting for new creations of meaning. The projectary activity that takes up the mediated locality in the groove, which interrupts the routines of a place and allows for local re-imagination, can be considered for a significant program aspect in the sense that it is situated in the specific locality. This includes a creative thinking about "acting in the world" by creating a territory for the projectary activity.

The "groove" in a mediated locality is found in the site-specific renewal project "Mixed Reality Tent" (2009) by IP City in Graz, Austria. In this project, mixed reality technology – the combined representation of real and overlaid digital data – is enclosed in a shelter on the site-specific location of the urban re-

newal project (http://studierstube.icg.tugraz.at/ipcity/mrtent.php). With participants of both professionals and citizens, the shelter hosts a workshop for a creative space for experiments in integrating many different points of shared views on a mixed-reality reconstruction site. While this example represents a site-specificity of a mediated locality, it also represents a program of a détournement in the projectary activity.

Conceptualizing the "Program" of Urban Intervention in Locative Media Art

The "program" of locative media art, when conceptualized in a context of urban revitalization, regards how the project engages with socio-spatial practices in an urban environment. The program employs forms of knowledge to reform or radically challenge an operation, to reorient toward new goals and objectives, and to act upon the desires, aspirations, needs, and attributes of the agents within them. To think of a program in locative media art in this respect, is to think of how the locative media art is coded with an intention to *affect* a locality in a particular way, by affecting the spatial practices and urban imaginations among citizens.

When considering the program, we are to consider what the locative media art project should and could "do," meaning how it could transform a place by intervening in a place's socio-spatial practices. The program characteristics of respectively location-based media and mediated localities, which I have pointed out in this paper, regard the connection of subjects in a shared sense of project and cultural consensus in a network, which is possible from people's site-specific geo-tagging and spatial documentation through mobile phones; and the groove, which is established in the mediated locality and applies new goals to a place and invites for projectary activities which reformulate local meaning. These, I propose, are to be thought together in a program of locative media art as a tool of urban revitalization. While the program of the location-based tagging allows for a particular shared sense of geographic interpretation and cultural consensus in a dimension of networked de-territorialization from the fixed form of the urban, the program of the mediated locality is that by which the intervention is situated in place – and designed to operate for a particular project in that place, building on top of the place's specific aesthetics. Through location-based media of geo-tagging, people are enabled to identify features of embodied interaction and develop a language for shared creativity in a network-extension of the relational site. The mediated locality serves to direct this attention to a geographical site-specificity to bring the inter-subjective creativity "back to place."

The Performative Program

I will propose that such a conceptualization of a program of locative media art, to function as a tool in urban revitalization projects, is "performative" rather than "performing," as it responds to a processual aim of urban revitalization through an aesthetics that is designed, or programmed, with attention to the active action of the installation in the urban environment. While the program of the "Listen to Light" project and the "MoMA AR Exhibition" can both be considered as performances, with the subject as an audience of a pre-defined experience, a performative program is one that provides the subject with a lens to explore without the narrative being pre-defined. The narrative is to be constructed along with the exploration, and among participating subjects in the network.

In the performative program, which combines the two modes of site-specificity in organizing location based media to work in mediated localities, geo-tagging is combined with sense-experience in the "geo-

spatial"; meaning, the mediated narrative is concerned with place but its matter of intervention is constructed in the network among participants. This enables a form of cultural innovation among citizens in the double experience of site-specificity. This opens up for questions to be pursued further, about how the socio-spatial is being produced with locative media, and about what motivates citizens for participation in projectary activities in such forms of "geospatial cultural planning". What I am proposing here is a consideration on the potentials in the program of projectary activities in locative media art to enrich urban development by bringing citizens together in networks while reveal new possibilities in the locality of the urban environment.

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THE UNFORGIVING RATIO

Darren Tofts

This essay engages with the author's recent experiments in redefining urban space as aesthetic space. From this experiment it will offer a critical discussion of the relations between maps and territories, cartography and topography. This underlines a sense of abstraction, an unforgiving ratio that we continue to resolve and simply live as second nature in our negotiation of space and its representation.
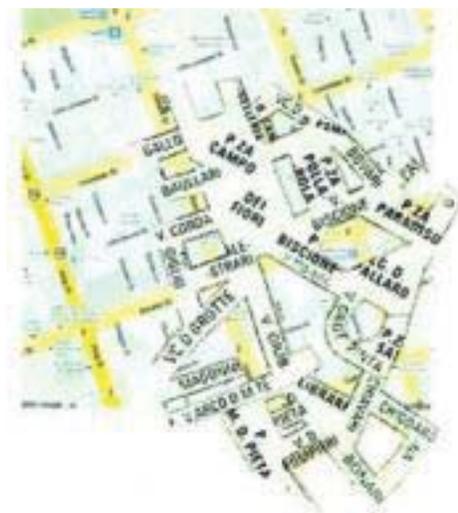
*Figure 1. Melbourne/Rome composite map. Darren Tofts, 2011.*
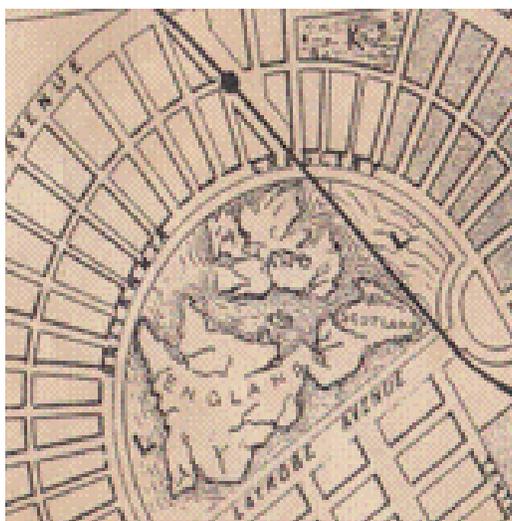
Figure 2. Hydrographic map design for the Port of Melbourne, 1860 (detail). Courtesy State Library of Victoria.

The Unforgiving Ratio

The notion of "unsitely aesthetics" carries with it a number of ambivalent inflections to do with the space of art, its installation and its reception. It presumes the convergence of remote and telematically mediated spaces made possible through personalized mobile media. The unsitely in contemporary media art practice transcends an aesthetically sanctioned notion of 'site' in favour of public spaces in which art would not be expected to be encountered or recognized (hence unsightly), or would seem to be entirely out of place if it were.   This paper is in part a critical reflection on an experiment in unsitely aesthetics I conducted in February this year, which I have blandly titled *Melbourne/Rome*.   What emerges from the specific details of this work is a more general, philosophical critique of the relations between cartography and geography with respect to the construction of site. Rather than pursing a typically postmodern recursion that posits the exact blurring of the two, it argues for a more radical displacement; a rupture in which the map and the territory reside uncomfortably in an awkward, algorithmic relationship with each other, what I call the unforgiving ratio.

The title *Melbourne/Rome* is deliberately nondescript in order to foreground a largely didactic engagement with the process of conceiving, performing and documenting an unsitely aesthetic. Taking its starting point from the Situationists' détournement of maps, I wanted to use the experience of physically walking through the streets of the immediate and embodied city in which I live (Melbourne) and map it on to a virtual journey through a remote city.   Adopting the rule-governed principles of certain OULIPO artists (in particular Raymond Queneau and Italo Calvino), a set of personal preferences established the guidelines and principles for determining the city that was out-of-sight. First, the last international city which I have visited (Rome), second, where I stayed during that time (the Campo dei Fiori), and third, the exploitation of an essential difference between the two sites (the definitive grid structure of the Melbourne CBD and the labyrinthine tangle of streets that circumscribe the Campo dei Fiori). The idea behind this mapping was to see what might happen in the way of sitings in one city and mark anything of conspicuous interest on the appropriate map. The contrast of the topographical characteristics of each city was chosen as a variable, a potential, generative algorithm that allowed for potential convergences of co-ordinates that were beyond my conscious choice.

I selected the judicial section of the Melbourne CBD for obvious reasons, in that it was as far from the local, residential and community vibe of the Campo dei Fiori as Melbourne is from Rome in geographical space and time. I partitioned a selected grid ofMelbourne streets roughly comparable in scale to the area around the Campo dei Fiori with which I was familiar. Then using tracing paper, I outlined a manifold map or palimpsest of both areas so that a siting in one city could easily be mapped on to an equivalent coordinate in the other. Then, using the Streetview function in Google Maps, I traversed the equivalent co-ordinate in Rome in the hope of synchronicities; what Guy Debord described as a "possible rendezvous" (Debord, 2006, 65). The capacity of Streetview to simulate a sense of movement, albeit highly stylized, translated the scanning of the eye over the screen into a synaesthetic analogue of walking. This was a kind of virtual take on the dérive. It was weirdly suggestive of a kind of perambulation that makes sense in the world of atoms and friction, especially with respect to its connotation of drifting. The spectral phasing of the screen as the Streetview image resolves itself into clarity creates the illusion of movement along the street. This ocular mobility is akin to the physical sensation of walking towards and pausing in front of a specific *something*. At this moment I become, to use Timo Kopomaa's term, an "*e-flâneur*" (Kopomaa, 2000, 20).

The results of this process have been detailed elsewhere (Miranda, forthcoming). I am less interested here in reporting on the outcomes of the experiment than reflecting upon some conceptual tensions

that emerged from it; tensions that have implications for the notion of the unsitely as the "*superimposition of real and virtual space*". If we accept that real here refers to my embodied, quantum experience of being in Melbourne, then the virtual is my image of a specific part of Rome where I cannot be at the same time through means other than mediation. The use of Google Streetview offered a canny, pictorial solution to this vectoral assemblage of here and there. Rather than telematically feeding me an image of Rome in a common global time of now, it captured an image of a co-ordinate that exists despite the need for a common here and now. In other words, the Google image of a streetscape in Via del Biscione was not live, and nor did it need to be live for a conceptual overlapping of space. After all, it is difficult to know when specific images archived in the Streetview database were actually taken. This in fact removes the need for a temporal link in the process, maintaining the emphasis on site.

Semiotically, then, the Streetview images constitute an index of a location in Rome where I have been, or, after Roland Barthes, an experience "that-has-been" (Barthes, 1984, 77); a photographic supplement for a somewhere that is not here, that I know exists while I am in Platypus Lane in Melbourne at 9.45am, Eastern Standard Time.   Like a live televisual feed, it is an index of a remote elsewhere aligned conceptually with my immediate here and now (just as a phone conversation is symbolic in the semiotic sense). The index provides a sense of coincidence that makes sense, a vector that resolves the abstraction of mediated real-time telepresence. However Streetview was not my first choice of media to establish counterpoints between two distinct and remote locations in time and space. I had originally planned to use GPS co-ordinates, in a similar manner to McKenzie Wark's book *Dispositions*, an experiment in real-time diarizing of the author's experience of a here and now "lived increasingly in the shadow of the satellites" (Wark, 2002). Wark's use of global positioning satellite co-ordinates is more abstract again than the symbolic and indexical registers of voice and image, adding another hand-held media device to the kit of the e-flâneur. Polemically Wark's project sought to draw attention to the increasingly surveilled nature of private space. Aesthetically, his preface of every entry with a topographic point of latitude and longitude underlines the highly abstract, even absurd nature of mapping lived experience in such a manner. His bio note is suggestive of this: "He lives at about 40.7°North and 073.9° West, aka Williamsburg, New York City" (Wark, 2002).

It is necessary to underline the abstract nature of any and all forms of mapping that seek to converge remote sites in the name of unsitely aesthetics. Our use of maps has acquired a familiarity over time, a virtual assurance that they can be read as if they are semblances or facsimiles of the spaces they represent. I want to reclaim the abstraction of cartography as a formal characteristic of contemporary media art practice. To get to this point I need to make a brief digression into the relations between maps and territories. The very notion of cartography is premised on a figurative geometry of scale, a convenient, disproportionate projection of space that makes it apprehensible to the gaze in real-time. Gerardus Mercator described his famous 1569 projection of the world as an "augmented description of Earth corrected for the use of sailors". Perhaps the first instance of augmented reality, Mercator's map revealed the approximation of an actual terrain that could never be experienced other than as a projection. His legacy of a modified form of vision was hardwired into the collective psyche of human perception for centuries; a technique of observation that shaped modernist epistemology's command of nature through scientific knowledge. In his *Simulations* (1983), Jean Baudrillard's prefatory use of Ecclesiastes' definition of the simulacrum as "the truth which conceals that there is none" signaled the emergence of postmodern skepticism towards the grand narratives of modernity and in particular, to quote Jorge Luis Borges, "exactitude in science".

Borges revisits the equation of the map and the territory many times in his fictions, notably in "Partial Magic in the *Quixote*", where he quotes the 19th century Idealist philosopher Josiah Royce imagining a

scale map of England carved into the very terrain of England itself, in which "no detail of the soil of England, no matter how minute… is not registered on the map", including a map of the map of the map, and so on to infinity (Borges, 2007, 195-196). However his famous 1946 fragment "On Exactitude in Science" is a parable of the consequences of a literal 1:1 scale in cartography. Here Borges imagines a souped up version of Mercator's projection in which the map is an exact copy of the territory "point for point", whereby "the map of a single Province occupied the entirety of a City, and the map of the Empire, the entirety of a Province" (Borges, 2000, 181). The idea of a map that is the scale of a "mile to a mile" is also encountered in Lewis Carroll's 1893 text *Sylvie and Bruno Concluded*, where the absurdity of the map standing in for the territory it represents also presages the advent of the hyperreal. This map is so big that it has never been rolled out as the "farmer's objected: they said it would cover the whole country, and shut out the sunlight!" Consequently, as Mein Herr explains to Bruno, "we now use the country itself, as its own map, and I assure you it does nearly as well" (Carroll, 1893, 169).

The map is a surrogate or proxy of the space it projects. The episteme of projection implies a necessary amnesia whereby the territory and its other avatar, geography, are completely forgotten. The map is a fetish that stands in for an absent, impossible presence. And so we return to the unforgiving ratio of scale. It is unforgiving in that it persistently foreshortens the relationship between the territory and our capacity to perceive it. Mercator's projection of the earth flattens out scale, topography, distance and time into a facsimile, a necessary fiction. It is a reminder that cartography relates us in inhuman ways to the space we live in and, more particularly, the spaces that are elsewhere, out of sight and out of site.

The *Melbourne/Rome* map manufactured a semblance of flow and consistency, whereby streets seemed to blend naturally into each other (see Figure 1). Here Via dei Baullari runs in tidy parallel with Lonsdale Street, as do Via del Biscione and Bourke Street. In the context of the composite map, things converge in ways that bear absolutely no relation to anything other than the map itself. But nor should they be obliged to, since the stylized figuration of scale is an approximation of what actual space would look like if we could see it from an inhuman point of view. The map works because of a distortion of the difference between the two sites, not any perceived fit . The unsitely and unsightly come together here not as a manifestation of scale, but as a plausible palimpsest, a tracing that is self-referential and makes sense within the poetic of the *Melbourne/Rome* experiment itself.

And in this we are privy to something like a nomadic, synchronous and ideally mobile point of view of unsightly and unsitely space. As I have been using these terms throughout this discussion their semantic, orthographic and phonetic difference can only be grasped visually rather than sonically. Their difference can only be seen but not heard. But as sonic events of time, of duration and delay, they remain equivocal, elusive and beyond immediate comprehension. This undecidability of site and sight is the *pharmakon*of deconstruction, the ambivalence of either *and* or, the unavoidable, ineradicable slippage between sound, image and sense. This aporia is also at work in our perception of space, it is the unforgiving ratio that must, of necessity, abstract the way we perceive geographic space. Cartography smoothes out and reconciles the abstraction of ratio to create the illusion that we have mastered the relations between space and time. In particular it manipulates our ability to believe that we can comprehend the here and now in relation to a distant there an now, where Melbourne and Rome can exist in the world simultaneously from the embodied experience of being in one of those cities. This inevitable flickering between presence and absence, here and there, unsightly and unsitely will continue to beguile its aesthetic practitioners for some time to come.

POSTSCRIPT

During the research undertaken for the *Melbourne/Rome* project I came across this map in the State Library of Victoria (Figure 2). It was made in 1860 and details plans for the western development of the Port of Melbourne. It features the design of an ornamental pond with two horticultural islands as its centerpiece.   The islands are cultivated to resemble Great Britain. Here is a different version of the decorative *mise en abyme* of heraldry, the map that contains itself in miniature. It is a powerful image of empire and colonial expansion throughout the globe, a patrician homeland carved to scale into its antipodes. The notion of the antipodes presumes otherness, a subordinate relation to a distant and autonomous self.   There could never be a hyperreal synthesis of map and territory here, whereby the map of Great Britain covered the territory ofAustralia. Apart from the obvious discordances of terrain, the spirit of Republicanism would, I like to think, prohibit such a travesty. The token Britain, suffice to say, was never built. But this hardly matters for even the idea of it sounds like a 'Pataphysical art project of the kind that Alfred Jarry might have cooked up while riding around Parison a bicycle. In the spirit of 'Pataphysics it invokes an imaginary response to the very real condition of presence at a distance. This image of little Britain in a distant colony is an incipient allegory of unsitely aesthetics. It evokes an image, a metaphor of possibility for unifying site and sight, sitely and unsightly that we can glimpse in the age of synchronous, mobile media. It is the intuition of a form of perception to come, a way of seeing also intuited in a rhetorical question asked by Paul Virilio and Sylvère Lotringer in *Pure War*: "When we can go to the antipodes in a second or a minute, what will remain of the city? What will remain of us?" (Virilio and Lotringer, 1988, p.62).

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COMPUTERS AS METAPHOR, MINDS AS COMPUTERS; NOTES TOWARDS A DYSFUNCTIONAL ROBOTICS

John Tonkin

I am building a series of small robots that explore different approaches to thinking about cognition. Computational theories of mind are used by cognitive scientists as a model of how to build an electronic mind and by psychologists to understand the human mind. I want to complicate these cognitivist ambitions through the building of a nervous robotics that is situated in the everyday behavioural realities of contemporary dysfunctional life.
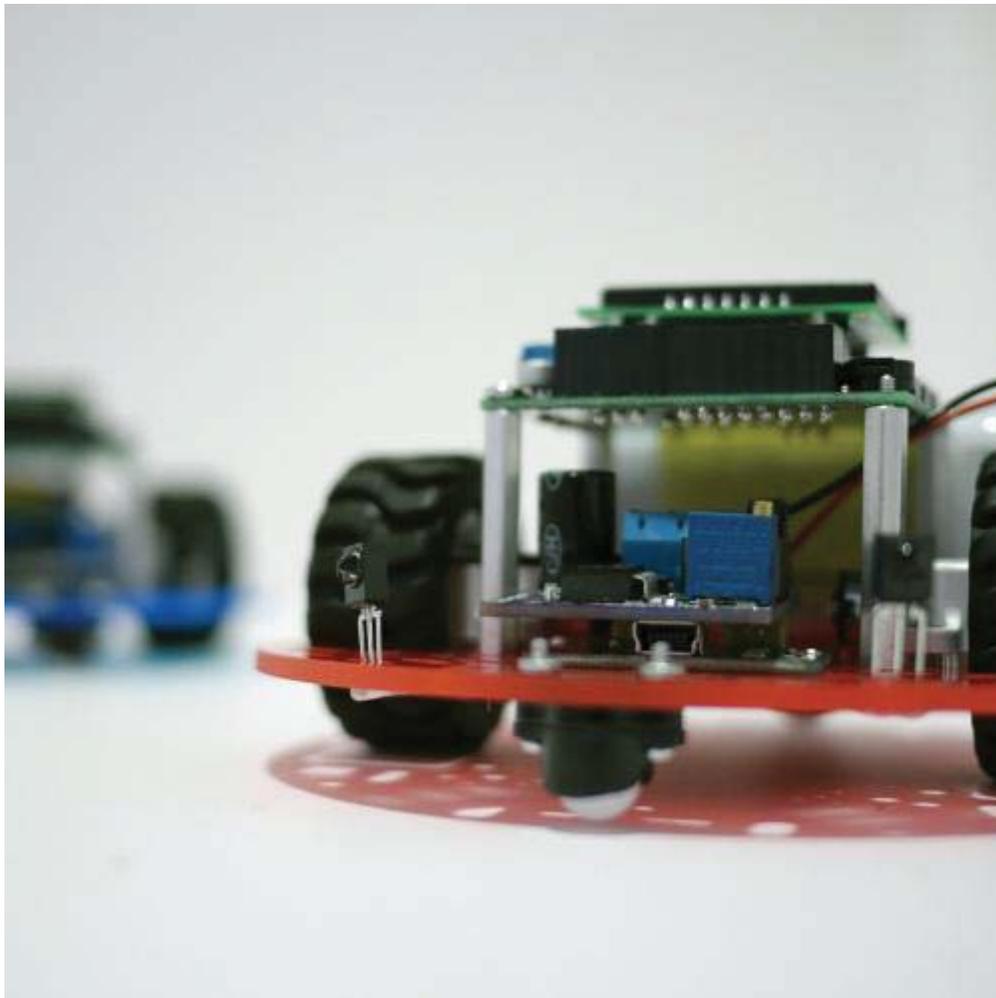
Fig 1. attached/detached : robot love for beginners, 2011, John Tonkin, custom hardware and software. Copyright John Tonkin.

I am building a series of small robots that explore different approaches to thinking about cognition. This paper presents some background material in the development of this project.

Cybernetics was defined by Norbert Wiener in 1948 as the science of communication and control in the animal and the machine (Wiener 1948). It used ideas of circuits, feedback, and information flow to describe how systems, both organisms and machines, functioned. Many of the core group of early cyberneticians had backgrounds in psychology, psychiatry and psychoanalysis. Some practitioners in these fields have since adopted cybernetic models to conceptualise their research, using a language of feedback loops and homeostatic control systems to describe the (mis)workings of the human mind. For example; Gregory Bateson wrote a paper titled 'The cybernetics of "self": a theory of alcoholism' (Bateson 1972)

Jean-Pierre Dupuy suggests that the development of cybernetics represented not so much the anthropomorphisation of the machine as the mechanisation of the human (Dupuy 2000). This is perhaps most obviously made manifest in computational theories of mind which have been used by cognitive psychologists as a means of understanding the human mind and by cognitive scientists as models of how to build an electronic mind. They see the mind as an information-processing system and thought as a form of computation. These symbolic approaches to thinking about the mind have been challenged by more embodied and embedded approaches to cognition and perception. This has been reflected through the development of a number of bottom-up approaches to AI and robotics, such as neural networks (McCulloch, Pitts 1943) and behaviour based robots (Brooks 1986), that are based on ideas of reactivity and situatedness rather than higher level symbolic modelling.

AI researchers, regardless of their approach, are generally committed to building functional engineering tools that efficiently solve real world problems. If we are to take seriously the concept of a computational model of the mind; then does this not need to embrace the dysfunctional as well as the functional? I plan to investigate this question through the building of a nervous robotics; a robotics situated in the everyday behavioural realities of contemporary dysfunctional life. These robots are more likely to rock nervously in the corner than to lock you out of the spaceship ("Open the pod bay door, Hal. Sorry Dave, I'm afraid I can't do that" (2001: A Space Odyssey)) or attempt to enslave humanity.

The robots that I am building for this project draw from a number of different psychoanalytic theories as well as more generally from a folk psychology conception of the mind as being the home of internal mental processes such as motives, desires, phobias and neuroses. They use a range of computational approaches, for example Brooks' subsumption architecture (Brooks 1986), to create layered hierarchies of behaviours and stimulus/response reflexes. For ISEA 2011 I have built "*attached/detached: robot love for beginners*" which consists of two robots that go through an ever shifting interplay of insecurity and dismissiveness with occasional moments of mutual happiness. These robots are primarily focussed on seeking/avoiding each other and are oblivious to the audience. Their behaviours are based around attachment theory. Attachment theory grew out of research by psychoanalyst John Bowlby in the 1950s. It was further developed with developmental psychologist Mary Ainsworth in the 1960s and 70s. It concerns the relationship between infants and their primary caregiver. Bowlby was influenced by cybernetics. The young child's need for proximity to the attachment figure is balanced with a need for exploration in what he described as a homeostatic control system. It was extended in the 1980s to encompass attachment styles in adult romantic relationships. These different styles (secure, anxious-preoccupied, dismissive-avoidant and fearful-avoidant) corresponded to different combinations of a person's atti-

tudes (positive or negative) towards themself and towards their partner. I further explore the development of attachment theory as an example of the use of cybernetics to model human behaviour in a paper that I will be presenting at Rewire 2011.

I am interested in how the audience will react to the robots' behaviour and am especially interested to explore the lower boundary of computational complexity that still evokes some sort of projection / anthropomorphism in the audience. Simon Penny has produced several robotic art projects including *Petit Mal* (1993-95). This low tech looking robot (it resembles a bicycle) reacts to the movement of people in its immediate vicinity. It follows them around curiously yet backs off if they get too close. Penny used a bottom up approach to create a system of layered behaviours similar to that proposed by Brooks.

People immediately ascribe vastly complex motivations and understandings to the Petit Mal. The robot does not possess these characteristics or capabilities, they are projected upon it by viewers. This is because viewers (necessarily) interpret the behavior of the robot in terms of their own life experience. In order to understand it, they bring to it their experience of dogs, cats, babies and other mobile interacting entities. The machine is ascribed complexities which it does not possess. This observation emphasises the culturally situated nature of the interaction. The vast amount of what is construed to be the `knowledge of the robot' is in fact located in the cultural environment, is projected upon the robot by the viewer and is in no way contained in the robot.(Penny 1997)

Australian artist Mari Velonaki has described something similar with regard to her Fish-Bird project. "The project has demonstrated that audiences are attracted to kinetic objects that represent 'characters' not because of the way they look but because of the way they behave." research statement (http://mvstudio.org/cms/wp-content/uploads/2009/08/ResearchStatement_VisualArt_Fish-Bird.pdf).

In his book titled "Vehicles, Experiments in Synthetic Psychology", Valentino Braitenburg describes a series of thought experiments that involve the building of a succession of simple robots that use a bottom up approach that is not unlike the approach that I am taking for my own robots.

"We will talk only about machines with very simple internal structures, too simple in fact to be interesting from the point of view of mechanical or electrical engineering. Interest arises, rather, when we look at these machines or vehicles as if they were animals, in a natural environment. We will be tempted, then, to use psychological language in describing their behavior. And yet we know very well that there is nothing in these vehicles that we have not put there ourselves." (Braitenberg 1984)

"It is actually impossible in theory to determine exactly what the hidden mechanism is without opening the box . . . A psychological consequence of this is the following: when we analyze a mechanism we tend to overestimate its complexity." (Braitenberg 1984)

This last statement of Braitenberg's is particularly interesting in terms of my broader project of thinking about cognition. Perhaps the "hard problem" of consciousness isn't actually so hard! This could lead us to a discussion around embodied cognition, but I shall save this for another time.

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HERE TO THERE AND IN BETWEEN: COMMUTING THROUGH PERCEPTION

Jack Toolin

"Here to There" will investigate how perceptions about the passageway between home and work, as well as the general relationship between the two, are influenced by various forms of (social) media and data. How do commuter perceptions compare to those of the community members, and to the general perception of a community as it can be perceived on the Web in the form of chats, blogs, images, and so forth?
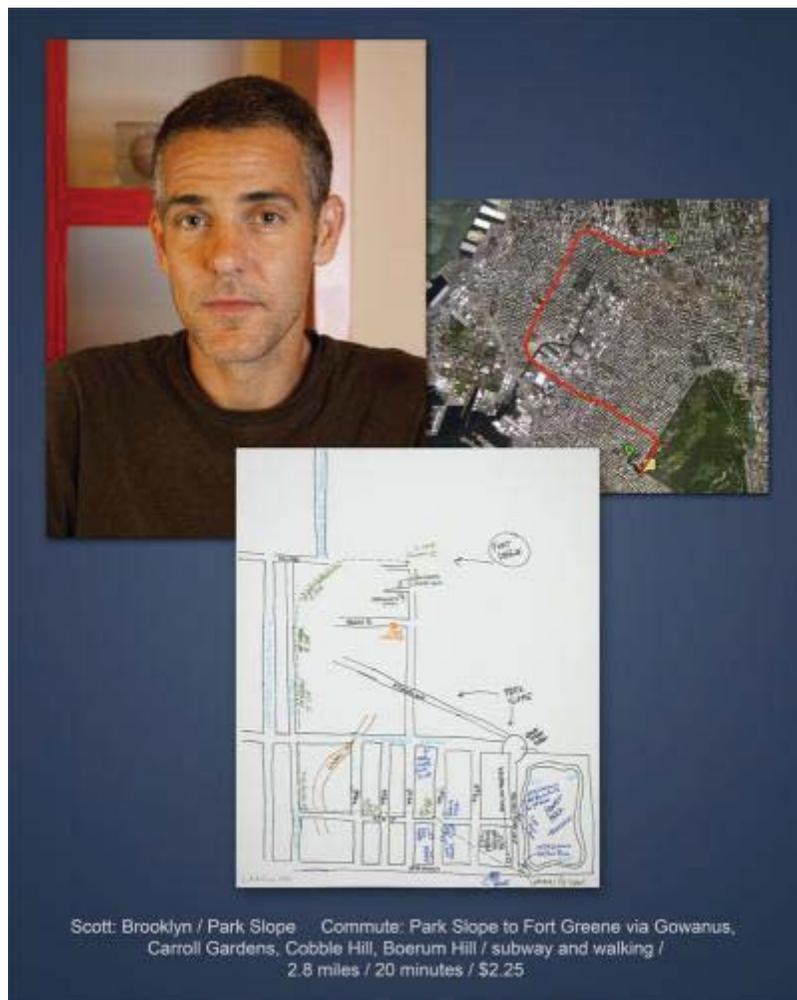
Scott_map, 2011, Jack Toolin, archival print and digital media.

Millions of people in the United States spend millions of hours every year commuting to and from work, and this is true for industrialized countries around the world. Commuting consumes an enormous amount of time and resources, whether it's by personal or public transportation. Yet, due to lifestyle choices and to the design of most metropolitan areas, commuting has become a necessity, a fact of life, something that's taken for granted for large parts of the population.

My project, Perceptions of the Commuting Ethnographer, investigates commuting with multiple interests in mind: the physical aspects of the commute (distances traveled, route characteristics, etc.); the commute as social phenomenon, reflecting upon the commuter's relationship to the communities they pass through; the relationship between home life and work life; finally, the relationship between individuals and the growing transnational economy that makes for what Saskia Sassen has termed 'Global Cities,' [1] key hubs in a global network of information and monetary exchange.

I have begun by video recording the stories of commuters in the New York metropolitan area and the San Francisco Bay Area. Along with the stories I am asking participants to draw their commute routes from memory and to draw maps of what they consider to be their communities. The routes will be recorded with GPS and the communities researched using census statistics as well. But the hand drawn maps, with their distortions of scale and misperceived spatial relationships may indicate perceptions of comfort or discomfort, the relative importance to ones daily routine, the people, places and activities that the commuters more or less identify with, hypothetically at this point. Lastly, a smartphone app for real-time commuter surveying will be distributed in order to capture commuters' perceptions as they travel.

The project will have various manifestations, but its initial phase will consist of juxtapositions of imagery (still and video), data, and commuter stories. This paper lays out some of the theoretical groundwork underlying the project.

History of Commuting

 Commuting is largely a result of the industrial revolution: lifestyles were transformed by the centralizing effects of increasingly technological forms of production, and society evolved away from agrarian production to manufacturing as the predominant source of work. Of course this development proceeded through the 20th century. Commuting itself has undergone its own development, moving from being mostly contained within urban areas (referred to as ICC: inside the central cities), to commuting from outside of urban areas (referred to as OCC: outside the central cities), and then increasingly between suburban areas, as cities decentralized into metropolitan areas due to the post-War middle class expansion, and the ensuing suburbanization – what economist Robert Reich has referred to as the Great Prosperity. [2]

While commuting in the late 19th and early 20th centuries was largely characterized by flows into and out of city centers, the 1970s, '80s, and '90s saw commuting increasingly done from suburb to suburb. Today, approximately 50% of the adult US population commutes; approximately 31% of that commuting is suburb-to-suburb commuting, and suburb-to-city commuting is approximately 14%. [3] This has occurred while the suburban growth in industries of all types outpaced that of city centers as businesses took advantage of the suburbs for reducing their 'transaction costs' (business overhead as well as general costs of living). [4] This period has also seen the nature of business itself in the US change in various ways, growing more in service related areas (from consumer services to financial services) than in manufacturing, and increasingly entwined in global relations. The world economy has changed as well, as it is increasingly composed of TNCs (transnational corporations), whose power and reach in some ways defies nation-state boundaries. [5]

The commute is often looked upon as an arduous task that is performed only out of necessity. But commuters, like all people, can prove to be resourceful and turn the routine into something more fulfilling.

Much like the everyday activities that became the substance for critical reflection by theorists of the mid 20th century such as Lefebvre and Debord, commuting is full of possibilities for artistic (aesthetic? conceptual?) investigation. This paper and the project associated with it are intended to do just this.

The Effects of Commuting on Community

It is easy to visualize these community effects as they have been mythologized in popular fiction about city life; for example, 'the wrong side of the tracks' characterization. We might refer to the 'wrong side of the tracks' divide as a lateral divide created by the commuter corridor. However, a 'longitudinal divide' may also be a component, as commuters often live in communities that are quite different (economically, ethnically, racially, politically, etc.) from the communities that they commute to or pass through. Both can result in what cultural geographers refer to as residential segregation. [6]Commuting allows for greater separation between home life and the other, which may be primarily work life, but is also the community in which one's work is located. Also, due to what can be referred to as the 'transportation divide' that exists within the U.S., different economic classes are capable of or choose to commute by more or less exclusive modes of transportation. So within the various modes of commuting there exists, to varying degrees, a class divide.

On the one hand these social divides are not new; they accompany the existence of civilization itself. On the other hand, one can point to examples where technology has been consciously used to reinforce social boundaries (Robert Moses' highway network between Manhattan and the surrounding affluent white suburbs is an example often pointed to.) Class divides in commuting can also merely be extensions of preexistent stratifications within society.

The subway presents another type of transportation divide, one that splits the subterranean traveler from the communities above: one may be exiting Manhattan in a subway car below the high finance district of Wall Street, while the car is filled with service workers making their way to New York's outer boroughs. Riding on any number of New York subway trains one can observe a complex mix of commuters from all walks of life, and yet this mix gravitates towards different cultural groups depending upon the neighborhoods being passed through. One observes different homogeneities in different parts of the city, and at different times of the day: riding the L train into trendy Williamsburg at midnight is a different experience than taking the same train during rush hour.

However, this is a rather dystopic perspective that may be misguided, for as much as creating divisions, commuting creates spaces for cultural juxtapositions, allowing for one community to experience another, if only from a distance. Riding the commuter train up the San Mateo peninsula into San Francisco, one passes by the campuses of hi-tech firms in Mountain View, the mixed development neighborhoods of Redwood City, the shoreline of the Bay itself, and the transitional southeast side of San Francisco's China Gulch. If only from a visual standpoint, the commuter is taken out of their locality and exposed to life in these other communities. On the other coast, the Long Island commuter driving their car into Manhattan on the Long Island Expressway passes the trees and lawns of Rosalyn Heights and the frontage road neighborhoods of Queens, arriving at their parking spot set amidst Midtown high rises.

The exposure to these communities, superficial as it might be, may generate reflection upon one's community in contrast to these others. Numerous studies have been conducted regarding the effects of commuting upon commuters' sense of belonging to a given community, as mobility has gathered increasing interest in the social sciences. As Per Gustafson points out in *Mobility and Territorial Belonging*,

the relationship between work-related travel and territorial identification is complicated by the types of mobility in consideration, as well as the age, gender, nationality, etc., of the traveler. [7] Using statistics from a 2005 survey done in Sweden, and referring to several other studies, Gustafson considers commuters' identification with local, regional, national, and international (European Union) territories given the types of travel they do. Overall, 75% the Swedes surveyed expressed a strong or very strong identification with their neighborhood or town. However, those with commutes of one hour or longer expressed less local identification than those with shorter commutes. Categorically speaking, women expressed stronger local identification than men, and white-collar workers expressed less local identification than blue-collar workers.

Another interesting aspect of the study is the relationship between nationality and community identification. Gustafson notes that it has been commonly believed that immigrants, while initially feeling little sense of belonging to their adopted country, develop this sense over time as they assimilate into the new culture. He mentions, though, that recent studies show immigrants can retain identification with their nation of origin while also developing belonging to their new home. This relates to interesting issues regarding the impact of globalization.

Globalization and Commuting

These issues conveniently direct us towards considering the interplay between globalization and community. Commuters using public transportation, especially those in major metropolitan areas, often find themselves in a complex cultural mix ranging from local to global varieties. The daily routine of the commute, potentially hours spent in transit, contributes to what Bourdieu and others have referred to as habitus, one's cultural identity as formed through the participation in everyday activities. And as Sassen has pointed out in her writing about the continued relevance of the local, these interactions remain relevant in spite of a growing globalization. These metropolitan cultural mixes present opportunities for the exchange of ideas through subtle and conspicuous expressions – it would seem that commuting via public transportation in a Global City might be one locus in which a global cultural identity is fostered, despite what might seem to be an insignificant interaction. As a commuter on a bus, train, or subway in a large metropolitan area, there is inevitably some interaction with people of different economic, ethnic, career, political backgrounds from one's own. Simple things like the navigation of available space on a crowded subway car can make cultural differences apparent, what de Certeau might have called the rhetorics of space become apparent. How commuters negotiate their place in a crowded car, avoiding or displaying eye contact, helping one another to clarify confusing directions, offering seats to those who are standing … these casual interactions with strangers form cooperative bonds that, despite their brevity, are a platform for interaction that enables trust to formulate

However, despite these instances of trust, can we credit these moments, what Patricia Price has called 'pauses,' with nurturing a sort of global exchange, the sort that Sassen would have us believe takes place at the Manhattan sidewalk food vendor? [8] [9] There is some acceptance borne from familiarity that is fostered by these encounters with others; could these pauses be wrapped into the process of globalization? While this is the case on some level, it is likely not a simple scenario. In an interesting discussion about cultural influence and recalcitrance, Paul Kennedy points out that people often hold more tightly to their cultural heritage in the face of diversity, for this diversity can be interpreted as a threat: a threat to one's 'way of life,' to one's standard of living, and so on. This threat level, while manifested in people's anxieties about cultural differences, can be exacerbated by those who seek to benefit from manipulating people's fears, such as politicians and businesses. Perhaps the average commuter carries with

them a type of cultural vaccination that allows for a limited amount of multicultural engagement while at the same time holding fast to their own cultural identity.

The Political Economy of Commuting

Are commuter thoroughfares neutral entities created solely for the purposes of travel ease? Are they the result of a capitalistic hegemony that benefits from the atomization of the public and the resulting commerce? David Harvey, writing about the impact of Haussmann's Second Empire Parisian boulevards, notes that the restructuring of Paris not only affected the movement of the city's residents, but enabled greater control of the populace both physically and psychologically. The former through creating harder to obstruct passageways and providing better site lines for police; the latter by creating a 'stage' for commerce, leading to what Harvey refers to as 'governance by spectacle.' [10]In discussing the relationship between public space, spectacle, and political agency, Harvey (and he is not alone here) asserts that transforming public space into a site for spectacle depoliticizes that space, that the politics underlying public space are obscured for the sake of spectacle and the allied 'embourgeoisement'. What if anything does this critique have to do with the motorized 'boulevards' of current-day commuters?

It is without doubt that commuter thoroughfares (freeways, trains, subways) exist in large part due to the need of workers and goods to be transferred from point A to point B. That the design and direction of these thoroughfares are determined by people in power who have a range of vested interests, from getting materials to market to getting reelected, has been well considered by the likes of Harvey, Castells, Kennedy, and others. Aspects of transportation planning such as the transportation type, the location of routes, the location of access points, the cost for use, and so forth, have a tangible impact upon people's lives (commuting costs and real estate prices, for example) – it hits them in the wallet, so to speak.

But how does the commute function with regards to political activation or pacification? Is the routine of the commute one more element in the average person's life that vaporizes political agency? Or does it, despite its phenomenological banality (or perhaps because of it) refresh the commuter's sense of social connectedness, or even engagement? I am early yet in the process of recording commuters' stories, but what I've found is a disconnect between commuters' perceptions and their surroundings, be it people, nature, commerce, etc. Does this speak to the instrumental nature of commuting - its purpose being only to get 'there'? Could it be that commuters, while not conscious of social engagement, are in fact absorbing subtle cues from the environment, whether it is the freeway or the subway, and thereby gaining some awareness of their community?

Aside from the particulars of the commute, commuting provides a connection between home life and work life: it is a physical link between personal life and one's role in the national and international sociopolitical complex. And yet, due to the routine of commuting, and the immediate economic and lifestyle 'needs' that work provides for, this connection is often overlooked. Leading to the misguided notion that one's home life is disassociated from the larger geopolitics of global culture.

Changing Technology: Telecommuting and Community

With the rapid growth in mobile communication, the notion of physically commuting to and from work is no longer a given; telecommuting is a growing option for numerous occupations. Along with the increased flexibility this provides there is a change in how one's time is spent, who it is spent with, the

substance of what is communicated, and so on. As well, telecommuting has an effect on the social bonds that once were largely established within one's proximity, but are now increasingly distanced and mediated. The ways that we think about community, possibly even the way we envision our community, may be changing along with these changes in technology. For instance, one can imagine an older sense of community that was determined by location, and that might be visualized as an entity established around one's home, or one's job. Today we can envision a community that, rather than being cohesive and centered, is polymorphous and complex, has telematic tendrils connecting places that one may only visit sporadically, or never at all. This would seem to produce an atomization of community, but one could also argue that a new form of community is shaping up. This new community is emerging with our increasing use of communications technology. It is rhizomatic in nature and appearance, a parallel to our networked lives.

Conclusion and Sendoff

Commuting is one aspect of daily life that, due to its nature of traversing through territorial and cultural boundaries, and its inherent connection between home and work, the personal and the social, the local and the transnational, is full of possibilities for investigating a range of issues. Issues such as perceived community, the cross fertilization of cultures, the relationship between home, work, and the broader socio-political realm. With the help of commuters and the use of various methods, from low-tech to high-tech, for documenting their impressions of commuting and community, Perceptions of the Commuting Ethnogapher will provide insights into at least some of these areas of interest, and areas yet to be defined.

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THE MEMORY AND THE CODE: THE PHANTASM OF DIGITAL CULTURE

Javier Toscano

The aim of this paper is to analyze the physical concatenation of technological devices, specifically between memory capacities and qualities (a database, an archive) and the code that regulates its performance. The code is here pursued as an "element" as concrete as an object, and with a specific cultural history (a code as a program, and in a wider realm, an ethos as a code).

Intro [1]

If man was one time the one that imposed his rhythm to objects, objects are nowadays the ones that impose their discontinuous rhythms to human beings, their discontinuous form to be there or substitute one another without becoming old. The status of a whole civilization changes according to the presence and use of everyday objects.

The system of objects

_Jean Baudrillard

We live in an epoch where, once a new technological device is created, we forget the use we had imagined for its predecessors. It is as if our memory of things was conditioned upon their presence. The lapse between the apparition of a new gadget and the moment we understand its implications for our world flees faster every time. But this holds no surprise, the oblivion of those implications is a calculated effect in the consumerist structure, one that operates more as a systemic constant than as a secret interest, and that derives from the daily iterative accumulation of all sorts and the saturated flux of current information. In a very practical and convenient manner, the erasure of meaning of our surroundings is organized as a veiling of a semantic matrix. The brief space of this paper would not allow us to go deep into its consequences and structure, we will concentrate instead in analyzing one way on which oblivion makes the new appear as the never-seen, while many times it is in fact a space-and-cost economical reelaboration of the ever-known. True invention will then appear as a case of its own, a rare species that reelaborates time and space, but one with which we would not have the occasion to deal with here. Hopefully, by signaling out what has been a recurrent practice in contemporary theoretical argot and conceptual paraphernalia, we can at least contribute to a re-organization of perspectives that sheds light upon the common fetishistic approaches around present-day technologies.

a. Language

One of the explicit forms by which the "new" is wrapped in spectacularity and sensationalism is with the sophisticated devices of neologism creation. Language accompanies every technological creation with a territorializing strategy that has an effect on an epoch's forms of expression. To address a specific issue in contemporary societies – based on an economy of the intangible – means to fulfill the destiny of a certain desire, and to orient specifically an act of consumption. To think about the technology of our

time, we need to think how it is being described, spoken about, how is it understood from, with, through the specific agents of its production and consumption, and how its capacities are evoked, its effects programmed, its thrusts referred. The technological production starts as a speech act in itself. A machine can be thought of as a statement that requests, demands, solicits or summons a user's mobilization, a specific use and deployment.

b. Memory

In any case, it would be an endless task to refer all the effects and affects that contemporary devices produce in our time. We could therefore concentrate on two structures whose incidence is ample and quite decisive at once. On the one side, we find memory, a capacity for retention, the stock of data over which technological devices are built upon. In our time, the notion that every technological device would be faster, fitter and more powerful the more data it can process has become a common association, may it be for a computer, a toaster or a car. But that is not all. The discourse on machinic memory has been overwritten on a distinct paradigm of human memory, the one set by John Locke – to be more precise – that has memory as the base for the identity of an individual. [2] This is nothing new – we presence again here descriptions on the new through what is already known. The problem is that the foundation of that analogy is utterly erroneous. With the latest findings we have come to know to a greater detail that human memory does not work as a mere receptacle of data (as the lockean ideal would put it), that it is equivocal – and that's where its creative capacity is rooted – and that more than speaking about memory like something man 'has', we should refer on how we operate as living conscious memories, dynamic and ever-receiving, that generate the materials needed for the projects that will end up building a common memory and a collective surrounding. In a few words, we can say that we are *perceptive memories*: we perceive from what we know, and this description is the one that fits best the *mnemonic experience.* [3]

The machinic memory behaves as a storehouse, but some relevant ongoing researches pretend to locate it and justify it as an enhanced human memory. The strongest trend in this direction has been that set by John McCarthy Gallagher, who came up with the expression "Artificial Intelligence" (AI) in 1956, from which the field of cognitive sciences has developed. Nowadays, there is a swarm of projects that ascribe themselves to the principles sketched by the AI trend. One of the most fecund and provocative is POEtic, an ongoing research that implies the development of a digital electronic circuit capable of integrating three biological models of self-organization: Philogenesis (P), Onogenesis (O), and Epigenesis (E). This circuit would conform a tissue that would become the fundamental strata for the creation of new machines based on this system, artifacts "capable of evolution, growth, self-repair, and learning" [4] according to its own creators. In other words, there is in this project, as in many similar ones, a supplanting of terms that always bring a reference and an imagined convergence with the natural sciences – mainly biology – and set the technological possibilities for a self-asserted avant-guard. But, to what extent is this only an excess of a rhetorical language? What is the fair measure for comparison? Should we remorselessly transpose the terms from one science to another, as if, for example, a human virus (a given form of 'life'), were the same as the virtual virus that apocalyptically spreads over ever-growing networks of servers and computers? There is a danger in the comparison, one that transcends the semantic field, but this is not a concern for the technology developers, who keep their tasks on target, encouraged by full-fledged 'efficientist' conquests on every field. The danger instead sprawls on the way we need to understand human intelligence and memory, beyond a computational paradigm. Briefly speak-

ing, we could say that human intelligence and memory are not describable as a series of ordered operations, but should be seen instead as emerging realities that could be transformed and affected by emotions, perception, experience and free will.

Memory as a term has to be acknowledged as a multilayered and context-related concept, the name for a capacity that is just not the same throughout species, and even less from human kind to its instrumental developments. While machinic memory is cumulative, human memory is safeguarding. The first complies with homogenization of data and neutralization of possibilities; it is materially restrained, and much formal in its display. It exists already on a world, to hold some of its data. On the other hand, human memory has remembering as only one of its functions. But thoroughly taken, human memory implies already a temporality, and above all, a world that is being built around it. Machinic memory is always external (no matter if it is inside a chassis), it contains information that is being quantified, encrypted, and therefore subdued; the data it holds is being con-formed as it is used, made ready to employ by any other application. Hence, it follows a container-model, and therefore the terminology that is used to describe its modulations: *formatting, compression, recovering, input, forward, zipping*, etc. Human memory, on the other hand, goes beyond the model of the container and contained, beyond the idea of a self-definitive capacity. [5] In this sense, individuals should be thought of as intersecting fields for remembrances, images, affections. Human memory is chiasmic, it builds traits 'inside', but operates 'outside', in the sense that it constructs sociality. The data it holds is productive in more than an organic sense: it can be only activated by contact with an *Other*. Machinic memories, formatting what they contain, deal with residues, incorporeal fragments: in the end machines cannot be held responsible, accountable, for what they contain. They are not 'faster', but only perform every time more rapidly what a human mind, responsible for its surroundings, has set them to do, in a calculated fashion.

This impossibility of covering over one function, one set of tasks, with another has, as we know, also implications that make the machinic memory achieve a performance that is usually not even sought after by the most sound of human memories. A given input, a plain given, cannot exist for the human memory, where every bit of information is instantly referred, inserted into a constellation of worldly fragments that dynamically signify it. Data exists as such only for the machine, a mere cipher is for them only a cipher and nothing else, and as such, it is already an entry that can be manipulated by a program (software or code) that allows for its recovery, its putting it forth, by its own means and terms (as we will see on the next section). Thus, human memory has not been 'upgraded' by the machinic memory; more likely, it implies a change of degree that comes here into question: the order of the archive plays now a substantial role, and pushes to a second plane the traits of human memory that do not allow for an efficient use of abstract input, now considered as 'immaterial resources' from where a surplus value can be extracted.

But how is machinic memory treated, accumulated and disposed of these days? What implications are derived from its form and use on the current technological surroundings? What is its reach? To tackle some of these questions, it will be important to turn into what makes the data stored in a simple box available, interpreted, and even shaped into operative forms with observable consequences in our current world.

c. Code

Code is the other structure that plays an important role in our current assumptions of media and technology. It is not only its definition that counts, but also its operative description throughout history. A

perspective that would have code as a notion pertaining exclusively to our time would be naïve: code is a cultural object – the cultural object *par excellence* – for every historical epoch, including ours. Code is the element around which the machinic memory is ordered, it is the precursor of technological events, the source for collective forms of inclusion and exclusion, the excuse for other devices of social resonance. But even if its importance can be clearly outlined, [6] not enough analysis have been developed on its cultural impact. We have not been trained on the importance of building algorithms, source codes and programs that would make us process alternate possibilities for other ways of being, distinct abilities for different ways of approaching the technified reality (and therefore our world), or new capabilities for the conception and constitution of information flows and archives (and their consequent implication for identity processes, historiography, narrativity and historical memory).

The more stable definition of code is the one that has it as a series of executable instructions. A primary approach would set it as a clear, distinct, constant, repeatable and productive object. But this does not take into account an old phantasm that inhabits its core, and which safeguards an old desire in Western history: to build something that has a life of its own, something that might spread without limits, without human control, transcending even the circumstances of its own creation. A historic research, which cannot be repeated in these pages, [7] would render the code as a logography that needs to be deciphered, an enigmatic cue that may be open only by those who have the key. Of course, this infuses the code with an auratic flair, which leaves it close at hand but inaccessible, far from evident. The code is a filter in front of which exclusions are being set. The code brings together communities, societies of interest and knowledge that gather exclusively, demandingly and disciplinarily around a cultural object, associating certain effects to it in a cultural ritual that performs those effects recursively – i. e. by ascribing them to the object in case.

But probably the trait that pertains more decisively to code is its repeatability. It is there that is operation is centered. This ability and demand to be repeated covers a pleasure principle that is unleashed in different epochs. Through this trait, a code can be assessed not as an object – and thus as a fetish – but more precisely as an *energeia,* [8] that ancient Greek term that tried to convey one stage of motion – something actual in the midst of becoming something else. And as an *energeia*, the code configures the everyday through, as, around, a set of cultural configurations. Its function is to disseminate and be disseminated; it is a spacing (as gaining a place) of meaning, or rather, a way for the hyposthasis of meaning. The code is an object-flux dispersing on, by, itself; it is the scattering of a contained force, a form of production that brings together efficiency and a promise, which rebounds in a production of symbolic forms.

By thinking on the ways language, memory and code are interrelated, we can anticipate the means by which algorithms and codes shape our relationship to information, and establish an array of operations from its flux. Nonetheless, the wide range of possibilities by which code transforms the data it uses as its basis – the entries archived –is yet to be assessed. When this data is held to represent crucial statistics or financial assets, strong walls of protection have been constructed to defend their form, to keep them intact. That yields some evidence upon the status assigned to that data. In the financial stage of capitalism, numbers and ciphers have become the new fetishistic category, and the algorithms used in banking operations and investment formats behave as the engines that speed up these numbers, making them advance, increase, take a share from another archive's data that then recedes, looses, decreases its face-'value'. The cluster of equations made possible by such codes is turned thus into a zero-sum operation.

When data is held to be historical information or identitary records, new historiographies and identity-creation concepts need to be developed, parameters that include the variable of technological configurations as a field of meaning. A wiki, for instance, can be thought of as a site where information can be conveniently shaped to fit a 'truth' by general opinion. A given fact gains such a status either when not many users are directly interested, or when other sources of information – conventional books most of the time – remain unquestioned. But wikis are leading the terrain in different forms of collective knowledge creation. The open code upon which they rely implies a certain epistemology, one that will leave its mark on our historical moment. Not surprisingly, the operation of a wiki remains an interesting topic in this sense, for if the manipulation of code can sensibly affect strategic data on a functional level (for example, on the determination of what constitutes a fact), we could raise questions on a historiographical, a technical, an esthetical, but most importantly, an ethico-political plane. In any case, the forms by which data is being transformed on its processing by code and algorithms are just about to start getting more importance. In the interrelations of the functions of machinic memory and the code that process it to make it available, we are witnesses to a very special moment, an epochal crossing of the technological and the conception of culture from which we can derive a more thorough understanding on the concrete possibilities for new forms of critical thinking, definitory behaviors and the collective creation of practical knowledge stemming out directly from our everyday interchanges with the world.

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SKEDIOMATA: GUINEA PIG AND PERFORMER

Patrick Tresset, Frederic Fol Leymarie & Nanda Khaorapapong

We present Skediomata, a low cost robotic platform dedicated to drawing sketches. Skediomata is described both as a tool for research for the AIkon-II project and as a performer (in various embodiments) in art installations. We present a brief technical description of the system as well as a summary of two recent art installations where Skediomata was employed as a live performer.

Fig. 1, Installations with multiple Skediomatas (Paul and Pete), Tenderpixel, London, June 2011. Copyright Patrick Tresset.
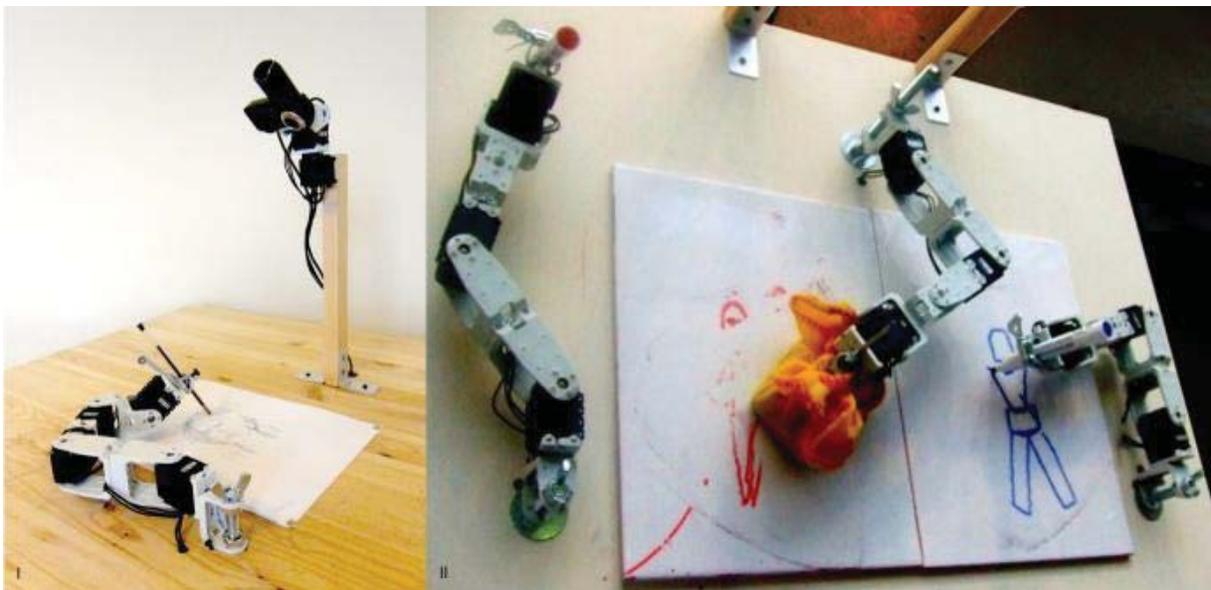
Fig. 2.I, Aikon pre-alpha at Kinetica Art Fair, London, February 2010. Copyright Patrick Tresset. 2.II Ladies and Gents at Watermans art centre, Copyright Nanda Khaorapapong.
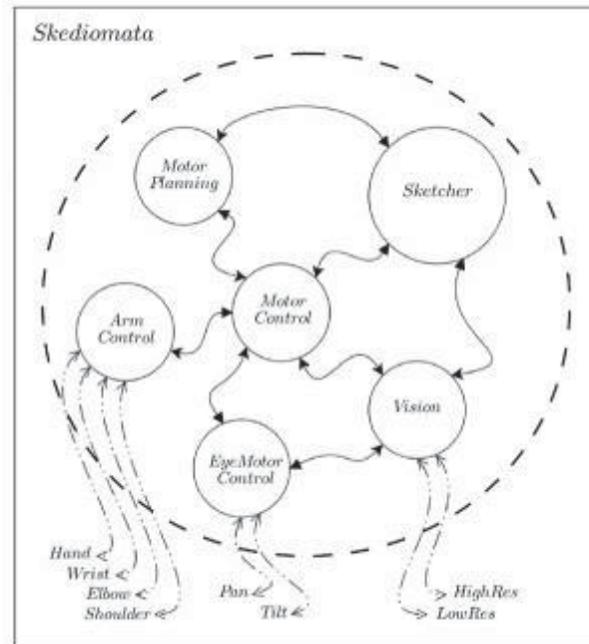
Fig. 3, Skediomata's architecture overview. Copyright Patrick Tresset.

Introduction

Skediomata, the robotic entity dedicated to the study of drawing was born in research as a guinea pig. Perhaps not surprisingly, it and its siblings have been found to be gifted leading performers when participating in art installations. The original Skediomata is being developed in the context of the AIkon-II research project, an investigation into sketching.

The AIkon-II main research objective is to gain a better understanding of the emergence of style in observational sketches. The methodology deployed to shed light on this complex activity consist of developing a computational model of the processes at play during the sketching cycle.

Interestingly, when designing a robot that interacts with physical reality, the issues encountered are of a very different nature than if the system is solely computational. It is one of the reasons that lead actors from the artificial intelligence community such as Rodney Brooks at the MIT [1] do consider that disembodied artificial intelligence is essentially flawed. Looking at drawing as a complex sensorimotor activity brings new insights into the processes we are investigating and into ways to model these. Furthermore, the type of software architecture that supports communications by distributed concurrently running processes as used in contemporary robotics is well adapted to the simulation of an activity such as sketching recognised has being the result of the interaction and cooperation of multiple processes [5].

Apart from being an essential and influencial "guinea pig" that furthers our research, due to the fascination that robots exerts on the public, Skediomata has proven to also be an excellent ambassador to promote AIkon-II's work. Furthermore due to its low cost and the type of software architecture developed, groups of Skediomatas feasibly collaborate as performers in art installations.

In this paper after a brief historical introduction of drawing machines and laying out possible avenues to explain the performative qualities of Skediomata, we present a comprehensive description of the Skediomata platform. We then describe two recent artistic installations presented in 2010 and hint at the future.

Drawing and Robots

There has been a long tradition of drawing automata or machines, which we can trace back to at least the 18th century, e.g., with Maillardet's automaton which was able to draw seven sketches and write four poems. Closer to us there are important links between the origin of computational art and drawing machines. The Algorists [2] who were pioneers of the field made extensive use of early drawing machines namely pen-plotters. A notable member of the group, Roman Verostko who was celebrated in 2009 by ACM Siggraph with the attribution of a prize honoring achievements in digital art, still uses pen-plotters. Although Harold Cohen has for some time now used large format ink printers as output for AARON, until the early nineties he used custom drawing/painting machines. Interestingly the first versions of AARON were using a drawing robot, a type of mechanical turtle that allowed for large scale drawings [3]. This early robot was performing live notably at Documenta 6, 1977, Kassel in Germany. From Cohen's descriptions we can recognise that the performative quality of the installation had a strong impact on the audience; an effect that later Cohen would judge distractive.

A drawing or even a sketch is made to be appreciated when finished. It is a static image. As often noted by artists, the process of drawing is a private intimate activity, seldomly intended to be shown. Often cited in the literature are the time, movement, process, intention, capturing the quality of the drawing activity. For the observer, the sketch is the trace of the gestures, the paths that the draughtsman's arm/body/hand has taken. It is a memory, a direct witness of the draugthsman's action. The manner in which traces lay on the paper, their positions, curvatures, harmonies or discordances, will influence the observer's perception. The recent discovery of the mirror neuron system (MNS) has lead Gallese and Freedberg [6] [4] to speculate that aesthetic experience in the viewer in front of an artwork can be explain through the MNS activity. Mirror neurons, found in the premotor area of the cortex, are activated when either performing an action or observing another individual performing the same action. The existence of mirror neurons would explain phenomena such as empathy, and reading intentionality. Interestingly, MNS activity could explain the strong effect some robotic art installations exert on audiences. For example, consider the fascination exercised by Edward Inhatowicz's Senster [9] or more recently Ricardo Nascimento's Suffering robot. In these installations there is no attempt at making the robot look organic; on the contrary their artificially is not hidden, their mechanisms are laid bare. It is only through their limbs' layouts, reactions and movements that the audiences feel empathy.

When we are exhibiting installations where Skediomata is a performer we are exploring on one hand the performative nature of drawing and on the other the perception the audience has of the artistic practice and the artist. We remain safely away from the uncanny valleys; Skediomata does not pretend to be human. It is only an obsessive drawing entity. It has eyes but no head. The arm's limited freedom makes it only able to trace or erase. Yet, it is displaying some form of attention when focussing on a person and some form of intention, as for tracing a line there is a need for intention. The presence of intention is even more striking if the action slightly fails, such as when the arm is attempting to draw a straight line but not managing to do it perfectly.

Technical Description

Skediomata is a robotic hand-eye system conceived to be used as a guinea pig for experimental research during our investigation into the processes involved when sketching faces. As such the general design objectives for the Skediomata system are to: a) fulfill some minimal requirements necessary for experimental research into the sketching activity, b) be suitable for public demonstration, c) be employed as a performer in art contexts. We are describing here the current version (at the time of writing, in January 2011).

ARM

The arm is conceived as a planar arm with an extra revolute joint allowing the vertical movement of the pen. Having 4 DOF brings the arm's architecture closer to a humanoid arm. This increased morphological proximity influences the observer's affective relation with the robot. To further increase the association with a human arm we have set the joint's angular limits in such a manner that the arm's freedom will resemble that of a human left or right arm.

The actuators used are Dynamixel AX-12 servos manufactured by Robotis. Each such servo includes an integrated 8 bit micro controller. The servos are addressed with an 8 bit ID that can be networked in a daisy chain. Commands are sent by writing some values in registers. Servos states (for feedback) are queried by reading values from registers. Commands include velocity, position, compliance, maximum load. Feedback includes position, velocity, load, voltage.

EYE

The camera system provides visual data about the sitter and feedback about the drawing gestures and sketching evolving results. These multiple functions entail different requirements: i) motor control to bring the focus either on the drawing or on the sitter, ii) precision to look at the sitter and drawing, iii) speed of capture to observe the hand drawing in real time. A pan and tilt system driven by two ax-12 actuators is used to control the focus of attention's (FOA) direction.

SOFTWARE

Contemporary robotic software architecture is based on communication between concurrent distributed processes. In recent years we have seen the development of open source robotic software frameworks such as ROS and YARP. These frameworks help organize communication between sensors, processors, and actuators. One of the advantages of these frameworks is that they facilitate components' reuse and have a large ecosystem of research teams that use these and publish new components that are reusable for other projects. Skediomata is currently using YARP as a framework. An overview of the Skediomata framework is presented in fig. 3. One of the advantages of this architecture is that depending on what Skediomata is used for, AIkon or as a performer, only the Sketcher's component is specific. Furthermore it is very easy two have multiple instances of the system running concurrently and communicating. Using YARP also provides a web interface that allows for the systems to be monitored and controlled remotely.

AIkon Pre-alpha

The AIkon pre-alpha version was exhibited for the first time at the Kinetica Art Fair held in London in early February 2010. The system drew over a hundred visitors' faces during the weekend, the role of the human operators (the authors) being reduced to mechanically changing the paper. The requirements we had set for the system in view of the exhibition was to have AIkon capable of autonomously do live face sketches of visitors (fig 1. and fig 2-I). Our approach is to have the system follow a strategy, method and manner as would be deployed by a human when sketching. In this instance, the manner in which the system produced sketches was inspired by the idea of approximately drawing the structural lines that could be used as initial steps in a more complete sketching cycle.

SKETCHING CYCLE OF AIKON-II PRE-ALPHA

1. Scan the environment by moving the eye until a face is detected. Uses the Haar feature detector that is part of the openCV library.
2. Focus the eye onto the sitter.
3. Limit the region of interest (ROI) to a close-up framing.
4. Segment figure/ground, simply by applying a flood fill algorithm, with seeds located at coordinates heuristically known to be ground.
5. Convert the ROI to gray levels.
6. Convolve the ROI with a difference of gaussian (DOG). Difference of gaussian are known to be a good approximation of the transformation that occurs in the human in the lateral geniculate nucleus (LGN).
7. Draw salient lines with increasing precision.
o Convolve the image with a Gabor filter banks with diminishing spatial frequencies and tuned to an increasing number of orientations. Gabor filters are known to be a good approximation of simple receptive cells found in the human visual cortex V1 area [8]. Simple and complex cells in V1 are known to have peak excitation (firing rate) to lines with given orientation and high contrast [7].
o Extract the stronger responses from the Gabor filter response images.
o Compute the location and direction of straight lines corresponding to selected responses.
o Point to point trajectory planning in the Cartesian space.
o Resampling and transformation of the trajectory in the Joint space using analytic inverse kinematics.
o Execute the gesture, sending the succession of Joint positions to the arm's servos controller.
8. Execute the signing script.
9. Human operator mechanically and boringly detaches the paper, gives it to the sitter and puts a new sheet of paper while AIkon cools down and waits for the next sitter.

Ladies and Gents at Unleashed Devices

Ladies and Gents was a site specific installation presented at the Unleashed devices exhibition, which was held in September and October 2010 at the Watermans Center in Brentford, London. The idea we developed then was in response to a promenade in the Watermans Center space. A problem with the AIkon installation as exhibited at Kinetica was that it required the presence of a human operator to act as a paper changer device. This was unsuitable for a two month long exhibit. So we decided to work on a site specific installation with the additional constraint of being wall-based, and to produce drawings in response to visitors' presence. The only suitable wall space we found was just in between the Ladies and Gents toilet entrance doors. This location provided inspiration for the piece. The wall based drawings

would echo the idea of graffiti as found in lavatories and the gender would provide guidance for the drawings.

Ladies & Gents is an installation employing three Skediomata performers acting respectively as Gent, Lady and Cleaner. Gent has an eye in the Gents lavatories, Lady an eye in the Ladies and Cleaner has two eyes watching the tiles that are located on the wall between the doors outside the lavatories, located in the center's ticket hall.

Every time a new person enters the public lavatory, some measures are extracted from the captured silhouette. Depending on which room the person is in, either Gent or Lady uses the gender-based measurement to create a somewhat humoristic graffiti. This grafitti is drawn either by Gent or Lady's arm on the tiles located under the Cleaner's eyes. As soon as a graffiti is finished, Cleaner wipes clean the tile, but Cleaner's eyes have previously captured the drawing process, in the form of a video being automatically compressed and uploaded to YouTube and posted on a dedicated blog.

Conclusions and Future

We have presented here Skediomata, a low cost versatile robotic platform used in a research context as well as in art installations. Each time a Skediomata systems was exhibited it attracted the public and press attention, which has enabled us to have a rather full program of commisions and exhibitions for 2011. Even if our focus is on the Aikon-II research project's objectives, the versatility of the Skediomata system allows us to take part in such public engagement activities. Over this coming year, we have planned for most of the work to be on the refinement of the AIkon-II core system, with for main objective to provide AIkon better capacities at using visual feedback to correct or modify a sketch in progress. We foresee that AIkon-II will be exhibited sometime in 2012.

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FROM « IMMATERIAL » TO « HYPERMATERIAL »

Colette Tron

In this proposal, it is submitted to approach the digital technologies through the question of their materiality. To do this, the references will be taken from theoretical and conceptual propositions by some French philosophers.

This paper would like to develop a sort of historical definition and conception of the new technologies of information through these philosophical concepts.

Catalog « Les immatériaux », cover pages, Centre Pompidou publications.

Introduction

By its use of the term, the exhibition entitled "Les immatériaux" / "The Immaterials" organized in the 80's under the conception of the philosopher Jean-François Lyotard at the Georges Pompidou Center seemed to define a new plasticity of art for the computer. "The material itself never ceases to become more complex [...] stipulates Lyotard. A color, a sound and material are restituted as precisely identifiable digital numbers [...] the end result comes to us analyzed and reconstituted in complex formulas." [1]

Electronics, the digital and programs, all of which are components of the computer work together to create digital representation which we currently label immaterial.

Electronics with the rays that it emits, and its intangible physicality, computing and its digital base, the calculations it implements and the languages it manipulates participate in systems that are already symbols, hence abstractions. Thus we call the computer an abstract machine.

"Materials and digital tools are essentially symbolic and linguistic. These are what compose the language of computer programs" according to Hillaire and Couchot in "L'art numérique ou comment la technologie vient au monde de l'art" / "Digital art, or when technology comes to the art world." [2] They nevertheless go on to say "we can no longer consider them simply as immaterial "what marks digital technologies is not their immateriality but their programmability, in other words the fact that they are reduced to computer programs with a capacity to be processed by a computing machine". And despite the language or symbolic form that arises what is subjacent and allows the computer to function are automatically treated programs and data.

In addition, in computing and the digital we come face to face with the computer's double language, allowing the machine to operate, uphold representation and that of interface and surface, restituting symbols that we know and recognize, i.e. text, image and sound.

Whereas it is this chain of abstraction, this superposition of digital, programmatic and semiotic languages that work together to produce the immateriality of digital technologies. From bit, the 0 and the 1, the binary basis for the functioning of the digital system, to interface that renders the symbolic figure readable by way of the treatment of data by the computer program, the computer only manipulates abstract symbols. This interweaving links *techné* and *logos* and this techno-science gives rise to technology. Thus we find the immateriality of abstract machines occupying several layers.

The immateriality described above applies itself both to computers and to the abstraction of the languages flowing through it.

However through a reading of recent work by philosopher Bernard Stiegler entitled "Economie de l'hypermatériel et psychopouvoir / "Economy of hypermaterial and psychopower," [3] we discover a new way to ponder the developments of new technologies (via scientific research preceding them…) making their way into a hypermaterial reality. Stiegler describes the evolutions of technique, diverse periods of science, the emergence of techno-sciences and their transformation into technologies, their industrial economy and most especially he analyzes scientific terrain that he calls invisible "ranging from nanostructures to neurological foundations of the subconscious, including biotechnologies". He calls these invisible systems the terrain of the hypermaterial when, according to him, "material remains a form (consider the quantum level) and the form is always information in itself (that is to say a transitory state of substance produced by a material)"… This hypermateriality weaves its way through cultural and cognitive technologies and closely related technologies (biotechnology and nanotechnology) whose paths converge in the digital.

"The Immaterials", an Exhibition, a Concept

The exhibition "Les immateriaux" designed by the philosopher Jean-Francois Lyotard at the Georges Pompidou Center seemed to define through this term, first a new plasticity of art for the computer, as well as new Information Technology.

Now a key point of reference in the evolution and a definite revelation, at least concerning France, of art using new technologies, especially via electronics, computers and obviously programming, this exhibition and its title announced the coming of an immaterial art, in flux, impalpable and was a precursor in the analysis of the mutations for our senses, our sensibilities and meaning, adding significant perception to messages sent and received in the framework of these new technical mediums.

Indeed, the term "immaterials", he tells us, was chosen for two main reasons.

Message and medium, or material, are considered to be integral parts of one another, especially in the framework of technologies where "a code itself is inscribed in the medium" and is even part of the material itself. Substance or matter which, given the complexity of the elements behind its functioning have been relegated to the function of medium as a "model of language", for outside its physical elements, the computing machine merely manipulates abstract languages that link together to reproduce marked and significant symbols for our use.

The second reason for this terminology is linked to a change of scale initiated by this techno-science: "the infinitely small" is no longer confined to human scale and the new sciences that evolve from these new values have an influence upon artistic experimentation.

For Jean-François Lyotard and his collaborators, these parameters generate a questioning on the part of human beings and shake up the foundations of modernity that have been established in the 20th century's culture since the Age of Enlightenment. A "notion of the complexity of things" has provoked these questions, contextualizing and making concrete this "post-modernity" announced by Lyotard.

This complexity alone made it vital to seek answers about messages of reality and its references. An ontological approach? A structural approach? A scientific approach? Whichever the case, it is an issue of going beyond appearances and understanding what was taking place at the source. In the organisms and material themselves. And Lyotard probes this, examining and analyzing to get to the roots of "the birth of meaning" and seeks "the source of these messages", conveyed by the new mediums of electronics and computing.

Indeed, the main line of reasoning behind the exhibition "The Immaterials" was built upon the idea that "the materials themselves become more and more complex. When their brains began operating with digitalized information without analogy to their source this was a great step forward."

Here an analogical system is compared to a digital system: for the analog signal the medium of restitution of representation still has a reference point even if it is absent. In the digital system the real model no longer exists: it has been digitalized and renders representation totally abstract. "It is as if a filter had been established between things and us, a screen of numbers, he goes on to say. A color, a sound, material, pain or a star are all sent back to us as very precise digital numbers of identification."

It is the "language model" Lyotard evokes, replacing material which will transform reality in such a way that "the material itself comes to us analyzed and reconstituted in complex formulas" when "reality is composed of indiscernible elements" because "organized by laws of structure (matrix)". All this, he concludes "constructed upon disproportionate scales of space and time for humans".

Here, structure becomes texture and web and this "immateriality" born from a complexity we merely glimpse leaves behind it a Cartesian approach to the world. Is the deciphering of meaning a revelation? Can we find ways to reign it in? The Immaterials examined the drastic change that surfaced as we move from modernity to post-modernity, as we tackle the problematic of mastering material.

Digital Art

What is the digital and accordingly, what is digital art?

How does the digital influence art?

These subjects have already been tackled by Jean-François Lyotard, as he studied computers and their digital functioning, computer languages and replaced "pure material" with numbers, erasing source material. Superimposing languages of different registers, substituting matter with algorithm, altering the model by graphics and calculation, digital art is a product of these systems of languages, all abstractions that are interconnected between reality and its digital representation.

In their book "L'art numérique, ou comment la technologie vient au monde de l'art" published in 2003, the artist Edmond Couchot and the philosopher Norbert Hillaire develop their viewpoint on digital technologies, stating that "we can no longer consider them as simply "immaterial" because while the objects they produce are virtual, they are a significant part of the real world and have a definite influence on our senses".

No matter how we view virtual reality, or the essence of virtual artwork, it is important to stop and consider their technological mode of production or what we could call technique; this is what Edmond Couchot and Norbert Hillaire ascertain when they point out that science and art have found a new way to articulate through the digital. Indeed, they are of the opinion that "materials and digital tools are essentially symbolic and linguistic", functioning with abstraction and symbols that "stem from the language of computer programs".

For Couchot and Hillaire, "the specificity of digital technologies lies not in their immateriality but their programmability, which implies they have been reduced to computer programs capable of being automatically processed by the computing machine."

What becomes obvious first in Jean-François Lyotard"s analysis and then in the work of Edmond Couchot and Norbert Hillaire despite the results they obtain, resides in the relationship between technique and art, language and representation. Thus we discover that computer technology modifies the "texture" of artwork produced by computer or digital art, technology without which the work would be inexistent since it is encoded.

How do we seize upon the implications of digital art?

Couchot and Hillaire demonstrate early on that their terminology brushes aside "New Technologies of Information and Communication" in favor of "digital technologies" adeptly referring to their specificity. Technology rather than technique is an indication of the technical development of the science from which these are a product in terms of a system and its "formal reasoning", a regular and methodic functioning that attains logos, or an internal logic.

The works that evolve thanks to these digital technologies "share two common characteristics"; they are generated from the automatic calculations of computers and are adept at interacting with their creator or the intended user. Hence they are noteworthy for their programmability and interactivity. What Couchot and Hillaire would like to stress is that "the processes of fabrication that build the work" "are no longer physical but "computational and language based". Lyotard said the same thing using different words. But the latter all insist upon the role played by scientific modalities in digital computers. Their

programming activity is based on "logical models and mathematics from science". Sciences that use reality as a model in order to capture it and then reconstitute it. And this is accomplished by simulation. "Digital technologies are for the most part technologies of simulation" add Couchot and Hilaire.

Therefore digital simulation and its mathematical models are the underlying elements of representation. "Because of the digital, science cannot be interpreted metaphorically", rather "it asserts itself directly upon art by way of models of simulation, materials, tools and more importantly its processes".

We can consider the digital as a new state of representation, tied to a form of technique. Herein we are exposed to another approach to the complexity of the digital.

States of Material, or a Reason for the Hypermaterial

While Jean-François Lyotard considered material as a state of energy, and energy as being immaterial Bernard Stiegler's analysis took on a new approach with regards to science and technologies and their potential, "technologies of information, communication and cultural and cognitive technologies." by situating them in "hypermaterial devices", when the notion of information is offered up as an invisible yet omnipresent material.

"There is nothing that is not a material state", says Bernard Stiegler. And so for this philosopher, ""the immaterial" does not exist, not even in the nanometric dimension.

"States of evanescent material" remain material nonetheless. He foresees a situation of hypermateriality for our era and our economy. "I call hypermaterial a network of energy and information where there is no longer a distinction between material and its form – as we find in quantum mechanics", he explains, "and I label a process as being *hypermaterial* when information – presenting itself as form – is in reality a succession of states of material produced by materials, apparatuses, and techno-logical devices when the division between material and form is totally devoid of meaning". In reality "this is proof not of dematerialization but on the contrary, of hypermaterialization: all is transformed into information, or states of material through the intermediary of material and apparatuses which are instantaneously manageable and controllable "in the infinitesimal and the infinitely brief."

The only way to understand this concept or consider hypermateriality is to move beyond the out-dated differentiation between matter and form and acknowledge the state of the nanoworld. When matter becomes invisible and consequently "the problem is not one of immateriality, but the *invisibility* of matter". And we cannot comprehend the notion of such widespread information without keeping in mind that it is transformed matter, which is to say the product of other states of material, compiled in the digital and its mediums, or in the words of Bernard Stiegler, grammatize it by a process of discretisation, shifting from one form of material to another until matter and form merge. A process of discretisation that he reminds us has existed since the Upper Paleolithic from the sharpened flint to the digital and IPV6 and where it is always a question of mental processes that perform like engrams, because inscribed, encoded, memorized through materials, techniques and representations.

As such, in an analysis of formation and components of matter and a reformulation regarding information (its substance, its texture), hypermateriality takes on a definite consistency : "it is a state of transitory matter, in movement, a process which is always *up-to-date*, impossible to analyze simply, as either matter or as form. It is energy and information." Bernard Stiegler goes on to say that on the nanometric

scale there is really no reason to distinguish between the information industry and the industry of matter.

Bernard Stiegler's objective is not to refute the idea of the "immaterial" but rather the so-called economy of the immaterial which would ignore the possibilities of this new mode of production and transformation of matter, that of digital information (ranging from nanotechnologies to biotechnologies), whose encoding presently represents "colossal possibilities" which stretch beyond "the number of atoms on earth".

He is wary of a hyperindustrial society, capable of an infinitesimal accumulation of computer memory (data of every sort and their meta-data), within the confines of these technologies of the hypermaterial. His critique is founded upon the perspective of a "non-inhumane" future for humanity, a world Jean-François Lyotard had already described as being on an inhumane scale twenty-five years ago.

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TRANSFORMING THE PHYSICALITY OF EMOTION

Joan Truckenbrod

Where do emotions reside? Are they the sole property of the body or do they resonate in the interstitial spaces between the material world and ephemeral realms? I propose that emotions reside in the object, physical and virtual. In my artwork, I juxtapose objects with video projection. The object maintains a powerful reference with a cultural and social meaning, while multiple video projections intervene.
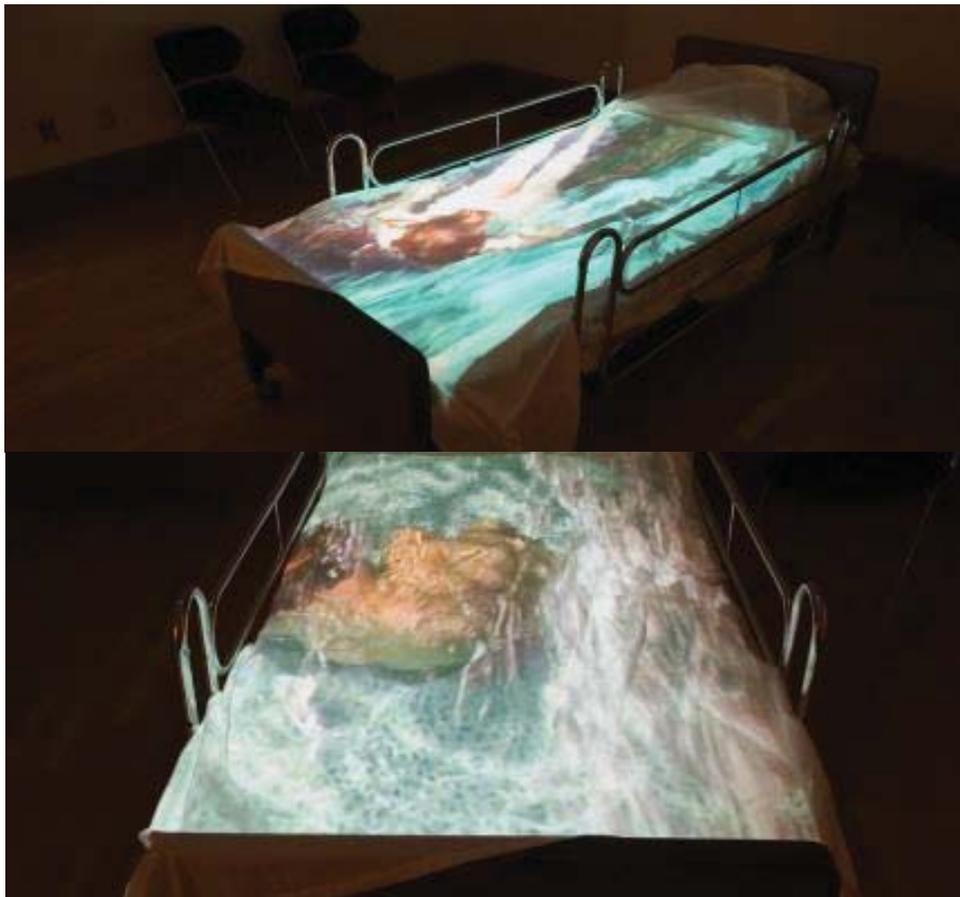
Against the Current, Joan Truckenbrod, Video/Multimedia Installation, Full Size Hospital Bed with Video Projection of Body Tumbling in Stream with Salmon Run, Sound. Copyright Joan Truckenbrod.

Where do emotions reside? Are they the sole property of the body or do they resonate in the interstitial spaces between the material world and ephemeral realms; in invisible but palpable electronic spaces, in virtuality, in spiritual and ancestral realms in indigenous cultures?

Developing research in affective computing aspires to create computing devices that embody emotions, - recognizing and responding to emotions expressed in people's faces, gestures and stances. Emotion is

fundamental to human experience, influencing cognition, perception, and everyday tasks such as learning, communication, and even rational decision-making. In the field of *Emotion Design* can we instigate spontaneous emotions? Is there an electronic mimesis that can empathize with the user?

The physical body is not the sole proprietor of emotions, rather, they reside in objects.Emotions emanate from the material world. Objects are imbued with power - "thing power" as described by Jane Bennett in her book *Vibrant Matter.* She proposes that objects embody a vibrancy of their own. Not only do they display or have *meaning*, they are active in creating the context of that meaning. They have agency in their behavior. Materiality is expressive. The efficacy of objects is in relation to the meaning they express. "Things" have a capacity to impede or bloc the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own. *Thingness* is not a fixed stability of materiality or a passive object, rather, she theorizes that materiality is as much a force as entity, as much energy as matter, as much intensity as extension. [1]

Demonstrating the vibrancy and power of materiality, my video sculpture is the collaboration of a charged object with time-based digital video imagery projected into the object. As video is nomadic, transitory, itinerant and even entropic, the juxtaposition of video with sculptural object is an active collaboration of the cultural or social meaning embedded in the object, with the animated imagery. Carried on the light of the digital video, the narrative intervenes in the meaning of the object. The digital theatrics of video sculpture engage objects as actants with a vital impetus – never acting alone. Their efficacy or agency always resonates in a collaboration, or in this case a collision, as objects are actors in this theatre of art installations. [2]

Objects Embedded With Memories

The potency of the material culture (materiality) emanates from memories embedded in and evoked by objects. Objects become sites of memory. Memory is intimately connected to our material culture. In the book "Memory Work: Archeologies of Material Practice" memory work refers to both the social practices that create memories and the materiality of memory making. Personal events and activities leave behind remnants or vestiges of social practices, that become infused with memories. Another example are the highly charged material fragments deposited by ritual and ceremony in indigenous cultures. Memory resides in these material traces, evoking strong emotions long after the performance of the ritual. In archeological research, objects uncovered provide insight into social and cultural practices, as they are traces of deposits left by these material practices. Memories of these practices are embedded in archeological objects which create contexts in which memory is materialized. The same is true for contemporary objects that embody memories of histories or practices. Materiality becomes a portal to understanding the connections between people through time, and diverse geographic locations. [3]

Resonances of memories are evoked in my video/multimedia installations. In the installation titled "Lightening in My Blood" the *object* is a large cardboard playhouse painted white - imbued with childhood memories of spontaneous narratives erupting in make-believe spaces. This *house* is placed on a small pedestal with wheels on the sides –giving the contradictory impression that the house is mobile. One side of the house glows with the fast paced video of baby salmon obsessively jumping at a grille trying to escape, in a fish hatchery in Oregon. This imagery mirrors the underlying emotions of participants in the video on the opposite side of this house – a slow walk through a nursing home captured from a wheel chair. The inaccessible inside of the house remains empty filled with an uncomfortable darkness, except for the fragments of video that push through the small cut-out windows. The sound of

gushing water fills the space. This potency of the material cultural emanates from memories embedded in, and evoked by, objects such as this playhouse. [4] Objects as sites of memory, construct personal emotional landscapes.

Emotions are sited in objects as memories become embedded in them. Artifacts carry the remembrance of events, the history, the power of an event such as trophies, plaques, certificates, as well as baby blankets or stuffed animals from childhood. Emotionality is active in objects through the memories they possess. The installation "Against the Current" employs the highly charged object of a hospital bed with the railings up, occupied by a body tumbling in a steam with a salmon run. (See Figure 1.) Emotionality is palpable as the nude body twists and turns in the water, as salmon swim upstream, against the current. See Figure 2. Salmon create a powerful metaphor as they are born in fresh water, and swim downstream and into the ocean as they mature with the radical shift in their environment from fresh water to salt water. Years later they return to this same stream, swimming upstream against the current to return to the lake of their birth. During this journey their powerful bodies propel them up the falls in the river. The timing of this return is for them to spawn, which jarringly is followed by their death. This installation exemplifies physical things that are employed to signify ephemeral events, virtual experiences or spiritual rituals. [2] They become signifiers for complex concepts.The physicality of emotions embedded in these objects is transformed into ephemeral, virtual or spiritual experiences through on-line societies, virtual relationships or spiritual experiences.

Agency of Objects

They are *animate* and possess agency, as objects are actants with a vital impetus – never acting alone. Objects are *animate* and possess agency, as they are actants with a vital impetus – never acting alone. Artifacts cause actions and their effects have consequences. Their efficacy or agency always depends on collaboration with other objects and people. In indigenous cultures there are numerous ritual and sacred objects that *possess* agency. A provocative object in African culture is the *Power Figure*, imbued with spiritual power by a ritual specialist. They operate with different functions such as healing, divination or protection. These unique sculptures are thought to have their own identities, and are treated with great respect because of the power they possess. Secret compartments within these objects contain special ingredients empowered to carry out their functions. These figures frequently are constructed with mirrors positioned on their stomachs, which become the eyes of the figure, enabling them to "see into the spiritual realm". Highly charged objects are an integral aspect of indigenous cultures. Emotions reside in these objects and are catalyzed in the interstitial spaces between the objects, shaman, and citizens during ritual performances and ceremonies.

'Machinic Assemblage'

The object is neither subject or object as in the grammar of a sentence but rather a participant in a *mosaic* or an assemblage which is comprised of heterogeneous elements. Emotions reside in multiple realms, in the interstitial spaces of assemblages of diverse elements. DeLeuze describes this synthesis of heterogeneities, an acculturation of diverse elements, as machinic assemblag*e*. [5] According to Bennett, machinic assemblage becomes a body that is multiple, with objects functioning in assemblage, in a mosaic. Mosaicism links the degree of internal diversity to the degree of power possessed by the thing. The agency of assemblages is the sharing of powers between artifacts, or people and artifacts, and the tendency to operate in dissonant conjunction with each other. Assemblages owe their agentic capacity to the vitality of materials that constitute it. [1]

An exhibition titled Machinic Alliances at Danniell Arnaud Contemporary Art Gallery in London in the summer of 2008, examines the issue of 'machinic' as a process that expresses our capacity as humans to form alliances with non-human forces, be they animal, insect, plant or virus. The exhibition takes this Deleuzian premise as the basis from which to propose unholy affiliations between categories of human/animal/technological.

Digital Art and Design

Nonobjectness is the focus of the Design firm named Nonobject Studio created by Branko Lukic with the objective of bringing meaning to otherwise unremarkable objects by creating emotional links to them. Engaging the idea of the agency of objects, they employ the power of emotions to activate and invigorate objects they design. Objects are designed and empowered, based on emotional references embedded in them. [6]

An iPhone app was invented by Alicia Morga to tracking emotions, for the purpose of managing one's emotions. The user inputs their evaluation or interpretation of their own emotional states. The app allows the user to track their emotional responses in order to become more aware of one's feelings and control them. The implication being that one's emotions are transferred to the iPhone.

Art exhibitions are also probing the site of emotions. The exhibition *Talking to Objects*, currently at MOMA in New York City, examines what is necessary to develop machines/objects that communicate their use and process for interaction to the user. The resonance of responses reside in this interstitial space between the user and the object. A previous exhibition at the New Museum in New York was titled *Free* exploring the Internet as a public art space. One artwork in this digital exhibition was a virtual exhibition of objects titled "School of Objects Criticized" by Alexandre Singh in which he located ordinary object positioned on spot-lighted pedestals. He transformed these toys and household items into characters performing a lively comedy of manners.

In my video sculpture*,* video projection and object collide or collaborate in creating a hybrid with the power and provocation arising out of the assemblage of diverse elements. Dynamic force, power emanates from the spactio-temperal configuration rather than from either participant. There is a combustion of the interstitial forces.

Contemporary theory migrates emotion from the physicality of the body to objects – both in the material world and the digital realm. The assemblage of emotional resonances are highly complex networks entangling people with objects collaborating in virtual and ephemeral experiences across cultures. Examples are "Vigilant things" created as powerful protectors in Yoruba culture. Amazing constructions involving ordinary materials such as string, paper and sticks, are described as "ase-impregnated sculptural constructs". A battered black plastic bag filed with a potent substance, tied and hung from a stick over a pile of recently cut green branches, signifies ownership. Anyone who steals these branches is warned and will "suffer some calamity". There are invisible potencies embedded in these protective constructions called "aale" that protect property and objects. These aale, even though they are constructed with ordinary objects like cloth and branches, *contain* and emit strong emotional resonances. [7]

The Chinese tradition of 'shi' is another example of the emotionality and agency embedded in objects. This concept of "shi" embodies the idea of congregational agency in which an assemblage owes its

agentic capabilities to the vitality of materials that constitute it. The shi of an assemblage is vibratory. The potential of this assemblage originates not in human initiatives but instead results from the very disposition of things. "Shi" is the style, energy, propensity, trajectory or élan inherent in a specific arrangement of things.

The material agency of assemblages is the sharing of powers between artifacts, or people and artifacts, and the tendency to operate in dissonant conjunction with each other. The assemblage owes its agentic capacity to the vitality of materials that constitute it.

Emotions have migrated from the physicality of the body, facial expressions, gestures, and posturing to the evocative resonances embedded in objects, and in the interstitial spaces between the body and objects. The digital realm has transformed the experience of affect into virtual and ephemeral territory, reawakening the emotional power of invisible potencies of objects in diverse cultures.

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INTERSECTIONS OF INTERDISCIPLINARITY: TECHNOLOGICAL, TRANSNATIONAL AND FEMINIST FORMATIONS IN THE PUBLIC ELECTRONIC ART OF MURIEL MAGENTA

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This essay explores not only Magenta's personal and political causes as a transnational academic feminist, but also the ways in which her public electronic art has served as a forum for the intersection of technology, social critique, and women's issues.

A Professor of Art at Arizona State University, Tempe, a new genre artist who works with numerous technological media, and a dedicated proponent of the American women's art movement, Muriel Magenta (1932–) is the embodiment of not only interdisciplinarity but also of feminist transnational public art. A native New Yorker who was trained at Queens College (NY), Arizona State University, Tempe, and Johns Hopkins University, she has spent her career exploring the interface between art, science and technology, while remaining true to her larger objective of "creating a visual experience in an actual space, and then transmitting it over electronic networks into virtual environments," which are, due to her use of the Internet, both public and transnational [1]. Another goal of her digital art is to carve a space for women within this male-dominated genre. To that end, she has served as the President of the national Women's Caucus for Art, contributed to the College Art Association's Committee on Women in the Arts, and participated in public global gatherings, such as the United Nations World Conference on Women in Beijing, China (1995), where she presented *The World's Women On-Line!*, a transnational web database Magenta created and curated.

This essay will explore not only Magenta's personal and political causes as a transnational academic feminist, but also the ways in which her public electronic art has served as a forum for the intersection of technology, social critique, and women's issues. Focusing on her most prominent works, such as *Coiffure Carnival Trilogy* (1990), *Token City* (1997), *Times Square* (2002), *Club M: Avatars* (2007), and *Hot "Az" Hell* (2008), it will examine how Magenta's public art has addressed the challenges of globalization and transnationalism, and dissect the social critique her feminist digital art has posited since the 1990s. Moreover, it will elucidate the ideological underpinnings of Magenta's contributions to the digital art world, as well as her "activism through electronic art," both nationally and transnationally, by focusing on her work with the WCA, WWOL, and her Internet Art Workshop (2002/2004) at the YWCA Haven House (Phoenix, AZ), which yielded the documentary *28 Women: A Chance for Independence* (2005).

Muriel Magenta (née Gellert) has been producing art as a vocal member of the women's art movement since the 1960s and is known for her signature color magenta which she wears and uses in all of her creative work. However, her profile as a public electronic artist became more prominent in the 1990s after advances in computer technology and the advent of the Internet provided her with the tools necessary to express herself transnationally through her installations, interactive graphic displays, and short videos. One of the first works she produced as a result of these technological changes was *Coiffure Carnival Trilogy* (1990), a three part video/sculpture installation which incorporates computer graphics; specifically, the work *Patio de la Pompadour* which includes a cascade of multicolored androgynous

heads sporting exaggerated pompadour hairstyles, juxtaposed over a checkered disco floor and a magenta Cleopatra image whose hair resembles the Coliseum in Rome. Overall, *Coiffure Carnival Trilogy* is a satire of the power of hair in contemporary society, both as a capitalist industry which defines masculinity and femininity and as a vehicle for the construction of "self-image through hairstyle." It is comprised of three works - *In Defense of a Hairdo*, a giant pompadour sculpture, surrounded by fencing and concertina wire, and made of hair-like fibers; *Salon Doo*, a series of images depicting hairstyles since antiquity; and *Coiffure Carnival*, a short video tracing the literal and figurative "struggle" between humankind and hair and the "influence of hairstyle in art, history, and art history." Through numerous vignettes, this installation piece conveys the absurdity of hair, which becomes a transnational, transcultural and transhistorical "indicator of power, youth, and sexuality for both men and women" [2].

As Magenta has conveyed, "the trilogy addresses the quest for ideal beauty, as dictated by popular culture and driven by the stimulus of media 'Image Makers.' [It] speaks to styling one's hair as an aesthetic act. We create a work of art, a sculpture, as we stand in front of the mirror each morning, making sure that it works from all angles: top, sides, front and back…[Thus] the trilogy is a tongue-in-cheek look at society's obsession with the hairdo. It is a spoof on our pre-occupation with self-image as pure vanity" [3]. *In Defense of a Hairdo,* for example, is a "monumental, totemic icon to hairstyle" that juxtaposes both the sacred and the profane: "It's like a big, pagan idol. It's on wheels like something they would pull down the street." Even though the sculpture is a tribute to absurdity, Magenta simultaneously defends the notion that hair is also a palate for self-expression, creativity, and originality, and that it should be protected against the enemies of culture and individuality [4]. Implicit in the trilogy, however, is an indictment of the presupposed relationship between hair and gender. Although society has traditionally associated hair with women, especially in literature, mythology and popular culture (Medusa and Rapunzel), as Magenta illustrates through *Coiffure Carnival Trilogy,*it has also been an obsession of men, ranging from the flowing locks of the biblical Samson, to Louis XIV and his wigs, to Elvis Presley and his over-the-top stage presence, to drag queens. Hair, she suggests, like gender, is a daily performative act that involves staging, artifice and, above all, participating in multi-billion dollar global industry which traces its roots to the ancients. Thus hair, as part of the unattainable ideal of human beauty, is not just a concern for women but also an indelible element of masculinity.

Token City (1997) marks a turning point in Magenta's career in that the works since the debut of this electronic installation piece share a distinct urban, cosmopolitan, and multicultural dimension. *Token City* is essentially a four minute electronic representation of a New York City subway station that depicts the sights, sounds, and even scents of the world-famous public transportation system through real-time recoded footage of riders mixed with a 3-D computer animated subway station. A collaborative work with composer and percussionist Michael Udow, who recreates the subterranean sounds of the subway - past, present and future - by weaving a mixture of actual noises with electronic and multicultural musical elements to reflect the wide-range of subway riders, *Token City* is a multimedia work of virtual reality or "digital time travel" that uses computer graphics to "transform the everyday commute into an experience of images and sounds that simulates [the subway experience]. The viewer is immersed in a situation where emotions and thoughts associated with the subway are implied and heightened: the anonymity of the individual within the crowd, the anticipation of the unknown, [and] the passing of time." Viewers enter a subway platform that replicates riders' experiences and once again juxtaposes the sacred and profane elements found in urban street culture, such as exquisitely detailed mosaics and gum on the walls. Thus, *Token City* essentially transforms "the everyday commute into an experience that merges reality with the extraordinary" [5]. As Magenta elucidates, *Token City* was inspired by her own childhood experiences: "I actually spent all my time until I was about 20 years old in New York….I traveled to school on the subway…and I always used the subway as a place to sort of think and get my

system together as the subway system seemed to unfold itself. So I was very aware of the subway as a place, as a site, as an institution in my life, so to speak…I was always very fond of the mosaics and all the art that I saw in the subway. I was very observant of all the details, so it just sort of went into my consciousness" [6].

The 1997 opening reception of *Token City* at the Arizona State University Art Museum also had the added element of smell - specifically that of urine - which was meant to add to the virtual subway experience by injecting a "whiff of reality." In a parallel project called *Actual Odor*, "a Two-Hour Guerilla Performance," artist Angela Ellsworth "wore a jersey cocktail dress soaked in her own urine for the duration of the opening reception…to demonstrate how smell destroys any social boundaries existent in a subway, as it permeates the space and transcends visual barriers or experiences." As Ellsworth describes, "For six days prior to the event the dress soaked. On the seventh day the dress was hung out in 110 degree weather to dry." While wearing the dress, she fanned herself, "spreading the odor with a hand fan, one side of which was lettered with the word 'actual' and the other side with the word 'odor.' Ellsworth mingled with other museum visitors and for continuous periods of time sat in the projection space of Token City."   At other times, "she positioned herself under hot spot lights in order to generate more heat from her body for the utmost odor." While "most of the visitors could smell the unpleasant odor, [they] did not associate the nicely dressed woman with the smell, nor could they find the source of the scent," probably because femininity, as Ellsworth suggests, is still not associated with "actual odor" [7]. Thus Ellsworth's performance piece responded to *Token City* not only by questioning socially constructed definitions of gender, especially within public, urban, cosmopolitan spaces (women are not supposed to smell), but also by effectively challenging Magenta's comfortable and digitally-sanitized virtual depiction of the subway.

Times Square (2002), like *Token City,* was created from Magenta's personal urban experiences and uses the medium of 3-D computer animation and her skills as a sculptor, a painter, and a videographer. Moreover, both works provide an electronic, public window of critique into the fast-paced New York lifestyle on multiple levels - as it exists underground in the subway system or aboveground on Broadway - rendering New York not merely a "token city" but rather a microcosm of urban space around the world. As Magenta conveys, the four-minute long *Times Square* 3-D animation is "driven by the universal attraction to this urban icon" [8]. Using computer animation, "an ambient soundtrack made from sounds recorded at the real Times Square," as well as hip-hop beats and three of Magenta's custom-made video games which add to the interactive environment, Magenta recreates the exciting rush that accompanies Times Square, however, virtually: "hurried people stream down the sidewalks, taxis zoom by with horns honking, the air is filled with throbbing energy and random strains of music." Altering colors and textures of buildings to include her famous magenta, and substituting her own image and artwork in Times Square billboards, she imbues the space with her own subjectivity as a feminist artist and a creator of popular culture. As Magenta conveys, "I literally changed my art to fit Broadway and I changed Broadway to fit my art" [9]. Moreover, by using the Internet as a public forum to display works such as *Times Square* and *Token City*, she makes the local global, thus contributing to the transnationality of electronic art.

Magenta's public electronic works have continued to incorporate the urban sensibilities of *Token City* and *Times Square* as well as her image as a "hot pink" feminist icon. Not only have they grown increasingly reflexive and subjective, but they have also become increasingly political in terms of the statements they make about the emphasis on youth and sexuality in contemporary popular culture. Many of the images in *Club M: Avatars,*such as the laughing woman, the beating heart jumping rope, the blond with the flowing locks, and Magenta herself can be seen in the billboards of *Times Square*, thus creating

an electronic genealogy that links Magenta's work across time and space. Representing a wide-range of her animated characters or "alter egos," these avatars simulate "a discrete aspect of her own persona. The avatars reside at Club M, a cyberspace locale with an Internet address. They appear on video in actual spaces for specific museum and gallery installations. [However] in this work, the avatars are juxtaposed on an animated street mural, referencing Magenta's urban background" and her interest in public art [10].

Similarly, the video installation *Hot "Az" Hell* (2008) also uses urban elements, such as a brick wall, this time painted in magenta, to showcase a public street mural. Reflective of the metropolitan experience of living in a city like Phoenix - a cross between an urban environment and desert landscape that is "hot as hell" - the animated "vibrant, colorful, funky and contemporary" mural expresses "the overriding effect of the Arizona summer sun on urban and desert life." The progression of the video "mimics the hard light of the [Arizona] sun that changes the color, texture and intensity of everything it illuminates" [11]. It "combines a perpetually radiating sun and desert landscape digitally painted on a virtual brick wall. The blazing sun bleaches the wall until all color disappears, [with] the slowly moving video loop suggesting time lapse photography" [12]. Images on the wall include many of the same avatars or alter egos from *Club M: Avatars* as well as southwestern elements such as cowboys, cacti, the Phoenix skyline, snakes, skulls, desert rabbits and birds, and a blazing sun. Not only is Phoenix as "hot as hell" but, we presume, so is Magenta. By inserting her image in hot pink into the video, we infer that she is angry at society - perhaps at the stylized, cartoonish, way it depicts different groups - including women and African Americans, who she also inserts into the mural. The avatars in *Hot "Az" Hell* are meant to entertain; however, behind the vibrant and colorful public face of the mural lies a layer of social criticism.

Magenta has been an outspoken advocate of women's rights in the art world since the 1970s - before it was politically correct and even on the agenda of most women's organizations. She was one of the first academics to introduce women's art into the university curriculum, which she did in 1974 through Arizona State University, Tempe's program "Woman Image Now." Magenta maintained that women artists were not being taken seriously in the art or academic worlds. Thus, one her first activities was to lobby for the inclusion of the first female juror in ASU's Student Art Exhibition. This catalyzed her agenda and "Woman Image Now" eventually became a nationally-recognized program and participant in the American women's art network, promoting "the professionalism of women in the visual arts through education from a feminist perspective" [13].

Magenta continued her feminist activism through her participation in the Women's Caucus for Art (WCA) in the 1980s. She served as the president of the WCA between 1982 and 1984 and during her term "set two goals: to strengthen links between the national office and the chapters and to 'raise the feminist consciousness.'…Under Magenta, a national headquarters at Moore College in Philadelphia was established" [14].   Moreover, she also sought to increase the number of WCA chapters nationwide in order to strengthen its outreach and influence in the art world, which, in the 1980s, was overwhelmingly dominated by men.   Magenta's other goals included making the WCA a multicultural organization and institutionalizing a communications network. To that end, she began publication of the quarterly *Huepoints*, which was one of the most effective networking strategies in the days before email and the Internet [15].

As an active member of the College Art Association's Committee on Women in the Arts, Magenta also attended numerous conferences worldwide - including three UN world conferences on women (Beijing, Nairobi, and Copenhagen) - all with the goal of promoting women in art [16]. One of her most productive conferences proved to be the UN's Fourth World Conference on Women in Beijing (1995), which

was also attended by then-First Lady Hillary Clinton. There, Magenta introduced the Internet forum *The World's Women On-Line!*, making her truly one of the pioneers in the electronic medium of the Internet. In fact in 1995, there was no global Internet network, so Magenta used projectors to display saved versions of her website. The website remains one of the first transnational "electronic art networking projects…[using] the Internet as a global exhibition format." It "focuses attention on the vast resources of women's experience and culture…[and] bridges language barriers though art imagery and promotes interdisciplinary collaboration between [female] technologists and artists." Moreover, "all media are represented, from painting and sculpture to crafts, ceramics, photography and computer art," providing women, especially those from developing nations, with a free and accessible means of displaying their art both instantly and globally [17].

In 2002 and 2004, Magenta participated in a community engagement project, "Shelter Against Violence: A Case for Empowerment," at the YWCA Haven House in downtown Phoenix, where she and a group of students trained the women at the shelter in multimedia computer skills. Each of the twenty-eight residents created their own website to post artwork as well as their autobiographies, family photos and resumes for potential employers to view. As Magenta conveyed, "Most of these women are homeless and accustomed to society telling them no. [This] opens doors for them and empowers them" [18]. The women's struggles – and the process of rebuilding their self-esteems through the healing mechanism of art – were documented through Magenta's film *28 Women: A Chance for Independence* (2005). The documentary was inspired by the residents who "described their individual pursuits toward self-reliance…[such as] completing a basic education to qualify for a job, juggling work and childcare, budgeting, and maintaining sobriety." Magenta was particularly "moved by the determination of these women to overcome adversity to make a new life for themselves and their children" [19].

Magenta is not only a world-renown electronic artist whose works have been screened globally, but she is also a feminist activist who will undoubtedly inspire future generations of women. However, as Magenta readily admitted in a 2008 interview, the work of activists has and always will be a struggle: "I didn't wake up one morning and say 'I will be a feminist.' My activity in the women's movement was - personally and professionally - for my own survival." According to Magenta, while strides have been made towards gender equality in the arts, "the same attitudes toward women are still there, but they're expressed more subtly." While discrimination has partially gone underground, the most dangerous obstacle that remains for women is, ironically, women themselves: "Some obstacles are created... by women…because of conditioning… unfortunately, many younger women have no education relating to feminism, so they join the rest of patriarchal society in rejecting it" [20]. Thus, Magenta envisions that the future of women's art will not only involve the creative process, but will also include educating younger women and continuing the public struggle to be heard.

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EMBEDDED SOUND: A PROJECT ON TURKISH TRADITIONAL CALLIGRAPHY AND ITS MULTI-TOUCH TRANSFORMATION

Adviye Ayça Ünlüer, Oguzhan Ozcan & Hüseyin Kuşçu

This paper is about the idea of composing contemporary interactive screen designs using multi-touch technology in union with the dynamism and spirit lying beneath the art of Khatt. For the auditory orientation, a wind instrument called 'ney' has been chosen. Demonstrating the same space of time and variability with the exhalation, ney is an instrument originating from the philosophy of Tasawwuf as a visual concept and a musical one.
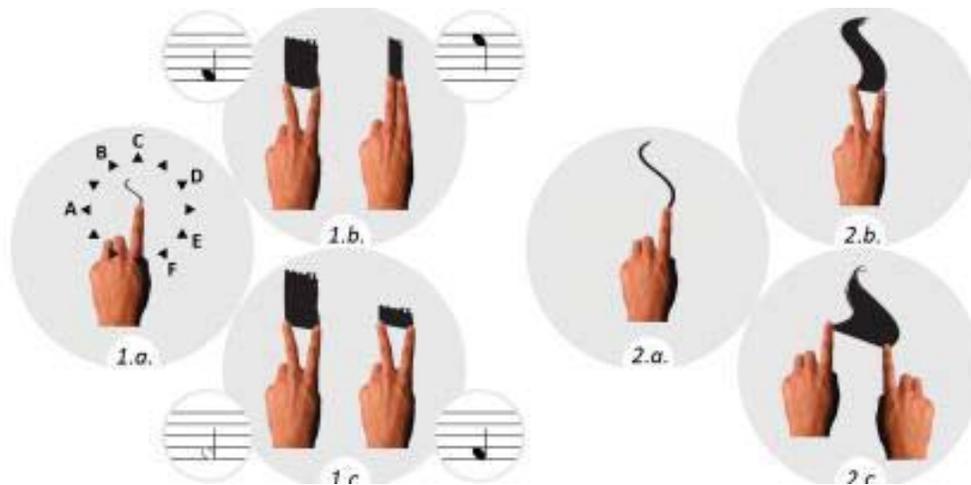

Fig 1. The relation between sound and image and the gestures for different line types.

Fig 2. A composition according to the gestures 'About Absence'.

Introduction

As digital technologies evolve, new forms of art are discovered by designers and artists. Yet throughout this fast evolution it is hard to say these art forms develop a solid background. We believe that one of the many reasons to this may be the fact that conventional input devices such as mouse or keyboard, do not provide freedom to hand and body use that were essential in traditional arts. It's a credible idea to achieve a well established approach by experimentally adapting art forms from past cultures to new digital media. Traditional arts in which body motion is used can be a source of inspiration for artistic achievement in digital media. [1] We believe one such subject of inspiration can be Turkish Traditional Calligraphy known as '*Khatt*'.

With the inspiration from the methodology and philosophy of this traditional art form, our aim is to create an interactive art tool that benefits from the possibilities of digital technologies. With interaction, we don't mean to create a series of preset moments for the participant to interact with, or a tool to get randomized outcomes, but a way to consciously create the art work itself.

Overview of Turkish Islamic Calligraphy

Khatt, which literally means '*line*', is described as '*the art of measured and beautiful writing*' using the Arabic alphabet. [2] Khatt emerged after the evolutionary period of Arabic letters, between the 6th and 10th centuries. During the *Anatolian Seljuq* period, from the 11th to the 14th century, and the Ottoman Empire, from the 13th to the 20th century, calligraphy not only was regarded as an art form itself but also made a significant contribution to the other decorative arts and architecture. [3] Between the 17th and 19th centuries, Turkish artists brought figurative and philosophical depth to the tradition.

In the practice of calligraphy, a pen that is made of a special kind of reed, - the same kind which the musical instrument *ney*, "reed flute" is made of-, a calligraphy ink that is made of soot, and a special calligraphy paper is used. [4] The khatt artist (*Khattat* in Turkish) candidates, with the guidance of their masters, pass through not only a long and disciplined technical education period, but also a philosophical education towards perfecting their body and self-control. Along with the hands and wrists, they learn how to use their whole body, posture, and breath, in order to represent their world view on the paper. The one who accomplish to reach the master level, are qualified with a practicing certificate (icazetname) by their masters and obtain the authority to sign their own works. [5]

Due to the religious prohibitions of their historical period, many artists stayed away from figurative painting. This constraint caused them to apply 2D visualizations through religious writing. [7] It was mostly verses and sayings from the Qur'an that were visualized, with the purpose of symbolizing words and ideas. This approach increased the strength of the emotional content. [8] Turkish Islamic Calligraphy was a favored art form during the 19th and in the beginning of the 20th centuries. After the fall of the Ottoman Empire and the foundation of Turkish Republic, due to the 'modernization movements' such as the change of the alphabet from Arabic script to Latin script, and the liberation of other plastic arts, calligraphy ceased to be popular and turned into a traditional and rare art form which is taught in a limited number of specific institutions.

Multi-Touch Technology and Inspirational Breath- Rhythm Structures in Khatt and Similar Art Forms

According to the arrangement, calligraphic compositions can be classified under four titles, which are "text in a line", "text in stack", "pictorial text" and "*tugra*" that are used as sultan's signatures. [9] In this project we studied pictorial texts that demonstrate both iconographic and typographic features and in which plastic quality is in the foreground.

When the pictorial text-based *khatt* compositions are in question, even if the text is not legible, the dynamic structure of the pictoriality which emerges from the connected letters, gives a feeling of rhythm to the reader. [6] The eye follows the line in the composition, thus the reader gets the feeling of drawing the whole composition from scratch when the eye catches the rhythm.

This is actually an experience which is more common among the calligraphers during the creation process of calligraphy. While a calligrapher creates a composition, he not only uses his hands and wrists through the use of pen, paper and ink; but also his breath and rhythm and his whole body as if he is one sublime spirit. This spiritual and emotional experience is projected on the visual language of the composition. In other words, we can say that the main form, which is formed by words, is first shaped through the calligrapher's body, and then it is projected on to the paper.

This time and motion-based creation process has been experimented in various other art forms. For instance, a similar method is used in the art of *ney* playing, (or *ney blowing* as a preferred term by the musicians) which is performed within Sufi music. The visual structure of the *khatt* and the auditory structure of the *ney* of Sufi music have key features in common. [10] The connections between the letters in the calligraphy and the soft transitions between the notes in Sufi music are parallel. While a calligrapher is drawing a composition, he inhales and holds his breath and completes the composition in one cycle of breath. The use of breath during this drawing period have similar uses of rhythm and breath as *ney blowing*, which has a principle of using the breath fully.

Within interactive media works, visual and auditory elements are used to create a complementary whole. That is why we argue that an inspiration from the common features of calligraphy and Sufi music can provide a significant contribution to the development of a contemporary and interactive artwork with a new language of expression.

However, while generating this kind of an artwork, there are crucial points to be taken into account:

First of all, *khatt* does not merely consist of the literal meaning of the text. The sacred text is transferred along with the stress and intonation from the body to the paper. That is why; it is not possible to get the spirit of a calligraphic work only through the literal meaning of the words written. [11] The whole meaning of the composition is constructed by and through its performance.

Reproducing a calligraphic performance is never less demanding than the original one. The calligrapher must comprehend all the visual and literal elements of the composition, and realize the performance just like an expert orator. [12] The audience can get the full meaning of the *khatt* only if it is created in their presence.

Today's technologies have the potential to reveal the previously hidden philosophies behind calligraphy and make the audience comprehend the spirit of its birth. As a remarkable example, multi touch, as today's popular technology, can recognize the touch, the position and the motion of more than one finger. As it leaves the conventional mouse and keyboard interaction behind, the user gets a more intact

interaction with the screen. With the development of interfaces sensitive to multi-user and multi-touch inputs, the users are able to use both of their hands with more natural gestures. [13]

In our study, these fundamentals of multi-touch technology provide us with the advantages of increasing the impact of the work by directly using gestures instead of traditional user interface devices and their constraints, a wider and closer screen as an ergonomic and sophisticated workplace environment, and the possibility of more than one person to participate in the composition creation process.

Embedded Sound

The purpose of the project developed for this study was to create an application that allows the audience with no prior calligraphy background to experience the performance process of the calligraphy by reproducing it themselves. If the user requires guidance on the use of the body, pen and breath of a *Khatt* artist, the application should give helpful hints and clues.

In order to accomplish this, we first eliminated the use of pen and paper and replaced them with a multi-touch screen. We then designed an interface that resembles the *Khattpaper* on which the users can draw *Khatt* lines with their fingers, with the help of hints when the users need help on form, speed and rhythm. Because the breathing technique of *Khatt* requires a deep and disciplined training that cannot be completed in a real-time performance, we chose to use sound effects in harmony with the breath. This enabled the audience to overcome the tendency to make untimely breaks in their performance. We used samples of Sufi music, which has significant similarities with the performance of *Khatt*.

The project was designed on an Apple IPad multi-touch screen, with a digital background imitating natural paper texture. The user activates the system and starts drawing by touching one or two points on the screen. By dragging the fingers on the screen, the user constructs the line and hears the music. Both the sound and the line are interrupted as soon as the contact of the fingers with the screen is lost.

There are four different kinds of relations between the sound and the image in the calligraphy:

1. **The direction of the line:** The program creates different audial responses in accordance with the changes in the direction of the line being drawn by the user. Each musical note has been assigned to a different direction in a circular scheme. A change in the direction of drawing leads to a corresponding change in the sound (Fig. 1.1.a).
2. **The thickness of the line:** The distance between the two fingers that are touching the screen represents the thickness of the calligraphic pen. This thickness, which is the thickness of the line being drawn on the screen, also defines the intensity of the breath that is playing the Ney and thus the octave of the sound being played. As the line gets thicker, the octave becomes lower (Fig.1. 1.b).
3. **The length of the line:** The length of the line is linked to the time length of blowing. The note is played as long as the line continues. This allows the user to feel the heaviness of the time that passes while drawing and also convinces them to create uncut lines (Fig.1. 1.c).
4. **The speed of the drawing:** The volume of the sound coordinates with the drawing speed. The faster the performance is accomplished, the stronger the sound. When an optimum volume is met, the user is expected to adjust to the ideal speed of the performance.

GESTURES-LINE TYPES AND DRAWING STYLES

Four different gestures have been introduced into the application:

1. In the case of one-finger touch, a black ink track is left at the point of contact, and the track will follow the finger as long as the contact remains. Ney sound will be played at the highest predetermined octave, in the direction of the hand. When the contact is over, the sound stops but the track of the line remains (Fig. 1.2.a).
2. In the case of two-finger touch, the distance between the two contact points will act as the tip of the calligraphic pen. As the hand moves, a calligraphic line will be drawn as thick as this distance. The Ney will play a musical note according to the direction of the mid-point of the two fingers, and the octave will be determined by the thickness of the line (Fig. 1.2.b, 1.2.c).
3. In the case of three-finger touch, the closest pair of contact points will act as the calligraphic line; the third will remain as a separate thin line. Each line will generate its own sound.
4. In the case of four-finger touch, two pairs are selected from the points closest to each other. Two calligraphic lines and their corresponding sound effects will be generated.

Composition

The traditional calligrapher forms text in an abstract or concrete shape in order to enhance the meaning of the subject. Khatt artists usually avoid color and perspective and prefer using artistic principles such as white-black balance, perceivability and anatomical consistency for the sake of simplicity. [8] They use bonds between letters to assure continuity from beginning to end and to reach an unlimited number of letter combinations. In this way, a single line can result in an incalculable number of diverse holistic forms.

In order to mimic the Khatt recreation performance, we developed various different compositions to be completed in one breath and one-line cycles as an alternative to freestyle creation. We refrained from using original Pictorial Text style because of legibility problems as well as the difficulty of re-creating such complicated artwork. By developing various linear and visual compositions using the above gestures (Fig. 2), we expect that users will be able to attune themselves to the sense of time during the performance and follow the guiding hints effortlessly throughout the performance.

Conclusions

In this research, we explore a new way to generate an innovative, pioneer expression language in gestural user interface area with the inspiration from traditional calligraphic art. When the project process is analyzed with the aim of seeing the results of this research clearly, it's seen that there are 3 inspirational facts in Khatt. These are *the unity and fluentness elements of the form, the use of breath and rhythm in the performance, and recreation element of its philosophy*. At first, with the inspiration of recreation, we developed a drawing tool that is used by body motions. In this way, the participators who do not even know anything about Khatt can experience this implementation beyond vision. The most important component of experiencing *khatt* performance, using of breath and rhythm properly, directed us to use sound in order to represent this element. In order to get sound as secondary output during the performance, the gestural characteristic of hand movements are distinguished and mapped to the auditory traits.

Lastly, with the inspiration of the unity and fluentness elements of the form, we created various visual compositions and designed an interface along with some clues so as to be followed by the users.

In the light of the progress of this project, it can be seen that Khatt can be source of inspiration for gestural user interface design. We have evaluated the novelty and advantages that evolved from these structures, under a number of different topics.

From the view point of Khatt, recreation is made possible by using new technologies instead of traditional supplies. The philosophy behind this art has been made comprehendible to the untrained viewer in a contemporary means. Visual and rhythmic details of this art form are featured not only by recreation as in classical terms, but also by audial supports to address different senses. Therefore, the emphases of body movements are made more perceivable.

New expansion opportunities are presented for the Khattats. The guidance of sound in the drawing process may bring out new aspects and expressions. By using audial output as an instrument, different lineal forms can be practiced.

From the viewpoint of gestural interaction technologies, the most remarkable finding is the unconnected outputs (visual and auditory) can be acquired by only one gestural input synchronously. The most important discrepancy of this project from previous similar studies is the way that both outputs work in accordance to the direct manipulation principle and carry directive aspects by giving instant feedback. Therefore, both the sound directs the visual and the visual directs the sound within all attributes of the applied gestures, such as presence, orientation and speed. Neither of the outputs are each other's coincidental result. With a little experience with the tool, both of the outputs can be acquired consciously.

It is also once more observed that, innovative ideas in the interactive media design field can be derived with the inspiration from traditional arts and further research should be made on other traditional arts that haven't been dealt with so far.

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URBAN CRACKS: INTERSTITIAL SPACES IN THE CITY

Elly Van Eeghem, Riet Steel, Griet Verschelden & Carlos Dekeyrel

This paper focuses on the research trajectory of visual artist Elly Van Eeghem. Through her practice of video and intervention in public space, she will reflect on the role of artists in re-shaping urban cracks and the influence of these spaces in re-thinking artistic practice.

Fig 1. Oceaniëstraat / recto, 2011, Elly Van Eeghem, video. © Elly Van Eeghem.

Fig 2. Oceaniëstraat / verso, 2011, Elly Van Eeghem, text projection. © Elly Van Eeghem.

Fig 3. Urban Fabric #19, 2010, Elly Van Eeghem, lomographic print, 90 x 90 cm. © Elly Van Eeghem.

Urban Crack as a Concept and a Case

The growing number of neglected, residual spaces challenges the functioning of our cities. These interstitial spaces fall between the familiar boundaries of urban planning (generally, they cannot be found on official city maps) and are often labeled as wastelands, characterized by an apparent void. The fact that urban cracks are not planned, does not mean that they are empty. They host informal practices such as fishing, squatting, waste dumping, taking the dog out, graffiti, drug use or underground festivals. However, these uses are often oppressed in more delimited urban spaces that are dominated by economic and consumptive logics.

Urban cracks are conceptualized as in-between time spaces in which different logics meet and conflict. Philosopher Dirk van Weelden described these places as manifestations of the inoperative city; an accumulation of disparate spatial experiences without a binding order, where form and void coincide. [1] The concept of urban crack is similar to 'site' recalling the meaning given to it by Anne Cauquelin: "Le site se trouve à l'intersection du lieu et de l'espace, ce n'est ni l'un ni l'autre, mais une sorte d'hybride." [2] ("A site finds itself at the intersection of place and space, it is neither the one nor the other, but a kind of hybrid.") Urban cracks are hybrid spaces since they belong to the measured and organized public space as well as to the intimate domain. These functionally indeterminate sites seem to have grown rather than planned and therefore appear to be the reverse of urbanism, "because they obviously do belong to the city." [3] Moreover, urban cracks belong to a constantly changing city, where houses are built and pulled down, where vacant lots emerge and disappear. These spaces regularly await a future destination within the context of urban renewal.

Last year, Elly Van Eeghem started working in one of the most profoundly transforming neighborhoods in the city of Ghent. The northern dockland area of Muide-Meulestede-Afrikalaan is subject to a large-scale urban renewal project that converts it into a new district by the water. A peculiar spot on Oceaniëstraat struck her: a leftover space surrounded by an industrial site, a private residence and a passageway for trucks and inhabitants of a nearby housing block. It is mainly used for illegal dumping and thus considered by many residents as a thorn in the flesh.

Van Eeghem decided to observe this place for several weeks, each visit setting up her camera. From these repeated returns originated an audiovisual chronicle of her performance in the space in addition

to the performance of the space. This ultimately resulted in an installation of both video and text: Oceaniëstraat recto/verso. [4]

The inlet jumped out of all other places.

One of the smallest gaps I encountered in the area

intimate

manageable.

A small triangle, cut out between large sites of productivity, inviting to be used

to leave something behind (that you no longer need)

to ask a question

to launch a proposal.

The inlet suggested something

something I'm still peeling off.

Week after week, Van Eeghem built structures using waste materials encountered on the spot, gradually writing a sentence on the wall: "Feel free to act and to proceed in whatever you do." Her interventions questioned the way in which to intervene as an artist in a constructive and critical manner, how layered and charged words can become when landing in a place like this. We experienced video to be a medium with the potential to trigger encounters with passers-by, to open discussion and to unveil conflicting logics of the city.

Artists Reshaping Urban Cracks

"Speed calls for emptiness and emptiness screams for haste." [5]

More and more urban policy makers appear to be concerned about empty space, afraid of losing control of what might arise from it. In an attempt to organize and boost vacant land, they often set up alliances with inventive forces of artists and creative non-profit organizations, offering them a temporary 'breeding ground.' Temporary, because the construction blueprints are already drawn, awaiting implementation. This way, certain creative groups no longer need to illegally claim their field of activity and are supposed to give rise to new dynamics and interests in the area.

In the mission statement on public art in the city of Ghent it is put forward that temporary interventions should generate dynamics. Yet, what kind of dynamics are aimed at? And are those the same dynamics artists intend to generate? Because the breeding ground scenario holds potential instrumentalization risks for artists: by engaging themselves in a dominant logic of city branding, their intentions might turn against them. [6] By making the area attractive to investors, project developers and high-income groups of residents, their work risks to be put on as a beautifying and boosting project. As Rosalyn Deutsche

alerted, this kind of promotion of art appears to politically neutralize its use within the city and to mask its political outcomes. [7]

Who selects the icons?

What is to become a landmark and what is to be ignored?

Do the housing blocks at Scandinaviëstraat just need a brighter color?

How does a landmark differ from public art?

Should public art truly render the city more beautiful? (than it really is)

Or more transparent? (than it appears)

Considering these questions, we do believe artists can play a critical role in (re-)imaging of the city. Public art can reveal ambivalent logics and practices. Will a crowd barrier transformed into a bench invite people to sit on? Does a car that is parked upside down still respect the public road code? What happens when we add color to public fountains?

Artists can bring into visibility the city's logics and are able to reinterpret, short-circuit or recompose them. Through their work, they can narrate changing urban conditions.

Throughout the city, vacant voids are being filled with structures.

Is this a different design? (I mean: no design at all.)

Starting from what is already there, creating new structures, entangled with the place

its history, its current use. (a prediction for tomorrow)

Maybe that is the attractive thing about working with waste materials

because nobody has expectations.

If I get the old computer screens neatly in a row, the inlet could look at us

maybe not in a blaming or a reflecting way. Just as a point of view

but differently.

A language textbook, a puzzle, a hobbyhorse. Puppets against the wall.

Pale green seat cushions as the front row of this dumping ground scenography.

An invitation to look at what is present. And how it changes.

As Moritz Küng stated, "the city no longer occupies a clearly delimited space, but has become a bewildering and dynamic terrain vague consisting of shifting neighborhoodly coexistences. In consequence, its identity has constantly to be re-explored and re-defined." [8] Artists can adopt this role as counterweights to a dominant imaging of the city. Through the embedding of artwork in urban cracks, these spaces might turn out to be indicators of existing frictions within urban culture. As the breakdown situated in the interstitial mechanical spaces of a building often reports an entire unstable construction, urban cracks can tell us something about a precarious urban planning predominantly driven by economic concerns.

Urban Cracks Challenge to Rethink Public Art

It is precisely the interstitial, complex character of urban cracks that can influence a dominant view of the city as well as the dominant conception of public art as a monumental landmark in public space. Does the constantly changing city not petition another way of situating art in public space?

Repeated returns to the same place create space for unforeseen encounters.

How do others interpret this sentence?

How do they look at the inlet?

How free do they feel in the area to do what they want?

Returning to the inlet to take a last picture, a man is looking for a new pair of shoes.

Reluctantly, I make him part of my last image.

You can only get away from something you return to. What you return to, is the place. The place is the crack that links leaving and returning. The place is the space of this turnabout. Architecture knows this so well: therefore it makes corners. Because in a circle, no turning is possible. (D. Lauwaert)

The undefined and layered identity of urban cracks, which attracts artists because of its openness to interpretation and counterproposal, necessitate time to grasp the space. These spaces demand what Elly Van Eeghem calls the 'tactics of slow return': to regularly call on the same space, allowing different perspectives to meet.
This relates to an alternative conception of public art as a dynamic paradigm of thought. In this regard, public art is not necessarily of a permanent nature but might as well include temporary interventions and symbolic gestures. "A movable structure is not necessarily temporary. What is seemingly transitory and ephemeral, processual and only a body of images, is often, by its illusion of stability, more durable than our eroding stone monuments." [9]

We imagine localized artistic practice not merely as the site-specific features of the artwork or the amount of community involvement, but primarily as the engagement of the artist to profoundly embed his/her work into an existing context. In a way, this is at odds with both the implanted monuments in public space and participative projects "engaging every-one but offending no-one." [10]

Through this interpretation of public art, the city functions as a starting point and the artwork as a trigger. Focusing on things already present instead of on a newly added value. As Anne Cauquelin said: "La ville ne devrait pas server de galerie à un monument supplémentaire conçu en dehors d'elle. Si la ville est oeuvre d'art, c'est dans ses pierres, dans sa manière d'être." [11] ("The city should not be used as an art gallery for an additional monument designed out of the city. If the city is a work of art, it is in its stones, in its way of being.") In consequence, the artwork is not merely an object, but a transformed perception of the environment. Through such interventions, artists map urban spaces in their own way. Their 'design on the spot' (as Patrick Geddes would have called it) becomes a performance of the space, rather than a representation or description of it.

Thus, they balance between the political and the poetic, about which Francis Alÿs wondered: "Can an artistic intervention truly bring about an unforeseen way of thinking, or is it more a matter of creating a sensation of meaninglessness that shows the absurdity of the situation? Can an artistic intervention translate social tensions into narratives that in turn intervene in the imaginary landscape of a place? Can an absurd act provoke a transgression that makes you abandon the standard assumptions about the sources of conflict?" [12]

The Artwork as Palimpsest of the Present City

We believe artistic practice embedded in urban cracks can independently generate a layered analysis and dynamic narration of our changing urban condition.

In the neighborhood of Muide-Meulestede-Afrikalaan, we tried to capture in what way urban cracks write back to the present city through diverse layers and remnants. How these spaces develop as metaphoric 'palimpsests': old manuscripts where different layers of writing shine through. Van Eeghem used multi-exposure lomographs to construct mosaic cityscapes that exhibit the accumulated iterations of a site; searching for traces of vanished human activity, fragmenting the chaotic city and reconstructing it according to her own logic.

Besides these fixed images, video proved to be an ideal medium to build a palimpsestic reading of urban cracks. Van Eeghem was able to reinterpret the site at Oceaniëstraat by working with diverse video layers during editing and manipulating the dimension of time.

Apart from that, the performative element of filming her own interventions functioned as a trigger for people to talk about what was happening in the neighborhood. Yet, sometimes the camera proved to be a barrier for people to start a conversation or made them walk away faster than they normally would have.

Back in Oceaniëstraat, there is a police car standing in front of the inlet.

The officer has found addresses in the dumped waste. He advises me not to work here, because the smell is obnoxious.

Whether he has noticed that there are old tracks buried in the earth?

He hands me his card.

Sint-Amandsberg district police officer. We are responsible for this area.

I wonder what he means by we. I wonder why police districts have different borders

and what this means (for him)

being responsible for an area.

The finalized installation was presented in a variety of contexts, from art galleries over community centers to academic symposia and student seminars. During each presentation, the reactions on the work were filmed: how the installation provoked communication, how it left some people indifferent or made others laugh or frown. This way, the performative character of the work continued and different perspectives and backgrounds started to cross. We experienced that the totality of the work managed to bridge certain gaps. Between the local and the global, the artistic and the academic, the experience and its representation.

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FROM LITERAL TO METAPHORICAL UTOPIAS: SPACE AND TIME IN THE WHITE CUBE

Christina Vatsella

In its literal sense, the term 'utopia' refers to the absence of *topos*. This condition is inherent in the new media artwork, which due to its immaterial status is not physically tied to a specific space unless displayed. In its metaphorical sense, 'utopia' has a significant ideological background. This paper attempts to indicate how the literal lack of *topos* of the new media artwork is related to its utopian nature.

When a term has different meanings, both literal and metaphorical, there is usually a common ground where all connotations intersect. Interestingly enough, the affinities between different meanings can go beyond the obvious, revealing historical interconnections and dialectical patterns.

Indeed, the term utopia [*outopia*] in its literal sense, refers to the absence [*ou*] of place [*topos*]. In its metaphorical sense, in which it is used today, 'utopia' is a term that originates from Thomas More's inaugural text and it seeks to describe the author's imaginary island country. According to Fredric Jameson analysis, two distinct lines of descendency may be identified from More's text. This major distinction is also adopted here. The first notion of utopia refers to the systemic, revolutionary political practice, aiming at founding a whole new society. The other line of descent, more obscure, refers to the omnipresent utopian impulse related to "the deceptive yet tempting swindles of here and now, where Utopia serves as the mere lure and bait for ideology." [1]

When it comes to the new media, their literal lack of *topos* is intrinsically related to their profoundly utopian nature. In other words, the metaphorical is essentially linked to the literal in many levels. This paper attempts to trace some of the interconnecting threads between those two dimensions of utopia.

Literal U-topias

One of the most fundamental characteristics of the new media image - a term that embraces digital or analogical moving image in all its imaginable forms - is its lack of *topos.* The moving image is a latent immaterial entity stocked in a device (digital or analogical) and thus deprived of actually occupying physical space. This absence of space, or more specifically, the lack of actual, material volume derives from the lack of objects. Of course, going beyond the object is not an exclusively new media characteristic. Conceptual art has been practically based on that principle. And, even before that, the *objet d'art* per se had already been through an important demystification since the ready made.

Abolishing the material entity of the work of art has clear political connotations. Lucy Lippard introduced the term 'dematerialisation' of the art [2] in order to describe the urge of going beyond the official art by spreading it in all social layers. Art would thus become a common activity and consequently notions of property and reproduction of the work would be eliminated. Dematerialized art would therefore actively participate in the transformation of the society. Art would then disappear in the sense that it would be generalised throughout society as the very aesthetisation of daily life. The fusion of art with

life, in a Marxist approach would be the negation of the division of mental and manual labour, which is a prior condition of the separation of mankind in classes.

Even if the fusion of life and art is a highly utopian, and thus an unattainable desire, the detachment from the object of art is a fact. And the non-object art a priori cannot be distributed, sold and collected. To speak in Marxist terms, non-object art materializes the negation of commodity fetishism.

But still, even if the new media image per se does not have a material entity, in new media art objects do exist even if their status is peculiar. The material part of the work consists of the tools used to present the image (monitor or videoprojector) as well as the physical container of the image such as the videotape (replaced nowadays with DVD, USB etc). If the projecting or broadcasting apparatus is an auxiliary part, in the sense that it's not connected to the work, the videotape is intrinsically linked to the image itself: it is the medium containing the message that is conserved in a latent form.

The question that is naturally raised is whether this storage apparatus is capable of counterbalancing the object's absence, thus rendering the work susceptible of being integrated into the distribution circuit.

New media artwork a priori resists commercialisation due to its fundamental characteristic: the reproducibility. Every tangible format of conserved moving image is in fact a copy that can be further reproduced without any limit. In every day life, for every work there are several exhibition copies, screening copies, not to mention conservation copies to different media following the evolution of the technology. All these *simulacra* prove to which extent we can happily (and legally) reproduce any work without any consequences to its nature or status. Hence, there is not such thing as authentic or unique videotape, or DVD or even worse, as authentic computer file.

In order for video art to enter the market, that characteristic had to be abolished. As a matter of fact, an absurd system of artificial control of the potentially unlimited reproducibility of the medium has been invented: the mode of limited editions, accompanied by certificates that assure the 'authenticity' of each copy. The limitation of the number of copies creates the illusion of exclusivity and thus increases its market value.

Historically speaking, at the dawn of the creation of new media art, artists acknowledged the challenge that the non-object status and the reproducibility of the medium represented for the institutions. The institutional critique became a major pillar of their ideological framework since their desire was not to enter the system but to transform it profoundly; [3] institutional critique should thus be perceived as a major aspect of the utopian urge to change the society and to merge art with life.

Installing the Image or the Passage to a *Topos*

If controlling new media art reproducibility, or in other words, establishing the commodity fetishism was one way of taming its utopian nature, settling down the image via the installation was the second.

The new media image a priori lacks *topos*. When displayed within the context of a new media installation, the moving image, "hung" on the wall or onto the monitor - to speak in traditional exhibition terms - acquires a physical location and becomes a more or lessphysical presence within the exhibition space.

However, even when the image comes into being in a specific place, it remains immaterial and thus deprived of volume. Consequently, no space is physically occupied by the moving image per se (monitors or projectors cannot be considered as part of the artwork as such, since they are auxiliary devices) and the space of the installation is practically empty. Yet, when the image unfolds in that specific place it activates a specific space. That space is a zone within the white cube - turned black for the occasion - where the moving image meets the viewer and creates "a passage for bodies and figures in space and time." [4] In other words, in spite of its immaterial nature, the image creates a space, namely the installation territory.

But when it comes to the moving image, which space and which time exactly are we referring to? Within the physical place of the installation, a second one is embedded, the filmic here and now of the moving image. The actual place where the image was taken is being transferred via the projection into the actual installation space, creating an additional spatiotemporal layer. These two parallel levels co-existing simultaneously generate several dialectical patterns. A typical example of conjunction of these two layers is the reconstitution of the filmic spatiotemporal condition within the installation space. In *Mapping the Studio II with Color Shift, Flip, Flop & Flip/Flop (Fat Chance John Cage)*, (2001) Bruce Nauman adjusts seven cameras in his studio in a way that they cover the largest part of its surface and lets them film for approximately 6 hours. When installed, the image that derives from this camera circuit is being projected without editing on seven 3x2 meter screens covering the entire gallery. His studio is thus being virtually transported and reconstructed via the moving image in the installation space. Freely interpreting Borges' mapping, Nauman grafts his studio space onto the gallery space, creating a virtual map of the same scale as the empire itself.

Borrowing the terms of the Foucauldian theory of heterotopia, the new media installation is "capable of juxtaposing in a single real place several sites that are in themselves incompatible." [5] By going further in the analysis of the new media installation's spatiotemporal condition, one realises that it can be considered as a paradigmatic contemporary heterotopia. Because it is, in fact, "a system of opening and closing that both isolates (the sites) and makes them penetrable". The new media installation is a temporary construction within the exhibition space made basically with temporal walls and curtains. It is often closed, partially or entirely, in order to avoid the spilling out of image and sound. By outlining its limits, in more or less radical ways, the work preserves its own integrity. At the same time, the blackout curtains or the narrow passages between walls constitute the points of entrance for the viewers.

According to Gaston Bachelard, (space) "in its countless alveoli contains compressed time". [6] Which is true for all kinds of spaces but in the case of heterotopias, they "are most often linked to slices in time". When it comes to the new media installation, the temporality of the artwork corresponds to the duration of the video image. That slice in time is repeated in a loop, thus establishing a temporality specific to the artwork. Hence, an exhibition turns into an assemblage of several spatiotemporal islets evolving simultaneously.

Like all heterotopias, new media installations "are not oriented towards the eternal".The work is ephemeral since when the projector is switched off, the image disappears without leaving any tangible traces behind, evoking an old anarchist slogan saying "your civilization ends when the electricity is cut off".

This unique and complex spatiotemporal condition is the outcome of transforming a 'u-topian' entity into a concrete here and now. At the same time, by installing the image, a utopian, wild form of art has

been gradually transformed into a tame, official and lately mainstream form of museum art, and consequently it has entered the market. As Martha Rosler points out, "museumization has heightened the importance of installations that make video into sculpture, painting or still life because installations can live only in museums".

The term 'museumization' within the framework of the institutional critique surely has pejorative connotations. However, the creation of a new species, even if it is mostly museum oriented, has enriched the art ecosystem. Beyond all political or social connotations, the new media installation as a form has opened a new field of experimentation and research, to which we owe some of the most splendid artworks of the last decades.

New Media as the New Utopia

Along with the utopias that arise from a political context, new media art has also reflected a broader utopian impulse. Through new media, the archetypical desire to tame nature and gain control has found a whole new field that would enable people to overcome the barriers of time and space, reviving even the ancient dream of teleportation. Inspired by the visionary theories of McLuhan, a vast literature, ranging from new media theory to science fiction, has outlined the belief in the miraculous potential of new media. They were about to inaugurate a new fascinating but also frightening world, situated somewhere between dream and reality.

A very characteristic media artwork that reflects that point of view is *Good Morning Mr Orwell* (1984) a new media performance orchestrated by Nam June Paik. On January 1st 1984, Merce Cunningham's minimalistic dance and Joseph Beuys' actions among other performances were transmitted to millions of spectators in different continents via a live broadcast shared between the Centre Pompidou and WNET TV in New York. The programme was also broadcasted in Germany and in Korea thereby developing an international network. Whereas the title of the work evokes the negative aspect of mass media, namely the Orwellian nightmare of mass surveillance, Paik seeks to prove that the television could eventually serve a positive purpose such as interconnecting people by rendering art available at the same time around the entire world.

It is the same spirit that emerges with his legendary video *Global Groove* (1973), the manifesto of the new video culture willing to become the melting pot of all different cultures and beliefs. Video was perceived by Paik as the new desperado language. In his most famous installations *Moon is the Oldest TV* (1965), where he recreates the moon phases onto monitors or *TV Cross* (1966), where nine monitors form a cross, Paik translates major icons and symbols of the humanity into the electronic image thereby creating a new universal visual vocabulary.

Driven by genuine fascination for the new media technology, Nam June Paik, the neo-romantic artist who wore Wellington boots in his studio for fear of being electrocuted, visualised a whole new world; new media technology would create a new visual culture resulting from the fusion of electronic music, performing arts and video image. In a state of totally utopian delirium, Paik went far enough to foresee medical implementations of the new media image. He believed that in the near future new media image would cure the blindness or that it would be used as an electro-visual tranquilizer (sic). [7]

A few decades later, the fascination towards the capacity of breaking the barriers of space and time switched medium, from television to internet. Internet is the new Utopiapar excellence. The question of

time and space, the reality of here and now definitely attains its more complicated and intriguing form. The ability of crossing the borders of time and space reinforced the development of a political framework. The delirious contemporary rhetoric based on the perception of internet as an immense collectivity is evocative of that political context; "digital revolution" or "virtual community" has become everyday language whereas the famous McLuhian term "global village" has been literally concretized in the internet era.

Just like the socio-political background of the television and the explosion of the mass media in 1960 and 1970 has been reflected in the video art, the political aspect of the (virtual) new land of promise has been crystallised in the internet art. The guerrilla television and the video works related to political activism that have marked the highly utopian era of videoart have been reproduced online three decades later. Tactical media, various forms of activism and openly political works denouncing the commercial use of internet have been at the core of the internet art creation (at least at the beginning); RTMark, etoys, Jodi to name just a few legendary moments. Their artistic status is quite ambiguous since, as Julian Stallabrass points out, "on the internet the border between political activism and cultural creation has been particularly porous." [8]

What we have described so far as the literally 'u-topian' status of the new media image makes its museum exhibition extremely challenging. If exhibiting a videotape is difficult, exhibiting an internet site is much more complicated. The institutionalisation of net art is indeed a very long and fascinating story that goes beyond the framework of this paper and will not be analysed in detail. However, the most interesting element here is the fact that the denial of internet 'u-topian' nature serves as a way to tame its utopian, revolutionary character. Two major examples support this primary thesis. First of all, internet sites are very often exhibited off-line. Cutting off the site from the web corresponds to the denial of the artwork's vital space. At the same time, the site is practically amputated since all the external links are automatically deactivated. The isolation of the site from the web prevents bad surprises regarding the exhibited content that could easily vary from pornography to personal email accounts provoking disturbing situations to the institutions.

The second one is, once again, the transformation of an internet site into an installation. Even if "video art's fate in the museum offers a dire warning to internet art" [9] whenthe latter is presented in a museum gallery it is usually bound to the actual here and now of the exhibition space. Media art history is indeed very coherent and repetitive since just like video artists have passed from videotape to video installation, internet artists have also developed net art installations seeking a more exhibition friendly form. That was a normal step of net art's evolution according to Peter Weibel since "it is the system of art that obliges artists to express their ideas in a specific space." [10] Hence, the "museumification" of this new media art passed, once again, through the installation of the new media image in a specific space narrowing both 'u-topian' and utopian characteristics.

New media art evolves in a profoundly paradoxical, if not schizophrenic, condition: new media constitute the key for the expansion of late capitalism and yet they can endorse, create and diffuse the most fundamentally revolutionary content. Ranging from globalised commerce to local revolutions, from state propaganda to alternative journalism and direct democracy, and from pornography to art and science, the contemporary form of new media, internet, can engulf the most contrary aspects. That profound endemic antinomy is embedded in "globalization itself, which can indeed pass effortlessly from a dystopian vision of world control to the celebration of world multiculturalism with the mere changing of a valence". [11] Red Art can, indeed, flourish within the late capitalism reality. Maybe because capitalism is strong enough to appropriate it for its own good. Nevertheless, Utopia, standing at the crossroads

between reality and imagination, faith and deception, authenticity and appropriation, exists as an ever-lasting source of inspiration for art and for life, even if their fusion has not yet been accomplished.

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TWO STEPS BACK AND ONE STEP FORWARD: REMEDIATION AS INNOVATION FACTOR IN THE CASE OF MACHINIMA

Thomas Veigl

The digital art of Machinima realizes narrations and installations in completely virtual sets. The increasing convergence of the computer game and film industries signals a process of change that has far-reaching consequences for production methods and copyright in both areas. The article shows how Machinima guides to social and cultural change and offers a theoretical approach to media evolution.

Machinima today is a worldwide phenomenon that in recent years has penetrated further and further into the media mainstream where it is fast becoming known as the most popular form of digital game art. Machinima technology is used to create computer-animated films within a virtual real-time 3D environment—in short, to produce films in computer games. The game's modified virtual environment, the objects, and avatars are used to develop scenarios that are then recorded and edited.

Machinima is strongly associated with linear narration and aesthetics of film and TV. Therefore it can be criticized as new art form or medium since the technology of computer game engines offers interactive potential as never before.

As well in the latest and most comprehensive publication on the subject, the "Machinima Reader," [1] Katie Salen and Michael Nitsche came up to this point. Salen remarked that, against initial expectations, the possibility of viewer participation is not realized in current machinimas. [2] And Michael Nitsche regreted that the performative character of real-time animation is not applied in most machinimas. [3] However under the perspective of media evolution new media precisely achieve their cultural significance by refashioning earlier media. This process which Jay David Bolter and Richard Grusin in their identically named and widely discussed publication called remediation [4] appears essential for achieving cultural and social acceptance which is further required for an economical and legal frame that matches the new art technique.

What follows is a summary of an investigation of the development and actual status of machinima which sets it in a theoretical frame of media evolution. The approach used follows the main features of Joseph Schumpeter's model of economic development [5]and Everett Roger's theory of innovation diffusion. [6] Traces of the invention of machinima, beginning in the mid-1990s will be located and its innovation, which appears at the moment to be completed will be described.

The invention phase comprises the period until the first complete problem-solving version appeared, a prototype whose ultimate use is not yet clear. It is not possible to pinpoint the beginning of this phase precisely, unlike its end, because every invention has a series of predecessors. To explore the invention of machinima I shall examine the immediate technological and cultural preconditions.

As the invention alone is not decisive for the form of its application or for whether a new media technology will continue to exist, the next section examines the prototype's innovation, which is articulated by

three indicators. These are: finding an accepted name for the new medium; the emergence of a commercial market for it; and the development of specific legislation.

Invention

Beginning with its invention machinima is closely connected with the very popular first-person shooter (FPS) games of the early 1990s in which the developers of id Software, John Carmack and John Romero, were significantly involved. Essential elements, which later proved to be prerequisites for machinima production, are the players personal point of view, 3D-graphics, real-time game engines, modifiability of game content, multiplayer mode, and in-game recording. These elements were present in isolated instances in 1980s computer games, but id Software consciously combined them in their FPSs to achieve an enhanced the payers immersive experience.

In 1996 the Quake movie "Diary of a Camper" was released by the Ranger Clan. In principle it was a recording of a Quake deathmatch with a short amusing narration referring to the game with text-based dialogues. Nowadays "Diary of a Camper" is widely recognized as the first machinima production - the first narrative produced with a real-time 3D game engine.

In the same year "Torn Apart 2: Ranger Down!", the first Quake movie with narrators instead of text dialogues, was produced. 1997 "Operation Bayshield" from Clan Undead was released, with added skins and lip movements, and the next highlight "Eschaton—Darkening Twilight" from the Strange Company, the first narration that did not refer to the game but had completely independent content. So around 1996 – 1997 we can indicate the prototype!

Innovation

In the phase of innovation, the invention encounters its proper application. I call this the society's differentiation of and function assignment to the new technology. As mentioned above, the phase's completion is marked by three indicators: (1) the accepted denomination of the new medium, (2) a nascent economic market, and (3) the formulation of specific legislation. Commercially viable forms reflect the social demand for a new product and determine its continued existence and further development. Media history shows that if a new technology achieves sufficient relevance, one consequence of the social formatting of the new medium and the increasing necessity for legal control will be the emergence of new legal provisions that are better attuned to the logic of the new technology.

Denomination

After 1999 id Software impeded access to the Quake III engine's code. This fact plus the release of further games with mod possibilities like the FPS Unreal (1998) from Epic Games, or Half-Life (1998) from Valve Software, ended the sole reign of the Quake engine. Significant for popularizing Machinima was the choice of format. A milestone was the movie "Quad God" in 2000 from Tritin films, which for the first time was not only distributed in a demo file format, but also in a conventional video file format and could be viewed without the game engine. This no longer excluded a greater audience not in possession of the original computer game.

In the same year the naming machinima, occurred under the auspices of Hugh Hancock, cofounder of the Strange Company and the online platform www.machinima.com. Machinima is a made-up word from machine, cinema, and animation. So we can confirm the naming.

The next important step was connected with two computer games which offered better user friendliness for machinimators: The Sims 2 (2004) and The Movies (2005). Following an inquiry by Robert Jones these games increased fiftyfold the whole machinima production from 2004 to 2006, and female machinimators, which prior were hardly active, increased up to 50 percent. [7]

The innovation process brought further development of machinima and a variation of different technical and conceptual approaches. Machinimas differentiated in the distance to the games, which 2005 led to a discussion about machinima production. Paul Marino first distinguished inside-out from outside-in machinimas [8] and Phil Rice referred on this distinction talking about "Engine-Idea" and „Idea-Engine." [9]

Mostly widespread machinimas are inside-out productions. With regards to technique, visual style and content they heavily depend on the game on which basis new stories are told inside the game world as intertext or paratext relating to or as comment about the game. The filmic quality often takes a back seat in favor of central dialogs, which tend to parody, reference and joke. The genre, which audience mostly consists of players, develops with the games and functions as fan-fiction or textual poaching. [10]

After 2005 productions more concentrated on visual and narrative aspects outside the game world as well as better pre- and postproduction were increasingly released.

Outside-In productions differ from the visual game style and story. Here the game serves rather as a render engine. In contrast to the inside out method the visual concept has to be designed from scratch, assets have to be produced and more production time and experience with film and 3D graphic production is necessary.

Although there are interactive productions as well, like the Ill Clan's "Common Sence cooking" (Quake II), Chris Burke's "Spartan Life" (Halo2) or Friedrich Kirschners "Litte Puppet play" (Unreal Tournament, Moviesandbox) they are definitely a minority.

Looking for machinimas in commercial relations solely linear narrations with concepts from film and TV can be found.

Commercial Uses

The game and film industries use the popularity of machinima for advertising purposes, image building, and image cultivation, and organize product-specific competitions on a regular basis. One of the highest paying is the "Make something unreal contest," organized by Epic Games and Intel.

Major film and media art festivals offer a platform for machinima productions: Ars Electronica Animation Festival, the Bitfilm Festival, the Ottawa International Animation Festival, the Sundance Film Festival; the exclusive annual Machinima Film Festival by the Academy of Machinima Arts and Sciences and the annual MachinExpo.

Producers of machinima who emerged out of the game community have found commercial applications for their art. One of the longest existing groups, the Strange Company from Edinburgh, produced in 2003 "Tum Raider" for the BBC and Further projects for BAFTA, Scottish Television, and Electronic Arts. The ILL Clan from New York, works for MTV, Universal, Warner Brothers, NBC, and IBM. They create videos, commercials, and presentations for Web and television, including a spot for the TV series Two and a Half Men and machinima material for the TV series CSI: New York. Rooster Teeth Productions successfully sell DVD compilations of their famous machinima series "Red vs. Blue", a comedy series produced with Microsoft game studio's Halo from 2003 to 2007. Thus, machinima has grown far beyond the context in which it emerged and is today an economic factor in film and television productions and commercials.

The French Duran Animation Studio has so far produced two films that utilize mainly machinima technology: "Ugly Duckling" and Me and "Immortel". Steven Spielberg used the Unreal Tournament engine for preproduction of *A.I.* George Lucas also used the Unreal Tournament engine as a previs tool to plan sequences of his *Star Wars* films.

The advertising industry also discovered machinima. In 2004 Volvo produced the commercial Game:on with the Unreal Tournament engine, and OSRAM, manufacturer of lighting systems, used Second Life.

A variety of music videos are produced with machinima for example, the Zero7 video In the Waiting Line broadcast on MTV using the Quake engine, Suffer Well by Depeche Mode with Sims2.

Several TV formats integrate machinima. MTV2 produces the series Video Mods, which presents machinima music videos. For Time Commander the BBC History Channel used the Rome: Total War engine to reconstruct historic battles of the ancient Romans.

"Molotov Alva and His Search for the Creator: A Second Life Odyssey" a the documentary by Douglas Gayeton was commissioned by the Dutch television broadcaster VPRO in 2006, and shown successfully at various festivals. In 2008 Home Box Office, a subsidiary of Time Warner, bought the broadcasting rights for North America, although it had already premiered on YouTube. To be precisely Molotov Alva was not in game recorded but shot with a high quality camera from the screen.

So we see a variety of commercial applications of machinima.

Last but not least Machinima enables amateurs and fans to become producers of their own computer animated stories. Using a familiar visual and narrative form makes them easily accessible for others. Computer game fans so far produced and distributed many thousands machinima videos. At the same time the social, economic and material relations of production, reception and distribution change which forces the industry to react.

In times of media convergence industries change the way they operate and realized how to profit from the symbiotic relation to machinima in several ways. They reacted on the not predictable consumer needs and included easy to use tools for modifying and film production. This provides for selling content to consumers in multiple ways, strengthen consumer loyalty and in the end increases their attention, which might be the most important economic factor today.

Legal issues

Machinima opens the field of action to a broader circulation and participation, which is an important innovation stage and essential for achieving a professional level. A serious barrier is the legal uncertainty surrounding the issue that computer game engines are the intellectual property of their producer.

Some producers reacted on machinima's popularity with special licenses. Blizzard Entertainment's "Letter to the machinimators of the world" [11] licensed the limited use of World of Warcraft, and Microsoft Corporation published the "Microsoft's Game Content Usage Rules," [12] an unilateral license for limited use of the games to produce new derivative works. Moviestorm, IClone, VirtualStage are dedicated Machinima packages licensed for making commercial Machinimas. Linden Lab allows in their machinima policy to reproduce, distribute, modify, prepare derivative works of, display, and perform machinima captured in second life outside of Second Life in any current or future media. [13]

Licenses and a clear delineation ensure the legal position of machinima producers and also festival organizers will present more machinima productions if the legal aspects are not in dispute.

So following the approach with the denomination, commercial use and legal issues, we can prove a complete innovation phase – and therefore can see machinima as an independent medium or independent art form.

One aspect is against this view:

Both in inside-out and outside-in productions use highly interactive features of realtime 3D computer games for the production of established linear narratives, which reprocess concepts from film and TV.

In this regard there is a continuing discussion about the uniqueness of machinima as a new art and media form. The potential of machinima as a new medium consists in the procedural - performativ nature of the image and therefore the possibility of real-time production and presentation, which allows live presentations and audience interaction. [14] We have seen that the popular mode of production did not follow this feature. We also have seen that the success of machinima by emancipating from the game engine resulted in cultivating traditional media.

Machinima's strong association with linear narration and aesthetics of film can be criticized since the technology of computer game engines offers interactive potential as never before. However under the perspective of media evolution remediation **- the representation of one medium by another -** appears essential for achieving cultural and social acceptance which is required for a legal and economic frame that matches the new art technique. New art forms like Machinima are not purely product of their technical pre-conditions and artistic will, but in the same way dependent of their potential of meeting with prevailing, historical grown, established and learned conventions of seeing and media competences.

Remediation is not new in the world of art and media. Photography remediated painting and film remediated theatre before they established their own accepted visual and technical concepts. **New media technologies innovate in existing media ecologies [15] and may or may not be integrated dependent on their ability to complete or enhance the existing media forms. Therefore remediation strategically targets reform of its antecessor driven by a new technical possibility. In the case of machinima this counts** more on the process of production than of reception.

Refering to film critic Bèla Balàzs Michael Pigott emphasizes that a new use of form only slowly comes into existence by a negotiation process between artist, medium and audience, which ultimately follows the possibility of communication. [16] The challenge of the artist to develop a new form is accompanied by the probably harder challenge of the audience to understand and accept it.

Although the criticism that, in most cases, highly interactive features of realtime 3D computer games are used to produce conventional linear narratives is correct, we should not overlook the necessity of this step. Machinima shows clearly that media evolution is a process where reference to older media is not a constraint but instead it is necessary for development because it enables increasing popularity and further economic applications and changes to legal structures.

At the moment it is not clear which economically viable forms will emerge out of Machinima, so we shall have to keep on observing which new applications that already exist on an experimental level will become established.

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THE MAKING OF DIAMANDINI: PERCEPTION, IDENTIFICATION, EMOTIONAL ACTIVATION DURING HUMAN-ROBOT INTERACTION

Mari Velonaki

This paper presents Mari Velonaki's new project, the humanoid robot 'Diamandini'. Diamandini is a five-year collaborative research project conducted by Mari and robotics scientists at the Centre for Social Robotics, ACFR, the University of Sydney. The project aims to investigate intimate human-robot interactions in order to develop an understanding of the physicality that is possible and acceptable between a human and a robot.

Diamandini, 2010-2013, Mari Velonaki, Interactive robotic installation, 155cm high.

In this paper I will discuss what led me to the creation of my new robot Diamandini – the road to Diamandini.

I am a media artist/researcher who has created interactive installations over the last 15 years. I have always been interested in creating 'characters' – either projected, or as three-dimensional kinetic objects

that inhabit an installation space. Since 2003 I have been working as a senior investigator in collaboration with robotics scientists at the Centre for Social Robotics / Australian Centre for Field Robotics (ACFR) at the University of Sydney, Australia.

THE "FISH-BIRD" PROJECT

In 2003 I started working at ACFR, leading a research team to develop the "Fish-Bird" project. This was an interdisciplinary project that involved the creation of novel interfaces for human-robot interaction, experimentation in distributed sensory systems and robot 'perception'. "Fish-Bird" is an interactive autokinetic artwork that investigates the dialogical possibilities between two robots, in the form of wheelchairs, that can communicate with each other and with their audience through the modalities of movement and written text. The chairs write intimate letters on the floor, impersonating two characters (Fish and Bird) who fall in love but cannot be together due to "technical" difficulties.

The most important thing that we learned from the Fish-Bird project in relation to human-robot interaction, after 35,000 recorded encounters in five countries is that Behaviour is more important than Appearance. Although Fish and Bird have the utilitarian appearance of an assistive device, participants were drawn to them because of the way they move and interact physically with them, and because of the handwritten style 'personal' messages that they print for their audience.

DIAMANDINI

With Diamandini, I wanted to make a new robot that would take this experimentation further, adding the element of interaction via touch. It was important that the interaction be one-to-one: one human, one robot.

The Greek word for interactive transliterates as amphi-dromos (amphi: around on both sides of, dromos: street or road). Thus it is defined as a middle point where two roads meet. In English, the preposition 'inter' means 'between' or 'among'. Inter-action, therefore, signifies between or among actions. A meeting point beyond action and reaction and prior to discourse, a brief moment of recognition between two parties. In this meeting point of recognition and identification I intend to use the moment as a stage to test if intimate human-to-human interactions can serve as an analogue for human-to-robot interactions.

The original intent of the Diamandini project was to create a robot that was non-representational and non-anthropomorphic. As I started experimenting with a variety of abstract sculptural forms, although interesting in shape and structure, as the artist/creator I found it extremely difficult to assign behaviours to them that could lead to emotional activation of the spectator/participant.

With Fish and Bird, although the wheel chair robots are certainly not anthropomorphic, it was inevitable for the participants to assign personalities to what was not there, since a wheel chair is a socially charged object that signifies the absence or the presence of a person. The dialogues expressed in written text between the two characters in Fish-Bird and the storyline further assisted the participants to feel a momentary connection to the Fish and Bird characters.

These considerations influenced my decision to create a humanoid robot. This was a challenging decision, especially when I had to decide how the robot should look. I didn't want Diamandini to have a typical humanoid robot aesthetic. After a long period of reflection I began to think of Diamandini as a female sculpture. In my mind Diamandini had a diachronic face that spans between centuries, a style that could be reminiscent of post-World War II fashion influences, and at the same time with futuristic undertones.

Diamandini is small - only 155 cm high. I wanted her figure to be small and slender so that people didn't feel threatened by her when she 'floats' in the installation space. I wanted her to look youthful, but not like a child, and for her age not to be easily identifiable. Interestingly, in my mind she is between 20 to 35 years old. Because I am a woman I feel more comfortable working with a female rather than a male representation.

Diamandini's construction was a multi-stage process, involving a sculptured prototype terracotta head, a custom-tailored fabric dress made over a wooden armature, high precision 3-dimensional laser scanning and manipulation of the scanned data, followed by computer-aided design (DAC) modelling. Diamandini's external shell was made using stereolithography – an additive manufacturing process that uses computer-controlled UV lasers to polymerise a resin. Of course, the skeleton, muscles, blood and organs were designed by my roboticist collaborator David Rye together with Mark Calleija and Cedric Wohlleber.

I imagine spectators entering the installation space to see Diamandini moving in a smooth, choreographed manner. How Diamandini behaves towards her visitors depends on factors such as time spent with her, proximity to her, and Diamandini's perception of the body language of the participants.

The dialogical approach taken in this project both requires and fosters notions of trust and shared intimacy. It is intended that the technology created for the project is invisible to the audience. Going further than a willing suspension of disbelief, a lack of audience perception of the underlying technological apparatus focuses attention on the poetics and aesthetics of the artwork and promotes a deeper psychological and/or experimental involvement of the participant/viewer. For me as an artist, the challenge is to create a female humanoid robot that simply does not resemble a female humanoid robot. When people first meet Diamandini I want them to experience a new aesthetic approach to what a robot can be. I want to intrigue them as to how a robot can behave. I strive to create a robot that doesn't look or behave like a 'robot'.

We live in a technology-driven world. I didn't create Diamandini to proselytise for robots in one's living room, yet as robots rapidly emerge from laboratories into society, my role as an artist (I am tempted to say) is to question, to provoke and hopefully to inspire.

This paper has described Diamandini in the first stage of the project. The next stage will involve articulation and actuation of her arms, kinetic autonomy of motion including tilting of her body, interaction and reaction via touch and generated text. In the next version, Diamandini will be covered in a light blue porcelain-like material, giving her the appearance of a floating porcelain figurine in the installation space.

DIGITAL MATERIALITY – MAKING THE UNGRASPABLE (UNBEGREIFLICHE) PERCEPTIBLE

Eva Verhoeven

This paper reports on a series of experiments that were conducted as part of a practice-led PhD, which explored the digital potentials at the interface of hardware and software through creative practice. The laboratory-style experiments develop along a trajectory from noise within existent (computer) systems towards speculative interfaces, where conceptions of materiality of hardware and software are brought into question.

Digital Transformations - Sand.

How do we conceive of contemporary Digital Culture? More specifically, how do the concepts of time and matter offered by digital technologies relay into culture and produce present conceptions of Digital Culture? And what methods and strategies can be applied to challenge dominant conceptions of it? Is it possible, for example, to think of and to produce the interface of software and hardware differently?

These were some of the questions I investigated as part of my practice-led PhD, which explored the digital potentials at the interface of hardware and software through creative practice. The research focused on this interface specifically, because it is potentially problematic in the context of conceptions of the digital as immaterial.

This paper reports on a series of laboratory-style experiments that were conductedalong a trajectory from noise within existent (computer) systems towards more speculative interfaces, where conceptions of materiality of hardware and software are brought into question.

Digital processes are omnipresent and yet remain imperceptible and ungraspable (unbegreiflich). Unlike mechanical devices, which can be opened up and inspected, the processes of digital devices take place beyond human perception – leading to them being easily (mis)understood as immaterial. That which is incomprehensible can also be described as ungraspable (or unbegreiflich in German). Understanding and comprehension can and often does work through a tactile process and has something to do with being able to grasp or grab something – comprehension can be a physical process.

In terms of technological developments, the concept of information as immaterial was already discussed during the Macy conferences in the 1940s and 1950s in the US. The Macy conferences were interdisciplinary events, attended by mathematicians, engineers, anthropologists, biologists, psychologists, neuroscientists and sociologists. Katherine Hayles identifies the Macy conferences as being crucial in the development of the conceptions of 'bodiless information.' [1] During the first Macy conference in 1946, information was already a dominant concept and, as Hayles argues, Claude Shannon's theory – although only meant to be used within communication engineering and not as a universally applicable theory of information – contributed to the construction of the idea of information without a body by making information a mathematical function that did not need a material base to be send from sender to receiver: "frequently the messages have meaning; that is they refer to or are correlated according to some system with certain physical principles or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem." [2]

What was a breakthrough for communication engineering, was, as Hayles argues, a step back for its relay into culture because, when understood outside of a communication engineering context, "the definition allowed information to be conceptualized as if it were an entity that can flow unchanged between different material substrates." [3] Hayles points out that the definition of information taken out of its communication engineering context had a strong influence on, for example, Hans Moravec's vision of downloading human consciousness into a computer, Norbert Wiener's suggestion that it was theoretically possible to telegraph a human being and also the producers of Star Trek, whose method of transport required dematerialisation and rematerialisation of the body without a change to the material itself. According to Hayles, this cultural conception of information without a body does not stop at early cybernetic theories or sci-fi of the late 1960s, but continues for example, in current molecular biology that understands the genetic DNA information as the key to the human body, making the idea of bodiless information a thoroughly contemporary phenomenon.

Since the implementation of the von Neuman architecture, which makes software and data interchangeable, it can be argued that the development of software took place within the framework of bodiless information and highlights the cultural conception of the division between hardware, or material substrate, and software, or immaterial (bodiless) element. Software as data is largely conceived of as an immaterial entity that can flow freely and without any material boundaries between material substrates. The German computer scientist Friedrich L. Bauer exemplifies this hierarchy of immaterial software over hardware in the following quote: "How did a few people come to construct software? Roughly speaking, it was an attempt to compensate for the inadequacies of the hardware by using programmed features – in many cases features that hardware designers had forgotten or had not even thought to provide for." [4]

Variations of this dualism can be found in much of western history. This paradigm of the digital immaterial however is highly problematic, and challenging it becomes particularly important in the light of relays between technological developments and cultural concepts that develop into so-called Digital culture.

Friedrich Kittler constructs a counter argument to the software/hardware dualism and argues that 'there is no software' in the as such titled essay. Computer languages exist on several layers, from the HCI and application software to simple operation codes, which exist as hardware configurations in the form of silicon chips. For Kittler everything that is digitally produced exists as binary data and voltages. If one magnifies the process of descent from software to hardware, one finds "signifiers of voltage differences," which strongly suggests that there is no software without hardware –that "software does not exist as a machine independent faculty." [5] This describes a much more ambiguous relationship between hardware and software.

This is the context within which a series of experiments was constructed. Creative practice and in particular critical practice has a particular position from which to challenge existing paradigms – it uses speculative propositions to challenge existing ideas and assumptions; it asks questions rather than giving answers. The experiment here was not used in the strictly normative scientific method – rather the experiment in the context of speculative and critical practice enables a continuous and open-ended process of evolvement and invention. The experiment here also celebrates the constructedness of the pseudo scientific laboratory – it plays with the rational approach to classical science and the potential fictional aspect of the constructed scientific experiment.

The series of experiments were set out to challenge and to question the hardware/software dualism. They attempt to challenge the materiality of the digital, and more specifically the 'softness' of software. They make use of the von Neumann architecture that treats software and data the same. The operating system and the application software (as data) is piped to the parallel port, where the ungraspable (unbegreiflich) process of software becomes perceptible as voltages. In the series of experiments this is amplified and materialized using a range of different materials. Through different processes software is transformed into perceptible (and literally graspable) dynamic matter.

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LIFE-LOG-ART

Lenara Verle

In an overly connected and digitized world, privacy becomes a privilege, and many people renounce to this privilege in a voluntary and purposeful way. By design or by accident, the private life becomes a work of performance art. What can we do, and can be done to us, with this growing digital memory? Some of these questions are raised by the works of a range of contemporary artists exploring the theme of lifelogging.

The 2010 Feltron Annual Report, by Nicholas Felton.

Recording information about one's life is not a new activity. Journals, correspondence, pictures and other forms of registering our life events have existed for quite a while and have enjoyed great popularity. As the time passes, new technologies for gathering and registering data are created, and the amount of information being logged seems to grow almost exponentially, some of it being purposefully recorded by ourselves, and some of it being logged in an almost automatic way by devices surrounding us.

What can we do, and can be done to us, with this growing digital memory? Some of these questions are raised by the works of a range of contemporary artists exploring the theme of lifelogging.

The records we create of our life have the role of a memory outside the self, an external storage beyond the one in our brains. While the features of our biological memory system were long determined by evolution, we are now defining the features of this new digital, additional memory. How much to record

and from what sources? How to extract meaning from the data, how to filter the memories? How to create meaning with the data, to connect and reach out? Who to grant access to, and share our memories with?

The artist and designer Nicholas Felton creates beautiful graphics from personal data. In 2010 he designed a special printed report after his father's death. According to him it represented "an encapsulation of my father's life, as communicated by the calendars, slides and other artifacts in my possession." [1] All of them analog records, from calendar entries to toll receipts, they already displayed a tendency to grow more abundant each decade. Felton diligently sorted thorough all of them and rendered the information he deemed interesting into well-designed pie charts, line graphics and tables of numbers, adorned by selected images. He has been creating a yearly report about his own life since 2005, following many of the data trails his computer and devices create about himself, and in 2009 he started handing out requests to every person with whom he had a meaningful encounter to submit a record of their meeting through an online survey. [2] He also created a software called Daytum to help others log and graph similar data. It is one of the many tools available to try to extract meaning from digital memories.

The website quantifiedself.com was also created for people who are logging many different aspects of their lives. One of its founders, Gary Wolf, talks about the motivation behind loggers: "For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask." [3]

If many people are purposefully tracking and registering their daily lives, and choosing how to display and share this information, some are surprised when they discover they are leaving trails in the digital world, and worried about who has access to this data. The digital tools make many tasks easier and faster, but often come with the cost of reduced privacy.

Hasan Elahi is a bangladeshi-born artist that has been documenting his life openly since 2002, when the FBI mistook him for a terrorist. He posts pictures of every meal he has, every purchase he makes, all the travels he takes, his current location, and many other types of information on his website trackingtransience.net. His life has become a sort of performance art, and thousands of people, including FBI agents, access his site. According to an interview he gave in 2007, he hopes they eventually lose interest, and "he figures the day is coming when so many people shove so much personal data online that it will put Big Brother out of business." [4]

The Big Brother nowadays is not only found working for the government but also inside corporations making their business collecting and selling our personal data. Google's mission to "don't be evil" is also a recognition that if only they wanted, they could be. Most of our personal information including emails, pictures and all sorts of tidbits is increasingly online at services provided by corporations, Google and Microsoft currently being two of the biggest ones.

In a culture growing accustomed to the benefits of abundant, convenient and fast digital tools, many agree with Elahi and are not afraid of opening up their lives to the world. Some are aiming to extract and create meaning from digital memories, to find beauty in mundane moments. New forms of art expression are being experimented with. A couple in Seattle attached a camera to their cat Cooper and posted a selection of pictures online, which attracted many admirers and are now for sale. According to Copper's owner, the photographs taken automatically by the cat's camera surprised him: "It's interesting

that something completely arbitrary can have such a beautiful result. It really changed my view on what art is, how it can be conceived and how it's interpreted." [5]

Life as art is not a concept exclusive to the digital technologies, the novelty they bring being maybe the opportunity and tools for more people to become life-loggers, and to generate forms of life-log-art. According to Gary Wolf, four things were fundamental in this process: "First, electronic sensors got smaller and better. Second, people started carrying powerful computing devices, typically disguised as mobile phones. Third, social media made it seem normal to share everything. And fourth, we began to get an inkling of the rise of a global superintelligence known as the cloud." [3]

Among the challenges the digital format poses for art, one is the conservation of a medium so dependent on constantly evolving hardware and software that, at the same time it opens new possibilities for experimentation, is rendering old pieces fast obsolete. Gordon Bell, a key-figure in computing and a prolific lifelogger who succeeded in digitizing most of his life, worries about it: "Another technical challenge will be ensuring that users are able to open their digital files decades after storing them. We have already run into cases where we could not access documents because their formats were obsolete. Digital archivists will have to constantly convert their files to the latest formats." [6] Bell's colleague Jim Gemmel is also a lifelogger and sees his extended digital memory as part of himself: "one day, Gemmell's hard drive crashed, and he hadn't backed up in four months. When he got his MyLifeBits back up and running, the hole that had been punched in his memories was palpable, even painful. […] He was amazed to realize his backup brain was no longer some novelty but a regular part of his psychological landscape." [7]

We are faced with the question of what shall we record, and the answer seems increasingly to be "everything". Even though most of it will get filtered out, mashed up together and consolidated into new forms, simply forgotten, or maybe fallen victim of obsolescence, purposefully or accidentally. It's all part of our new challenging digitized lives.

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IMAGINING THE SOCIAL CHANGE: NEW MEDIA IN CZECH ART DISCOURSE IN THE 1990'S

Jindra Veselska

This paper focuses on the emergence of new media in Czech discourse about contemporary art in 1990s. It works with specialized art journals and exhibition catalogues from 1990 to 1999 with the focus on narrative of information revolution in context of then social and political transformation.

Although usually considered in the context of artworks, imagination, in this paper, is taken into account as a part of the discourse about new media art. [1] As such it is restored on the basis of documents written in that era and considered as providing a horizon for practices of shaping the identity of new media art in the Czech Republic in the nineties. As I will point out, certain recurring discursive practices, which (re)appear in the situation of a technological change throughout media history, can be uncovered in the Czech art discourse this way.

In doing so, my approach combines the discourse theory with archaeology of media, since the latter is characterized as studying "recurring cyclical phenomena that (re)appear and disappear and reappear over and again in media history", while focusing especially on discourses „that guide and mould its development, rather in the 'things' and 'artifacts.'" [2] Archaeological perspective on media history allows us to focus on systems of statements in their own right and historical conditions that defined the discursive space. Even though the visions attributed to a new medium might seem exaggerated or even foolish at first sight, they are not considered here from the normative perspective as false or banal statements, because for the archaeology the originality/banality opposition is not relevant since it establishes no hierarchy of value. Rather than treating them from the perspective of their possible realization and the discrepancy between them and reality, which would mean overlooking the importance of their repetitive character, this paper focuses on the circumstances and relations that constitute them.

Combining the archaeological approach with Ernesto Laclau's and Chantal Mouffe's concept of discursive as social [3] [4] enables us to look on this 'recurring cyclical phenomenon' as a social practice. It also takes us to the point where we interpret these practices as (re)activated throughout media (art) history rather than cyclically (re)appearing. [2]

Looking perspectively at how media history was articulated, it becomes apparent that the term 'new technologies' is in fact a historical term. This is the case especially with the concept of new media, since no general definition was actually settled in the Czech media art discourse in the '90s, and the limitation of this concept is still ambiguous. At the beginning of the nineties the concept of new media was used for digital technologies that have emerged after television (while television was considered a traditional medium) such as interactive installations and videoart, but in the mid-nineties the concept was extended to ICT technologies and the Internet.

Soon after the revolutionary year of 1989 and since the beginning of the 1990s, there occurred a visible tendency in the Czech discourse to see the new media as one of the tools that would assist in overcoming the past totalitarian regime and also help with establishing the regained democratic system. In this enthusiastic atmosphere much hope was placed on the new media, expected to facilitate a radical social change. Regarding the social field of the contemporary art of the era, these expectations were located within the Soros Centre for Contemporary Art (SCCA) that was founded in Prague in September 1992 as a part of a network of twenty centres located in the capital cities of the former Communist countries in Central and Eastern Europe. The centres were founded not only to provide support for the new media art activities within the field of contemporary art, but also in order to introduce the Internet to general public.

According to its director at that time, Ludvík Hlavacek, the SCCA aimed to put visual arts back in the centre of social life. In doing so, the centre placed a particular emphasis on the new media in contemporary art, as they were supposed to introduce a new model of social relationships into the art world. In the mid 1990s, the SCCA organized an exhibition entitled 'Orbis Fictus. New Media in Contemporary Art'. In the texts that were written for the exhibition catalogue, the assumption of radical social change brought about by new technology is almost taken for granted. Here the art was largely viewed as a form of mediated communication between the author and the viewer, and many hopes were placed on its interactivity, enabling viewers to participate in the work of art, as well as on the possibility that through the Internet, it can be spread directly to the audience all over the world. Museums and galleries were no longer considered suitable for presenting this art. The new media were presented as a *democratic* improvement of the older *passive* media. They appeared to hold the opportunity for a new, more open and democratic communication, but this 'communicative, creative and critical potential' was supposed to be able to reveal its form only as media art, otherwise it would have yielded to economic, military and political pressures. [5]

It has been already recognized by Walter Benjamin that this utopian vision of a social change delivered by the fusion of art and technology is not new at all. It is actually a certain amount of discursive practices that evokes old utopias, dreams and myths, presenting them as new over and over again.

In order to be able to emphasise the newness of the new technology, first of all there has to be some kind of relationship created with the old one, in order to constitute the possibility of a revolutionary rupture with the past. Using the already existing technology of television that had already worked in numerous meaning systems, the new media was presented in the Czech discourse as more valuable and promising than the existing technology. The new technology was actually conceptualized through the opposition of old and new, which, as every binary opposition, embraces a hierarchy. In other words, the new technologies' identity was constituted through establishing a hierarchy within the discourse structure. Based on this hierarchy, the old technologies were marked as traditional, passive, old-fashioned, while the space for promising new media was being created.

Regarding the Ernesto Laclau's theory of discourse, the essential point here is his concept of discourse as a field of the social in which different political projects strive to articulate a greater number of social signifiers around themselves. [4] The moment of political transformation from totalitarian to democratic regime in the Czech Republic in the 1990s, when a democratic social order was being established, was beneficial to the reappearance of myths and utopias. In this euphoric but also very chaotic atmosphere the whole field of contemporary art was being repaired and restructured after fifty years of censorship and state control of art institutions. This historical situation was met with the emergence of new media

and in order to give them a significant and dominant articulation within a specialized discourse of contemporary art, these promises of possible new social order delivered by new media art were reactivated. Since the myths function as a surface on which social demands can be inscribed, they were useful in articulating the identity of new media, according to particular projects within the (re)constitution of the field of Czech contemporary art after 1989. However, while the promises such as 'building a bridge between the contemporary art and the public' were being proliferated, the new media was actually held back by this conventional imagination of myths and utopias that had already been well known. On the one hand new media's potential for radical social change was emphasised, on the other hand (re)activated discursive practices fitted it into old schemas.

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MORPHOGENESIS

Christophe Viau

Art and biology can be a natural fit. Some artists explore Artificial Life (Alife art). But morphogenetic art is a least known trend, interested in geometric structures derived from the observation of nature. Both approaches have common roots, but also great methodological and epistemological differences. A more precise definition of morphogenetic art will help understand how biology can provide strategies for creation.
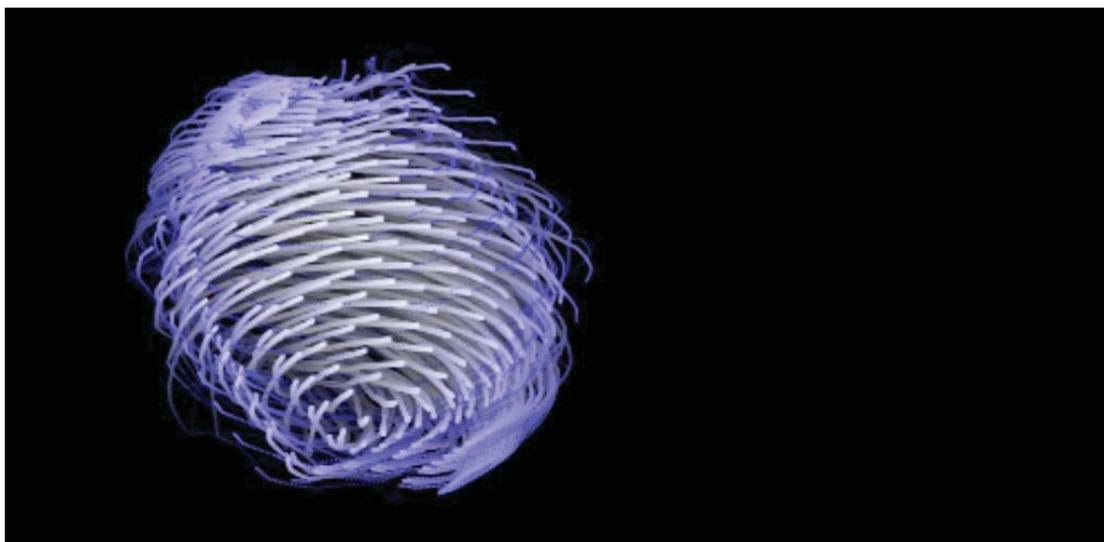

fig 1. GenomaLabs experimentation. Part of the Genoma project developed at the LabMIS, Museu da Imagem e do Som, São Paulo, Brazil.
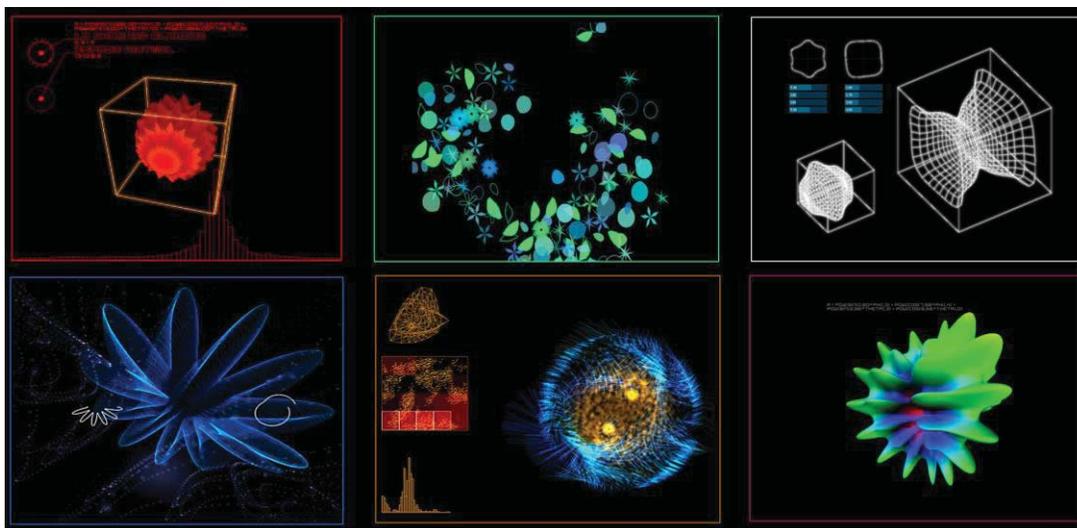

fig 2. Six experiments from the Spherical Series: Spherical Product, Genoma.Mercato, CAMC, Orbs, Genoma and Spherical harmonics.

Defining Morphogenetic Art

Generative art inspired by natural patterns and growth mechanisms can be named "morphogenetic art." To better define morphogenetic art as a blend of art, geometry and biology, we must first describe what is morphogenesis, a subfield of biology closely related to Artificial Life (Alife).

MORPHOGENESIS AND GEOMETRY

Morphogenesis is "the ensemble of mechanisms underlying the reproducible formation of patterns and structures and controlling their shape." [1] As a subfield of biology, it refers mainly to growth patterns in living organisms. Elegant equations can describe patterns as diverse as crystal configurations, spots on a fur, the texture of a horn or the arrangement of leaves on a stem. For example, the Fibonacci sequence, related to the golden ratio, named after an Italian mathematician of the 12th century but already known from the Indian mathematicians since the 6th century, is used to describe spirals found in nature, like from the unfolding of a fern, the arrangement of seeds and petals, etc.

Geometry helps to find the common roots of seemingly unrelated manifestations. For example, an ellipse can be defined by an equation. A mathematician called Lamé, in the 19th century, generalized this equation to describe an ellipse, a circle and a rectangle at once. This equation called "superellipse" was further generalized by Gielis, extending it for example to radial symmetry. This "superformula," published in 2003, [2] encompasses a lot of different natural forms from fruits and flowers to butterflies. Other equations such as spherical harmonics, minimal surfaces and reaction-diffusion systems are used in fields as diverse as atomic physics, geology, fluid mechanics, botany and chemistry.

Classical morphogenesis mainly tries to grasp the principles behind pattern formation and not the actual mechanisms of growth, that can be very complex and hard to modelize. For example, a few dozens of models can be found in the literature to explain the same arrangement of leaves on a plant stem, the main study of a field called "phyllotaxis." But some dynamic processes are more easy to formalize than others, giving some clues to help find the actual mechanisms that could be involved in the formation of certain patterns. Morphogenesis is therefore working on a purely geometric level only to describe forms and formation patterns, regardless of the causes governing the generation of these patterns in nature. In the words of René Thom, one of the great thinkers of morphogenesis:

"That we can construct an abstract, purely geometrical theory of morphogenesis, independent of the substrate of forms and the nature of the forces that create them, might seem difficult to believe, especially for the seasoned experimentalist used to working with living matter and always struggling with an elusive reality. This idea is not new and can be found almost explicitly in D'Arcy Thompson classical book On Growth and Form [...]." [3]

D'Arcy Thompson, with his book *On growth and form,* [4] is often considered as the father of morphogenesis. But the term is already used in a fundamental book by Leduc, from 1912, called *La biologie synthétique*. We will see that his experiments in generation of forms illustrate the common roots between morphogenesis and Alife.

SYNTHETIC BIOLOGY AND ARTIFICIAL LIFE

The fundamental experiments of Leduc [5] showed that shapes, patterns and behaviours previously associated with life can appear as a result of complex physico-chemical conditions. He generated fascinating moving and evolving organic shapes with drops of ink in metallic salts and alkaline silicates medium showing "the molecular forces brought into play by solutions, osmosis, diffusion, cohesion, and crystallization." These artificial creatures were looking like "flowers and seed-capsules," "most remarkable fungus-like forms," "capsules or closed shells," "amoeba," "a free swimming organism, a transparent bell-like form with an undulating fringe, like a medusa." These artifical creatures illustrated an approach in the study of life called "synthetic biology."

Other leading scientists contributed to this approach. Turing, forty years later in his seminal paper on morphogenesis by reaction-diffusion, suggested that "a system of chemical substances, called morphogens, reacting together and diffusing through a tissue, is adequate to account for the main phenomena of morphogenesis." [6] Leduc and Turing shared the same idea: if some fundamental patterns, shapes and behaviours can be synthesized by physico-chemical reactions on inorganic elements, life could have emerged from the organization of matter. We find an echo of this idea in the foundation of Artificial Life. As Langton, an important founder of the field, describes it: "Artificial Life (AL) is a relatively new field employing a synthetic approach to the study of life-as-it-could-be. It views life as a property of the organization of matter, rather than a property of the matter which is so organized." [7] Life is thus an emergent property of matter.

Morphogenesis avoids debates between mechanistic and vitalistic and other fundamental positions about what life really is. But it shares with Alife and with synthetic biology the idea that characteristics of life can often appear in the field of the non-living. Picking only one example, a dune of sand forms a complex system where grains of sand are driven by the wind but are also altering the dynamics of the wind. [1] The typical morphology of an isolated dune takes under constant wind is called a "barchan," It's a crescent shape sand ridge with the two horns pointing downwind, with the upwind side at 15 degree and the downwind slope (called "slip face") at 35 degrees. This precise configuration is invariant with size, moves at a defined speed under favorable conditions without loosing its shape, can "die" if deprived from new sand carried by the wind, and can even reproduce by splitting in two little barchans while colliding and fusing with another barchan! Self-organization, dependance to external conditions and supply, constance of the shape, birth, death, predation, motion, reproduction, collective behaviour, are all characteristics of life that have their manifestations in the inorganic world. Like Leduc says: "All the supposed attributes of life are found also outside living organisms. Life is constituted by the association of physico-chemical phenomena, their harmonious grouping and succession. Harmony is a condition of life."

Another shared observation is that simple principles can produce complex manifestations. One example is cellular automaton. For example, in the well-known implementation from Conway called "Game of life," [8] the environment is a grid composed of cells that can be in one of two states: alive or dead, represented by a black or a white cell. Simple rules guide each individual cells. At each step, each cell counts its number of neighbours and follows three rules: 1) a living cell will die by loneliness if surrounded by less than two neighbours and by overcrowding if surrounded by more than three. 2) A living cell will survive if surrounded by two or three neighbours. 3) A dead cell will come alive if surrounded by three neighbours. These three simple rules give rise to a lot of different patterns, like stable periodic forms with evocative names as "sparkers," "guns," "spaceships," "puffers" and complicated combinations like "glider-to-spaceship converters." Cellular automaton mechanisms have been recognised among other morphogenetic processes in the colored patterns of sea shells, in urban growth models and chemical systems.

DEFINITION

This definition of morphogenesis can now be used to better understand what morphogenetic art is.

Morphogenetic art is a subfield of generative arts interested in the dynamics of pattern formation as deduced from nature. Generative art has been defined as "any art practice where the artist creates a process, such as a set of natural language rules, a computer program, a machine, or other mechanism, which is then set to motion with some degree of autonomy contributing to or resulting in a complete work of art." [9]

It is distinguished from Alife art that try to simulate or to generate life. The pattern formation mechanisms, once formalized in equations and algorithms, can also be used to simulate organic shapes like in what is called "soft Alife," the study of simulated life. But the artist interested in morphogenesis will be less inclined to imitate the living than to directly present the geometric principle itself. The beauty of an equation lies in its elegance, its simplicity and its universality. It does not capture the beauty of nature but the beauty of the principles that manifest themselves in nature's amazing diversity. Morphogenetic arts don't talk about nature, but about its structure, about the intimate links between nature and geometry.

Designers and architects use the term "digital morphogenesis" to describe the use of shape generation strategies analogous to what can be found in nature. Hensel proposes to bring the analogy between architecture and living systems further, seeing architecture as a living organism, taking into account its growth mechanisms, its behaviours, its adaptability, etc. [10] Artists and scientists of morphogenesis are not only interested in how living systems are organized and how they evolve in their internal structure, but also in their relationship to their environment. Of particular interest for the artist is the way biological metaphors can help consider an artwork in its ecosystem, as a living creature evolving in a particular context, for example social, aesthetic and relational.

For example, looking at the cultural context of generative arts, we can question how we interact with digital artwork. A public immersed in video games, music visualizations and movie special effects can easily confound an artificial life form with some manifestation of popular entertainment. Some interesting generative work blur the boundaries between entertainment and art, virtuality and reality, "life-as-it-could-be" and "life-as-it-is." But some less mature work seems in need to impress, make the public move, manipulate, interact for the sake of interacting. Morphogenesis suggests more organic strategies to involve the public. For example, when it comes to "interaction," one proposition is to think of it as "interrelation."

Personal Experiments

We spent two years developing a series of experiments to refine the concept of interrelation in morphogenetic artworks. The first work of the series presented the non-interactive evolution of a spherical harmonics shape exhibited at the Saussignac castle in Dordogne (http://bit.ly/spherical_harmonics), immediately followed by a second experiment, in an art production residency in Quebec (http://bit.ly/spherical_product), to explore interrelation strategies. A supershape was evolving according to the ambient sound analysis from two different art centers, that collaborated in equal parts to shape the organic form. The result was interactive in the sense that one could see the effect of his or her voice on the evolution of the shape. But, as it was also guided by the ambient sound of the other gallery, the organic

form seemed to have a life of its own. The interrelation between the sound and the shape began to feel more abstract than a mere direct reaction. To dig further in this abstract encoding scheme, we developed "Orbs" (http://bit.ly/expo_orbs) and experimented with minimal interaction. The simple throw of a marble in a bowl triggered the deployment of a complex spherical universe. The reciprocating component of the trajectory of the marble was transformed into two circular shapes assembled by spherical product and embedded in an evolving representation of a spherical universe. The minimal but primordial gesture of throwing the marble could barely be assimilated to interactivity, being more like an impulse for the series of geometric transformations, analogous to a minimal interface to the outside world triggering and guiding the growth of an organic shape. In a third experiment called "Genoma," launched in Italy (http://bit.ly/genoma_mercato) and developed in São Paulo (http://bit.ly/genoma_sao_paulo), the series of geometric transformations was replaced by a complex "genome" encoding. The goal was to explore the possibilities of mapping the ambient sound of the gallery in a way that could not be confused with a direct interaction, but still showing the effect of the sound on the evolution of the shape. The sound analysed acted as a parasite for a rudimentary "genome" made of flocking agents exchanging data as they met. This data mutation influenced the evolution of the shape, involving a luminous Superformula surrounded by a particle system representing the genome flocking in spherical space. The result exhibited very organic behaviours, being autonomous in its development but responding to input from the environment in a very slow and deeply abstract manner.

This abstract interrelation replacing direct interaction is analogous to the kind of communication we can have with natural phenomena. Gesticulating and yelling at a flower will probably not result in a direct reaction. But caring and watering it will surely determine its evolution. Choosing interrelation over interaction has a profound impact on all kind of relations, be they social or cultural, where the effects often reaches deeper levels as the interaction is subtle.

The next exhibition in preparation also explores the abstract encoding between a stimulus and a generated shape. But this time, the focus is on more advanced geometry. It involves supershapes transformed into catenoids, the Superformula being used as the energy minimization function of a Wulff shape equation to form a "Constant Anisotropic Mean Curvature" (CAMC)[12], a type of minimal surface that can be interesting to morphogenesis. The resulting shapes will be printed in 3D by rapid prototyping and displayed with the word that served as the material for its evolution. Families of shapes evolve following families of sound characteristics, not because they are visualization of the sound, but because the sound is the seed, the impulse that triggers its evolution. In all of these projects, the idea was to experiment with abstract organic mapping as an alternative to the arbitrary mapping that is often used in biologically inspired art works. Instead of aggressive interaction, a minimal interface with the environment and a slow interrelation helped to place the participant in the role of a natural agent influencing, but not completely determining, the becoming of an autonomous shape.

Conclusion

The study of morphogenesis includes geometric patterns and mechanisms of growth observed in nature. It is a very broad area of research focused on the discovery of the structure of life itself. The combination of Alife, biology, geometry and art can lead to new ways of thinking about natural forms, about the principles at the roots of matter and life, and about the complex interrelations between each part of the complex ecosystem in which we live.

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MANY WITH A MOBILE CAMERAPHONE: THE DEMOCRATIZATION OF DOCUMENTARY?

Richard Vickers

The author is developing a new interactive documentary project entitled 24–hours.in (www.24–hours.in), exploring opportunities for participation and collaboration. The project is currently at the proof of concept stage, and is being discussed as a work in progress, exploring the impact of mobile phones and the potential that these devices, the web and social media may offer for the democratization of documentary production.
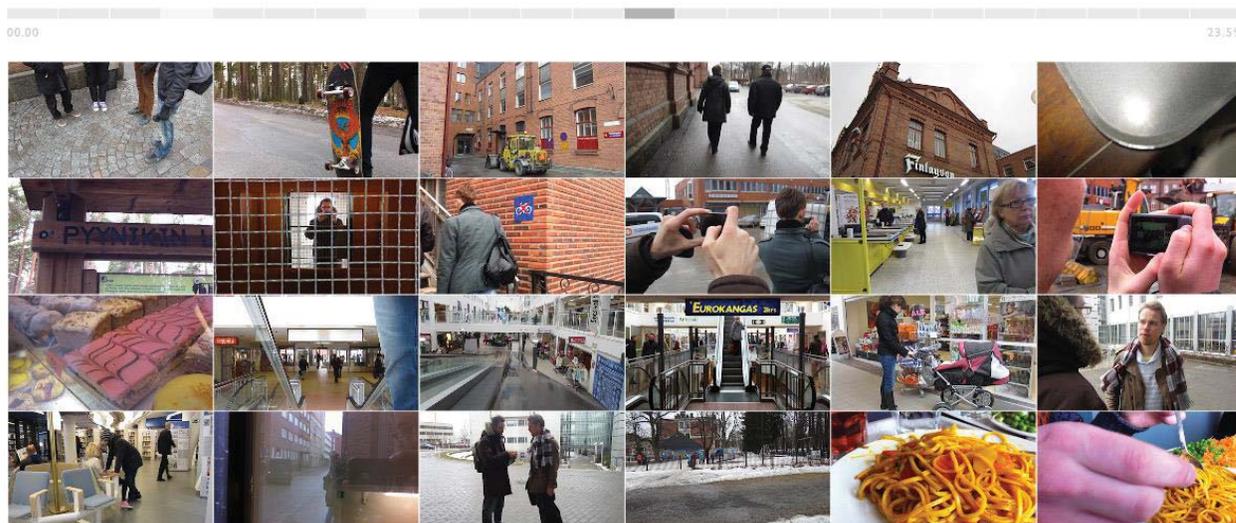

Fig 1. 24–hours.in Tampere main interface, 2011, Richard Vickers & James Field.

Fig 2. 24–hours.in Tampere video content, 2011, Richard Vickers & James Field.

Looking back – defining documentary

Since the invention of photography and consequently cinema, the camera has been used to capture or document reality; actual events that happened at that moment in time, however banal. Nicéphore Niépce, one of the pioneers of photography, pointed his camera out of the window in 1826 to capture what is now the earliest surviving photograph, 'View from the Window at Le Gras.' In 1888 Louis Le Prince captured some brief (2 seconds) but extraordinary footage, 'The Roundhay Garden Scene.' Perhaps the most famous early film, and often mistakenly cited as the first ever motion picture made, is the Lumière brothers 'Workers Leaving the Lumière Factory', 1895.

John Grierson is attributed with coining the term documentary in 1926, when he reviewed Robert Flaherty's film 'Moana.' In 1929 Grierson produced 'Drifters', a silent documentary that tells the story of Britain's herring fishing industry, filming real fishermen out at sea and capturing the reality of the experience. The film contains many of the characteristics that define documentary, particularly the observational style. Drifters was an attempt to create an 'imagist' film in response to the avant-grade 'city symphony' films and to reintroduce socially directed commentary into formalist film (Barson, 2006). Grierson believed that documentary film could change the world, that by increasing social awareness it would contribute to the development of society.

In the same year, Dziga Vertov produced 'Man With a Movie Camera', an outstanding example of avant-garde documentary filmmaking that still resonates today, perhaps even more so than it did at the time. The British Film Institute description of the film says, "Man With a Movie Camera is an extraordinary piece of film-making, a montage of urban Russian life showing the people of the city at work and at play,

and the machines that keep the city going. […] a work that is exhilarating and intellectually brilliant" (BFI, 2000). The film represents 'a day in the life' of the recently established Soviet Union, capturing 'life caught unawares', with the filmmaking process transparent and evident throughout.

Prior to making Man With a Movie camera, Vertov had worked on the 'kino–pravda' newsreel series, a film version of the Pravda newspaper. He believed that the 'kino–eye' or camera 'eye' could not only capture life 'as is', but reveal a deeper level of truth than was normally perceived by the imperfect human eye (Cousins & Macdonald, 2006). With the kino-eye movement Vertov explored a participatory model aiming to move away from the authorship of a single person to mass authorship and a montage vision. Vertov's aspirations for the movement encompassed the democratization not just of technology but also of creativity (Hicks, 2007). Man With a Movie Camera is often cited as the first example of database cinema, long before the database as we understand it today existed. Lev Manovich states that; "Man With a Movie Camera is perhaps the most important example of a database imagination in modern media art" (Manovich, 2001). Drawing a comparison between Vertov's film and the contemporary experience of the web, Seth Feldman suggests:

…the prototype of the net surfer downloading the bits and pieces of fragmented information. Vertov the filmmaker and advocate of mass filmmaking could well be thought of as a pioneer in the building of a system in which millions of people reconstruct fragments. (Feldman, 1999)

1960 was a paradigm-shifting year for documentary, the French anthropologist and filmmaker Jean Rouch, and sociologist Edgar Morin, had access to a prototype Éclair camera that was both highly portable and quiet. They utilized this new technology in the production of the experimental documentary film, 'Chronique d'un été', exploring the lives of ordinary Parisians, 'the strange tribe that lives in Paris', over the summer of 1960. This was the birth of 'cinéma vérité', Brian Winston identifies Chronique d'un été as the key film of the movement, saying:

They tried in some way to guarantee the 'truth' of their own observation because we, the audience, could observe them apparently in the act of observing. (Winston, 2008)

Cinéma vérité had direct lineage to Vertov, the name being a French translation of 'kino-pravda' or cinema-truth. The film that defined the beginning of the movement, Chronique d'un été, can be described as 'life caught unawares' and Jean Rouch said that the film was a homage to Vertov (Roberts, 2001). The new portable cameras gave the filmmakers unprecedented freedom of movement that allowed them to shoot real life and capture reality as never before possible. Intimate and immediate, it was like actually being there, documentary would never be the same again.

Being participatory

The internet, or more specifically the web, has changed the media landscape exponentially over the last decade. The online video sharing platform YouTube, launched in 2005, has fundamentally changed the consumption of media in the 21st century. YouTube established a media environment that not only enabled users to share videos; it also offered an opportunity, in their own words, to "Broadcast Yourself" to a worldwide audience. It is a phenomenal success, the web information company Alexa Internet (www.alexa.com) currently ranks YouTube as the 3rd most visited website in the world, with social network Facebook in 2nd place and search engine Google (who also own YouTube) in 1st place. But the platform for self-expression is not without its critics, Alexandra Juhasz comments:

YouTube allows everyone and anyone (with access to the technologies) to speak about everything and anything they please. I speak, you watch. But without context or community, who cares, and more critically, then what?(Juhasz, 2008)

Interactive documentary is a rapidly evolving field, with participatory projects embracing the opportunities that the internet and social media platforms offer. YouTube's 'Life in a Day' project (http://www.youtube.com/user/lifeinaday) was developed to document a single day, the 24th July 2010, on planet earth. Contributors from around the world were encouraged to capture a glimpse of their life on that day and then upload their video to YouTube for consideration to be included in the final film. YouTube received over 80,000 video clips and some 4,500 hours of footage. Sifting though all the footage and dealing with the multitude of formats, resolutions etc. was a formidable undertaking. The final 95–minute film directed by Kevin Macdonald and produced by Ridley Scott, went on general cinema release earlier this year.

'Man with a Movie: Camera the Global Remake', (http://dziga.perrybard.net/) is an online participatory video project that launched in 2007. Participants around the world were invited to record images interpreting the original script of Vertov's Man With A Movie Camera and then upload them to the website. Software developed specifically for the project archives sequences and streams the submissions as a film. Anyone could contribute footage to become part of a worldwide montage, in Vertov's terms the "decoding of life as it is." Sandra Gaudenzi suggests that:

The participative options of digital media enhance our acting role and therefore allow us to mediate reality in a shape that is more attuned with our way of being in the world. (Gaudenzi, 2011)

Online and social media platforms offer a means for participation, collaboration and distribution or dissemination that was unimaginable even a decade ago. The ubiquitous mobile phone offers the means of production. The first cameraphones were developed in 1997, however resolution and image quality remained fairly low until recently. Improvements in imaging sensors has resulted in a new breed of cameraphone that can record HD (High Definition) Video at 1280 x 780 resolution. Video captured on these devices is impressively good considering the small size of the lens. The mobile phone has become part of the social fabric of 21st century life, nearly everyone will have one with them at all times in a pocket or bag.

The author and Lincoln School of Media colleague James Field are developing a new interactive documentary project entitled 24–hours.in (www.24–hours.in), exploring new opportunities for participation, collaboration and the potential democratization of documentary production. Utilizing user-generated video captured on mobile phones and available devices, the project is participatory whereby the audience contribute documentary videos, around the theme of 24 hours in a city or location; for example 24–hours.in Istanbul or 24–hours.in Tampere.

With reference to Dziga Vertov's 'Man with a Movie Camera' and the concept of capturing life 'as is', the aim is for the user-generated videos to document the cities, the people that live there and their daily lives. Building on Vertovian concepts, the project explores the potential that the ubiquitous cameraphone 'eye' may offer for a unique and cumulative vision of truth to emerge. Moving beyond the participation model, the project will build up a database of location specific documentary material and aim to create a new system for collaborative documentary production and user-curated content.

24–HOURS.IN TAMPERE – AN INTERACTIVE DOCUMENTARY

In April 2011, the author attended the Tampere Art Factory International Week, hosted by TAMK School of Arts & Media, Tampere University of Applied Sciences, Tampere, Finland. During the international week he ran an interactive documentary workshop, working with students from TAMK to produce a prototype 'proof of concept', a collaborative, participatory, experimental documentary project centered on 24–hours in Tampere. The aim was to document the city of Tampere, with reference to (but not recreating) Vertov's 'Man with a Movie Camera'. The workshop participants were encouraged to embrace Vertov's pioneering avant-garde approach to filmmaking, using cameraphones to capture 'life caught unawares.'

The workshop began with a briefing on the technologies that would be utilized, a discussion on good practice and principles of using mobile devices for filming, screenings of interactive documentaries and Vertovs Man With a Movie Camera. Interestingly the students were aware of the film but hadn't actually seen it, they found the film striking and it is testament to the outstanding qualities of the film that it still resonates today. An important consideration was file size and bandwidth, video = data, 1 second of iPhone HD (1280x720) video = 1.3MB, so there was a requirement to keep the video clips relatively short. The participants were therefore encouraged to keep individual shots or scenes short, with the proviso that they could add lots to the database, one shot per minute over 24 hours would equate to 1440 shots. Adobe Flash Media Encoder was used to compress and encode the videos for online delivery in the FLV/F4V format.

For the prototype developed in Tampere the process of encoding and adding to the online database was laborious and time consuming. Using Adobe Media Encoder, each individual video clip was encoded and optimized for delivery over the internet, also for each clip a JPG image file was created for display in the main interface. All clips were uploaded via FTP to the project directory and a database entry made detailing the author of the video and importantly the time using the 24–hour clock. The process is best summarized with the mantra: Edit > Encode > Upload > Add to Database, seemingly ad infinitum.

The project is available online at http://www.24–hours.in, using Adobe Flash as the delivery platform. The main interface is a grid of 24 images, each one representing an individual video clip for that time within the 24–hour clock. Visible above the grid of still images (Figure 1) is a line of 24 blocks each giving the user a shortcut navigation to the 24 individual hours in the 24–hour period. Clicking on one of the images plays the linked video clip, there is a simple transition between the grid display and the video playing, the author of the video and the time are displayed in the lower left hand corner below the video clip. Clicking on the video as it plays will close that clip and return to the main interface, the still image from the video that was playing forms the first image of the 24 displayed. If the user does not close the video, the next clip chronologically plays and will continue playing through all the clips.

Once a video is selected and plays, the timeline visible above the video alters from the 24 block system to a more representational timeline (Figure 2), indicating where video content is available during the timeframe. Bunching of content is apparent at key times. The user can use the timeline to navigate between clips and time in a non-linear fashion.

Capturing scenes of life as the city awoke from the long Finnish winter; the cleaning of the streets, the simple pleasure of going for lunch, the political elections: 24–hours in Tampere offers a fascinating insight into everyday life in the city. One of the contributors to 24–hours.in Tampere commented: "After the first few shooting hours it became like an addiction. You begin to see everything not with your eyes, but with the video camera lens. Every minute scanning through buildings, people, events to find some perfect shots that could be interesting for the person sitting at the other side of the screen somewhere far away..."

The project is in further development to automate the process of encoding the video clips and currently focused on the implementation of FFmpeg on the server to convert and encode video on the fly. HTML 5 video will be utilized to offer a full cross-platform experience without the need for plugins. Other features that are being explored are key word searching and sorting for the clips and attempts to exploit geolocation data. It is intended that the project will roll out on an international basis later this year, adding 24-hours.in locations to offer a fascinating insight into 21st century life around the world.

Conclusion

During the past year we have seen mobile phones, the internet and social media platforms contribute to revolutions for social and political change in the Arab world, known as the 'Arab Spring.' Mobile phones were used to capture events as they happened and the power of the internet and social networks harnessed to circumvent the traditional media platforms that were controlled and censored by the state. The collective use of technology empowered the people to progress an agenda for democratic reform, in some instances accomplishing complete regime change that many had only dreamt of years.

Armed with our ubiquitous mobile devices and cameraphones we all have the potential to document everyday reality and ordinary life as we wander the city. We can capture the nuances of the vernacular, regardless of how banal or seemingly unimportant they may seem at the time, for posterity and digital eternity. Used collaboratively to capture unique moments, cameraphones can give us a window on the world, and as time goes by, a window on the past. Pervasive mobile phones and smart devices offer an unprecedented opportunity for the democratization of documentary production. These devices are in the hands of the many, with the potential for a collaborative and cumulative vision of truth about humanity and life in the 21st century to emerge.

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SELF-TRACKERS: WHY DO THEY PREFER THE SPREADSHEET TO THE SOFA?

Stephanie Vidal

With their smartphone, self-trackers log daily chosen parameters. Being the experiment and the experimenter of their own laboratory, they live a « data-driven » life. Based on numbers, self-tracking is seen as an alternative to psychoanalysis for reaching the self. Trackers mistrust words which they find too limited and prefer to rely on spreadsheet than to lay on sofa.
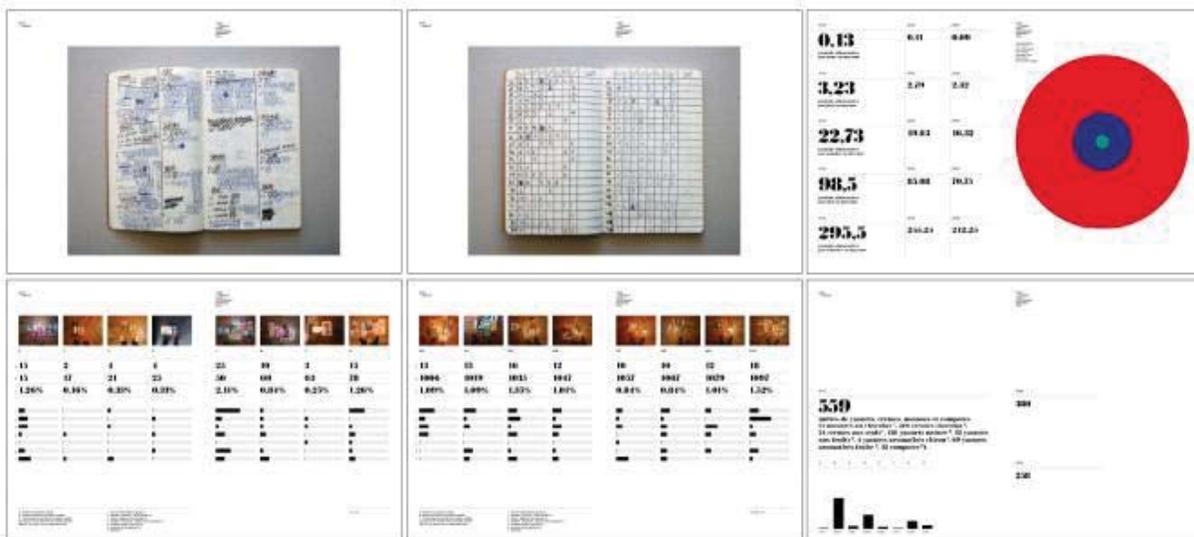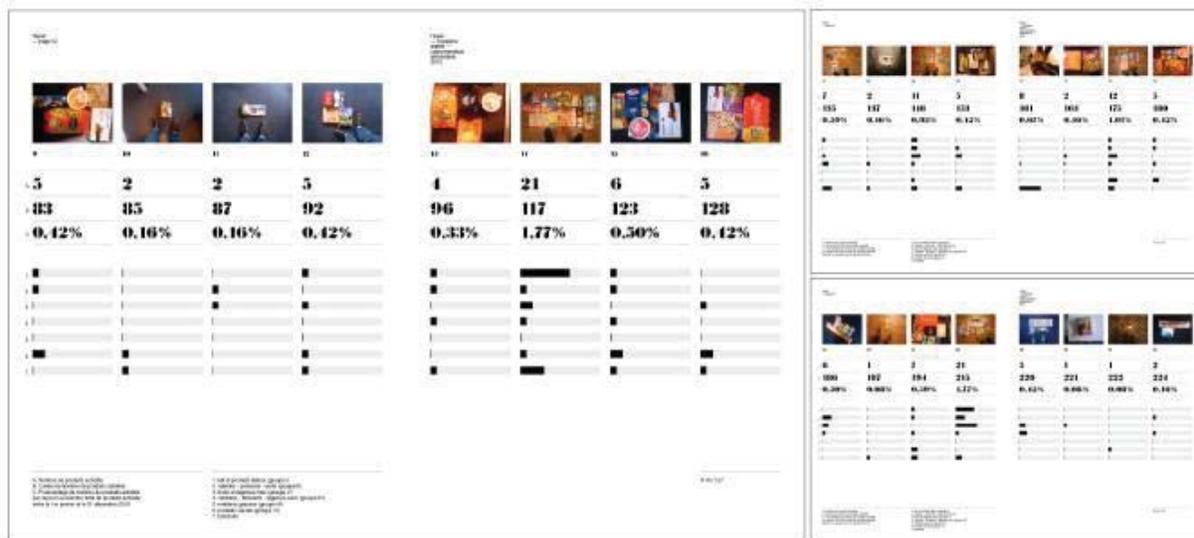
Hyper, 2010, Florent Guerlain.

A world in Numbers

"Personal Note. 11:15, restate my assumptions: 1. Mathematics is the language of nature. 2. Everything around us can be represented and understood through numbers. 3. If you graph these numbers, patterns emerge. Therefore: There are patterns everywhere in nature." says Maximilan Cohen, number theorist and main character of π, a Darren Aronofsky's movie released in 1998.

From Pythagoras to Descartes, from Kant to Poincaré, philosophy comes with the paradigm that our world is run by invisible numbers and mathematical equations. Nowadays this assumption is deeply established in the mainstream culture and embodied in scientific, business and even artistic projects. Artists choose data as raw material, traders use algorithms, some physicists visualize imperceptible particles while others—among them bestselling author, Brian Greene—seek after a unique and elegant equation to explain the entire universe.

Numbers and data streams are everywhere and can be easily collected, analyzed and visualized. Computational technologies we use everyday and everywhere from labs to personal desktops—even the smartphones in our pockets—were originally built to compute. Self-trackers are people who use those technologies to count and quantify themselves. They want to acquire a better understanding of themself through self-experimentation in an innovative way that decreases human sources of vagueness. Their common assumption is if nature can be understood in a mathematical way, why can't human beings as well?

As a new practice at the crossroads of technology, digital humanities and art, self-tracking aims to better understand behaviors by finding hidden patterns in daily routine. Self-trackers believe in the truth of numbers more than in the power of storytelling. That is why they use self-tracking as a way to reach the self, an alternative method they consider even better than psychoanalysis. Moreover, some of them use self-tracking in a political gesture, wishing to empower with numbers.

This article aims to present this practice and to show how new contemporary behaviors, that bet on mathematical language and on digital equipments, redefine or redesign established concepts. Self-trackers can be seen as an extreme example of the presence of data in human life. The premises and methods of self-tracking challenge the notions on humanity and society as well as the ways to study humanity in the attention and information age.

The Geek Diary

Self-trackers are people who gather, analyze and share their own data. They log chosen parameters—reporting on work, sports or sexual achievements, measuring and monitoring mood, food, health or finances—to develop a personal project.

Each tracker works out his proper methods. Even if they know what they are seeking at the start of theirs adventures, they are generally surprised what they find. Some are artists, others scientists, but most of the time they are just curious.

Self-tracking is already a massive trend, growing daily. Community sizes vary from hundreds (Me-trics) to thousands (YFD, Daytum) to billions (Runkeeper) of members depending on the parameters they focus on and the tools they use to monitor themselves. Tools and applications are fundamental; they allow personal logs and create the communities.

Self-tracking is conceived as a geek version of a diary where words are replaced by numbers and paper by digital spreadsheets. Self-tracking starts with a life-logging to begin gathering their data. Leading a kind of anthropological study of which they are the subject; they are looking for self-knowledge and personal insights through imponderability.

Used for the first time by Bronislaw Malinowski, imponderability is defined in his book Argonauts of the Western Pacific as "a series of phenomena of great importance which cannot possibly be recorded by questioning or computing documents, but have to be observed in their full actuality (…) such things as the routine of a man's working day, the details of his care of the body, of the manner of taking food and preparing it…." That imponderability are precisely what trackers are looking for and recording thanks to personal devices that did not exist yet in 1984.

Memory Tools

My Life bits, the Gordon Bell's project can be seen as an extreme example of life-logging. It aspires to be an exhaustive recording of his life thanks to several devices that save everything about him. He wears a microphone that keeps all his conversations and a special camera that takes pictures each time there is a change of light in his environment. And all of his physical and digital activities are saved, as are his movements and his web navigations.

The logging process is fundamental for self-tracking; it is the first step to create the appropriate development of the procedure. Trackers note what could be seen as humdrum and insignificant moments, keeping them in external storages. Machines, in opposition to human beings, are not subject to memory distortion or oblivion.

Even if self-tracking is based on life-logging, the example of Gordon Bell gives rise to the differences between these two practices: self-trackers only track the parameters they have chosen, finding them relevant for their personal research. Life-logging and self-tracking diverge in their final goals: the first only cares about saving traces and the second wants to make sense of them. By both leaning and relying on technological devices, they give their equipment the status of memory tools.

If some cases of self-tracking has have been noticed before, the trivialization and ubiquity of technological devices makes the process now easier. Trackers still crave for more automation of the gathering process and crave for digital devices called sensors to elude the manual log. They would save and send the information directly to the analysis softwares. They would seek to make the logging phase less time-consuming and to decrease the rate of human errors in the process.

Transforming daily routine into quantifiable facts the trackers paraphernalia is made of personal devices

that are used as scientific instruments. Iphones and Androids, always in the pocket of a self-tracker, enable precision and repetition of experiments that suits this continuous and rigorous process. Smartphones are at the core of self-tracking. Thanks to them, trackers upload and share their data anytime, anywhere, using specialized social platforms. Those platforms such as YourFlowingData or Daytum generate the graphical representation of the collected data that lead to their analysis.

Daytum was created by the designer Nicholas Felton, also called Feltron, famous for its Annual Report. Edited each year, using various concepts, patterns and datasets, the Feltron's Annual Report is a graphic and statistic review of the artist past twelve months.

He started to self-track to produce innovative designs using his own data as free and endless raw material. The young designer, Florent Guerlain, works in the same way making artwork out of his everyday food consumption. The project called Hyper, started 3 years ago, is still running today (Fig 1 and Fig 2).

The Life Lab

For both designers, self-knowledge through numbers was not the initial goal of their data practice. However they have come to learn funny things about themselves and would not stop collecting data. Data become a material for personal investigation, artistic creation and self-knowledge production.

Trackers tend to grasp their imponderability and to weight it, studying data streams they have composed. Translating their tastes and behaviors in lists of numbers, they develop a rational process to reach the hidden order that secretly drives their self.

"For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask," says Gary Wolf, editor of the magazine Wired and co-founder with Kevin Kelly of the website Quantified Self. Being the experiment and the experimenter of their own laboratory, self-trackers' life is a daily "data-driven" exploration.

Extracting meaning out of data, sharing and confronting results, a self-trackers' first will is "self-knowledge through numbers," which is also the motto of Quantified Self. They implement a scientific method to curiosity. Self-exploration intends to make sense out of daily routines and transforms non-factual things into meaningful insights. Self-trackers often confront several parameters—like their coffee consumption and their work productivity—to observe if parameters they feel correlate are truly linked. Often numbers disabuse their intuitions.

Spreadsheet versus sofa

Numbers versus intuitions, statistics versus memorabilia, spreadsheet versus sofa: self-tracking is all about that! Self-trackers consider that numbers fit better than words to access the personality core and to reveal patterns hidden between habits. That is why they prefer the spreadsheet to the sofa.

The mathematical language was once based on the verbal one. Then it became more and more complex

and needed to develop its own and separate form. Its history is—to use critic Georges Steiner's words— *the history of a progressive* untranslatability. Since the separation of verbal and numerical language, experience and reality perception have been separated in two aesthetic vision. In *The retreat from the word* Steiner explains that some phenomenons like time-space continuum or relativity theory have been conceptualized *outside* verbal language. Expressed through words they look like "animated fictions". Does the world can be better understood with numbers than with words ? Do they express and reveal the true nature of the universe as world never would? Trackers do not work with difficult equation to explain the world mysteries, they tend to understand their own complexity with simple numbers. They do not spend their life in a scientific laboratory, they are the laboratory. The trackers proclaim and mainstreamize the mathematical language triumph over the word one with their practice.

As they use machines to compensate for what human memory lacks, they too find in numbers the solution to words' failures. Indeed, with self-tracking all spoken language is globally criticized as an obsolete and incompetent system for efficient self-investigation. As psychoanalysis is based on verb, memory and storytelling, we can understand the self-trackers reluctance to subscribe to it.

Trackers upbraid verbal language for several reasons: its linearity and length, its lack of objectivity and expressiveness, its propensity for misunderstanding, its possibility of lying and the impossibility to communicate to whom who do not know this particular code—like people who do not understand a particular language or even animals or plants that are not equipped with sensors.

Seen as biased and incomplete, verbal method is avoided during the gathering and analyzing process. Even if trackers agree that psychoanalysis might help to find troubles that influence mood, they believe that it does not offer solutions as data analysis can. Trackers want to be able to modify their comportments in order to experiment with it directly.

Moreover, they think that people can lie or feel uncomfortable lying on a sofa, talking to a psychoanalyst. Arguing that it is also possible to lie to a machine, trackers answer that there is no personal interest to do so. Machine's main strength is they do not lie or please. Charts guarantee to obtain objective and trustful results.

In this system, the disappearance of human interactions during the process seems to grant a better knowledge of human behavior. But human interactions are not totally eclipsed. They come later when trackers present their methods and results to their community during meetings or let them accessible on social platforms.

Form Collective Intelligence to Collected Consciousness?

Even if the goal of self-tracking is not to figure out mankind in general, it is about finding personal comfort in everyday situations; trackers sometimes contribute to collective events, sharing their data and method to go further.

Sometimes they get along and collaborate on wider projects—most of them are dealing with medical care or emotions tracking—putting their results into a common conversation. On websites like curetogether.com, founded by Alexandra Carmichael, sick people can track their vital parameters and

join together to study their illness. She gives an example of patients affected by amyotrophic lateralsclerosis (ALS) who decided to observe the effect of lithium on their health state. Even if the results were not conclusive, a study seldom involves so many patients for so little time and money.

If data can be used for good, we are yet to discover the potential of these personal datasets. This information can have different use once available on a network. It brings up questions: who has access to personal data, why and what for but also what is considered now as personal data? Indeed, the notion of personal data seems to overtake its juridical definition.

Personal data is not limited to that which allows the identification of human beings, but extends to things that contribute, once viewed together, to build or reveal identity. In this understanding, personal data is not only what people produce or interact with, but also what they decided to gather as an extension of their self. Personal data is then contextual, earning its status by the individual and through the voluntary process of saving. This is perhaps why a data set on coffee consumption or a list of books can reach the status of personal data.

No one likes to lose the content of their hard-drives containing music, pictures, and texts and such. In this way the Collectif 1.0.3 uses the content of personal hard drives to shape digital portraits and Michele Gauler keeps memories of dead people compiling their data in storages that are, at the same time, the material proof of their legacy and everlasting presence.

As we absorb external content to transform it into personal data, we also leave traces of our path everywhere we go in the digital world. Sometimes, like trackers, we digitalize them on purpose, and sometimes we even forget that we do so. In their bachelors thesis called ~IDENTITÄT – The »Gestalt« of digital identity, Jonas Loh & Steffen Fiedler have created sculptures that represent the digital identities of people based on their activities on cultural and communicational websites. Here is a relevant insight into 21st Century society: there are no longer innocent surfaces today.

Information can now be considered as a value and so is attention. In our digitalized society, time is precious and information is massively available and recordable. Our behavior seems to mimic managerial and scientific methods: find what is profitable and, thanks to software, extrude meaningful results out of it. The culturonomics, the study of culture through the amount of digitalized books, can be seen as an other example of this trend. Books are not read anymore, but the words they contain are transformed into data to shape a diagrammatic portrait of our culture. Perhaps the social paradigm shifts following this move. From words to numbers, from information to attention; people seem to progressively abandon privacy for self-attention, sofa for spreadsheet, imponderability and memorabilia for digitalized and quantified facts.

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CAPTURING DANCE AND CHOREOTOPOGRAPHY: ANALYZING AND VISUALIZING COMPLEXITY

Kim Vincs

Motion capture provides 'snapshots' of the complexity of movement patterning. This presentation explores both the power and limitations of quantitative motion capture analysis, drawing on *Capturing Dance*, a three-year collaboration with mathematician Vicky Mak-Hau and biomechanist Richard Smith at the Deakin Motion.Lab in Melbourne, Australia, and on the live motion capture / 3D performance *Choreotopography*.

Fig 1. Velocity Engine / IK Dancer, Deakin Motion.Lab, 2011. Performer: May Yen Cheah, Interface: Peter Divers and John McCormick, Image: Kim Vincs.

Fig 2. Choreotopography, Deakin Motion.Lab, 2010. Performer: Sakura Shimizu, Choreography: Kim Vincs, Motion Graphics: Daniel Skovli.

The allure of motion capture for dance is that it can record the three-dimensional trajectory of movement in precise detail. However, dance is conceptual as much as it is physical, and dance movement only becomes meaningful via the artistically and culturally specific frames of reference that underpin its construction and interpretation. In this paper, I want to explore how motion capture analysis can potentially illuminate and drive creative processes in dance. However, understanding what is artistically meaningful

in motion capture data depends on an examination of the ontology of dance movement itself, and how that ontology both intersects and conflicts with quantitative analysis. In the *Capturing Dance* project, a three-year collaboration with mathematician Vicky Mak-Hau and biomechanist Richard Smith at the Deakin Motion.Lab in Melbourne, Australia supported by the Australian Research Council Discovery program (DP0987101), a team of artists and scientists came together to explore quantitative analysis of dance style using motion capture. This paper discusses the approaches the project has explored to date, as well as the studio-based and performance processes that have emerged as a response to the reductionism inherent in quantitative motion capture analysis.

I find motion capture data compelling because when I watch a marker cloud cross a screen, I see the traces of movement trajectories that are otherwise only accessible to me as abstractions – as what I thought I did and/or what I would have liked to have done. The possibility of accessing my movement, or another dancer's movement, in a way that doesn't immediately disappear, but can be replayed and watched over again, from any angle in a 3D volume, allows me the possibility of savouring a movement pathway in a way that is not possible when watching or performing a movement in real time.

Motion capture gives me a spatial and temporal perceptive mode in which to experience movement that is quite unlike the flat plane that comes back to me from video or mirror, but also qualitatively different from watching dance movement in 'real' time and space. The power of motion capture data is to visualize lines of movement from multiple, moving vantage points within a three dimensional volume. The ability of the virtual 3D in-computer world to let me spin the volume around, as if myself flying and swooping through space to better view and understand the movement I am watching, has the effect of allowing me access to the vantage point of a co-dancer. I can perceive the movement while 'moving' myself, as if I were dancing with the image, but this 'movement' allows me a spatiality that is free from gravity and physics, so that I can move in much faster and more extreme ways through the volume with my mouse and eyes than I could possibly hope to do in the flesh.

I am tempted to think that perhaps the dream of contemporary dance to de-hierachize the body, in its conventional standing, gesturing, speaking subjectivity, is stretched to its extreme limit in the potentially stomach-churning flying and falling pathways I can take as a viewer of motion capture data navigating a virtual volume. Laurence Louppe has argued that one of the key projects of contemporary dance has been a process by which the zones of the body associated with the semic and with power were "…caught up in a great reversal, a great work to de-hierarchize the role of the limbs: beginning with the head – at least as the support for the face which was no longer to be the imperial and immovable throne of expression, meaning or utterance." [1] Motion capture data, in its raw form of marker trajectory in *x, y, z* space, takes this deconstruction to its limit. Marker data may be named (e.g. top head, right wrist, etc.), but its movement is not yet defined by the hierarchy of the skeleton. In the visual apprehension of marker data moving, marker names are only significant in that they indicate a functioning software template. It is marker movement and the creative interpretation of the negative space between them that affords meaning, rather than anatomically determined relationships between markers.

The eye, in the sense of its dominating scopic perspective, has no privilege in a motion capture-enabled environment. The eye's habitual ways of conceptualizing bodies are displaced by motion capture, which is not so much more accurate, as differently accurate, organized via designated points (markers) and trajectories, rather than by lines and surfaces. Marker data, as well as being de-hierarchized, is semantically blind. A raw marker trajectory does not 'know' that it is part of a system. It is simply a record of where a particular point on the surface of the body travelled, and at what speed. No specific marker is more important than any other. The fact that the significance of marker data trajectories is not predicated on

their place within a skeletal organization of the body allows me to think differently about what those trajectories could be. The fact that naming, in this geospatial discourse, is relegated to an instrumental task, appeals to me as a reversal of the more usual epistemological situation in which naming reduces action to an instrumental rather than an investigative role.

The semantic blindness of motion capture data enables quantitative analyses that are independent of the artistic and cultural contexts of dance movements. Mathematical analysis of motion capture data effectively deterritorializes dance, to use Deleuzian terms, [2] because it looks for what is statistically significant rather than what is culturally significant. In our project, we began by applying Principal Component Analysis, a common statistical tool that compresses large data sets into fewer dimensions based on the strongest correlations between parameters, to see whether we could quantify the stylistic relationships embedded in motion capture data of contemporary dance movement phrases. The complexity of the principal components we identified was a revelation in terms of the disjuncture between what we might perceive as artists as key to the movement, and what is statistically significant in terms of the strength of the correlations in the data. Minute, complex interactions between relatively small and seemingly unrelated body segments, such as right mid-foot and centre-head, left thumb-base and right elbow, for example, characterized the analysis, and defied any attempt to derive information that could easily be used by artists in the studio.

A further revelation was the complexity of the movement analysis itself. In biomechanical applications such as gait analysis, most of the variability in the sample is usually accounted for by a relatively small number of principal components, typically $1 - 3$, which can then be used as surrogate for the whole. In our analysis, around 30 principal components were needed to account for 98% of the variation in the movement data, making any easy interpretation of such analysis out of the question. Vicky Mak-Hau's comparison of multiple classification methods, [3] which so far includes PCA, KNN nearest neighbor, Linear Discrimination Analysis, and Hyperplane, Hyperspheric and Hypersphere SVM methods, has produced recognition rates for specific movement phrases of over 99%. These results represent a major achievement in complex movement recognition, and have key applications in data retrieval, verification of movement style, and documentation. However, the mathematical basis of even basic PCA analysis, let alone the more complex data mining techniques needed to achieve reliable recognition rates, is too abstract to provide an intuitive tool that can be used by artists working in a studio.

This discovery led us to trial a number of more studio-based approaches, alongside the mathematical analyses. Firstly, we looked at marker cloud comparison as a rehearsal tool. Allowing a group of dancers to view their motion capture data projected within the studio in real time enabled us to develop a process whereby dancers and choreographer could work together to identify variations in style. The dancers and choreographer worked on a short piece of movement that needed to be performed in unison, yet was difficult to synchronize because it relied on small, idiosyncratic torso and arm movements. We found that being able to focus on specific markers helped to identify where and how the nuanced variations were produced. However, we were also able to view the whole marker cloud moving at once, so that information from the whole body's movement remained embedded in the representation. Because the data was visualized as raw marker movement, we were able to work directly with the trajectories and dynamics of the movement pathways without translating these into words or images. Of course there was talking, and a certain amount of 'naming'. However, the primary discourse was accomplished in terms of the three-dimensional trajectories themselves – a spatio-temporal rather than a linguistic discourse.

After the fact, we were able to apply different marker analyses to look at what had shifted in different dancers' performances. These 'after analyses' functioned in the same way as reductionist scientific methodologies in identifying specific movement variables of interest – in this case, the patterning of mid-back, hip and shoulder movement. However, a key advantage for the creative process was that we were able to do this retrospectively, and therefore without narrowing the exploratory and emergent nature of the dancers' processes in the studio.

Following the idea of marker trajectory as a primary mode of conceptualising movement, we developed another technique we called the 'IK dancer'. In 3D animation, an inverse kinematic (IK) effector moves a point on a character's skeleton, and the software solve engine determines a combination of joint actions to achieve the end position. We began to think of dancing as a living solve engine process that could be led by any marker functioning as an effector. We built a real-time program, created in the Unity game engine by John McCormick and Peter Divers, to visualize different markers and dynamic properties in real-time, such as top head velocity and acceleration. We used the real-time feedback from our 'velocity engine' to experiment with different movement aims, e.g. maximize top head acceleration in a jump. This process opened up for us a world of possibilities in movement exploration because it gave us access to marker data in a visualized space that we could record and examine in three dimensions, and in terms of movement *dynamic*, i.e. velocity and acceleration. While verbal language can specify positional instructions such as 'take your right hand and move it directly upwards until it reaches shoulder height and then circle it outwards through 90 degrees,' it cannot specify movement dynamics – velocity and acceleration – with the same precision. For example, an instruction to accelerate your hand 'quickly up and then slowly across' is indeterminate in quantity and direction. An instruction like this only aquires precision through physical demonstration. Our velocity engine gave us representational access to the dynamics of body trajectories in three dimensional space, enabling us to record, experiment with and manipulate the dynamic information contained in the marker kinematics.

A key aspect of both of these in-studio processes is that, because they focused on marker trajectories, the information the dancers worked with was not dependent on the hierarchy of the skeleton. This is not to say, of course, that the dancers moved without the physical support of their actual skeletons, but rather to emphasie that movement need not be conceptualized in skeletal terms. In this sense, our processes are aligned with Louppe's 'dehierachizing' agenda of contemporary dance, [4] and more broadly, with a Deleuzian deterritorialization of the body that opens new possibilities for movement exploration. [5] Deterritorialization is, in a sense, the opposite of (or perhaps, in a Deleuzian framework, outside to) quantitative analysis in scientific contexts. Analysis has as its goal the identification of key parameters and structural features of datasets that are repeatable, definitive and predictive. The goal of deterritorialization, on the other hand, is to create the possibility of new and constantly evolving ways of connecting information, which is more consistent with the aims of artistic processes.

We took a further deterritorializing step by visualizing our motion capture data in performance using 3D stereoprojection. In *Choreotopography,* [6] we streamed motion capture data from four dancers into three dimensional motion graphics environments created in the Unity game engine, which were projected around the dancers in stereo and viewed by the audience through 3D glasses. We wanted to remove the data not only from its hierarchical/skeletal context, but also from its direct relationship to the dancer's physical bodies. Ruth Gibson, who creates motion capture and game-based environments, articulates the desire to "…translate live-ness into the virtual world, that is individual qualities, authenticity of capture, weight and gravity." [7] We wanted to deterritorialize live-ness by extending it beyond the confines of the dancers' bodies. We wanted to create an illusion of virtual force, as Suzanne Langer

[8] described it, through visualizing dancers' weight, trajectory and force via the kinematics of marker data, and distribute this illusion throughout a performance space.

Creating this visualization using 3D projection allowed the kinematics to escape the two-dimensional plane of a projection screen and access the 'z axis' – towards and away. We used a variety of approaches to visualize 'lines of force' in the motion capture data, including a 'flocking' protocol in which virtual stars followed the dancers' positions in space, an undulating mosaic pattern that was disturbed by the dancers' spatial incursions, and flying cloth simulations that followed dancers' wrist movement. We also created non-interactive environments in which the trajectories of the dancers' movements were framed and complemented by moving 3D 'architecture' such as a series of huge 'blocks' that moved inexorably forward over the performers, and a moving 'infinity field' of particles streaming away from the dancers towards a vanishing point beyond the screen plane.

In addressing what is, or could be artistically and culturally meaningful for dance in motion capture data, *Choreotopography* took an extreme deterritorializing path, extracting the kinematics of dance movement from the hierarchical semantics of the structure of the body, and extrapolating them across volume as well as area through the creation of a live/stereoscopic spatial 'grammar'. In doing so, *Choreotopography*was a means of embracing and even magnifying the complexity of dance motion capture data. The semantically blind, highly abstracted space of mathematical analysis represents different approach that enables precise classification of motion capture data, but at the expense of artistic and cultural valence. These two approaches define a domain within which different kinds of motion capture analysis can address both quantitative and artistic/cultural questions about dance. The challenge is perhaps to more closely link the two approaches, and to build more nuanced bridges between the scientific and artistic ontologies involved.

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FASHION HACKING AS SHAPESHIFTING

Otto von Busch

Fashion hacking is a practice where fashion is reverse engineered and tuned to make users "fashionable", using social media to expand transversal tactics in order to reprogram and shapeshift fashion codes. Other traits address the shamanistic rituality of fashion and how participatory practices can expand the realm of fashion beyond the catwalk and ready-to-wear paradigm. Can technologies express the mythical beauty of fashion?

Fashion is transformation. It is a promise of becoming, a vessel of shapeshifting, a craft with which we can navigate across the currents of the social. Fashion is a medium of transgression from this world into the Other; from the world of flesh to the world of imagination and desire. We use fashion to become ourselves, more or better than before. To journey through the realms of imagination is to use the "technologies of the self", the operations of guiding the process of individuation; the formation of body and soul, matter and mind (Martin *et al* 1988). Yet in this text, the focus is not on the struggle between subject and power, but on the techniques which transmorph flesh to desire and reason to the imaginary. We should explore how the mythopoetic and magical consciousness of fashion help us shapeshift in the realm of the social.

Such magical approach displaces this perspective on fashion a little beside the ordinary academic perspective, which is usually withdrawn and secular. This para-academic position will aim at coming closer to the magical properties of fashion to better see its mystical workings. This would mean to not primarily focus on the secular and comparative "religious studies" of fashion, but rather the engage with the belief culture itself, or the "theology" of fashion (von Busch 2008). Whereas the Scientific Revolution and Enlightment strived to establish the order of a withdrawn and objective "science of reason", we must, like shamans and alchemists, seriously consider a "science of imagination" (Harpur 2002). Such perspective, taking an unsettling risk of sounding like new age mysticism, might offer us another understanding of how to hack into the inner esoteric workings of fashion rather than stay on the secular surface of style.

To seriously take up a "science of imagination" could resonate well with the resent attempts to establish a methodology for *artistic research* (cf Biggs & Karlsson 2011). Where reason traditionally deals with the actual and analytical, imagination deals with the possible and associative, or even virtual, visionary and holistic. This world of imagination should not be seen as the opposite of the real, or something fictional, but rather it is at the core of human existence and an extension of the real. While still only embracing the mind of imagination, philosopher Jean Paul Sartre puts it like this; "Imagination is an activity in which human individuals create and recreate the essence of their being, making themselves what they were, are and will become." (Sartre 1972: xx)

Already here we should notice how imagination is not limited in time, to the here and now, but works with an extended moment of relatedness. This world of imagination is a shared social world, including what was and what will become. It is a world of rituals and liturgical protocols. Like a masquerade, imag-

ination is not there to hide us from each other, but to bring us closer to each other: not too unlike fashion. But the shared imagination is also highly material as it is transsubstatiated as a shared manifestation of mind and matter. It is an alter-reality and, according to anthropologist Susan Greenwood, operating is this reality requires a "change in the *mode* of consciousness" to an associative "not only, but also" perception of the world in order to be rendered sensible (Greenwood 2009: 149). To see these associative and sensual patterns we need to don a "magical consciousness" and undo the Cartesian split between spirit can body, mind and matter, magic and science (Greenwood 2009: 4). This would challenge the researcher to train an associative sensibility to better trace what Gregory Bateson called "the flow of relatedness" (Samuel 1990).

We could put fashion somewhere along the axis between magic and science to unravel some of its properties that relate to the technologies of the self, and it is through this dimension we might easier spot the connection fashion has with art. To use the words of Paul Klee: "art does not reproduce the visible; rather, it makes visible" (Klee 1919: 28). In a similar vein, if we consider fashion as something of a religion of consumer society, we should investigate how fashion makes this spirituality visible. Yet, we should not take the mechanisms provided by the fashion industry as our only operational tools, but rather we will need to hack into the mythical properties of fashion. We need to reverse engineer the forces and processes at play and use the hack as a "trickery and manipulation of a system" (Cramer 2003) into the spiritual technologies of fashion.

The system of fashion is a *perpetuum mobile*, a machine in perpetual motion propelled by a "self-feeding, self-sustaining, self-propelling and self-invigorating process" (Bauman 2010: 55). When we are in fashion we manage to synchronize our technologies of the self with the workings of this *futuring apparatus*. Like a magic machine of light, fashion renders our prospective selves visible and radiantly bright. In this way, fashion is a spirited prism or kaleidoscope which helps us see beyond our doom of flesh, or a bonfire guiding our lost ships to the shining lands. Or as put in the movie *The Devil wears Prada*: it is a "beacon of hope".

The technologies of the self help us navigate the continuum between our world of flesh and the Other, or Imaginary. Or rather; they are technologies which help us see how our world is just a fraction of the Other, an ephemeral passage in a vast ocean of the Imaginary. What we consider the world of reason is the mere shadow of the Other. By wearing the skin of an animal the Shaman becomes the spirit of that *spiritus famailiarii*, using rituals to shapeshift through the passages between this world and the Other. Shapeshifting is one of the many means of travelling from the world of flesh, the world of reason, through the obscure passages of the Imaginary. The skin does not reproduce the animal, the skin renders the spiritual passage of the shaman visible. "Skin-shedding is a variation, rich in metaphor, for shape-changing; for it tells us, among other things, that there is only the softest, mistiest skin between this world and the Other." (Harpur 2002: 16)

Shapeshifting is just one aspect of how to take on journeys through the "daimonic reality" (Harpur 2002) of imagination. It is part of what we can call the *occulture of fashion*, where perhaps the most important asset of fashion is its cathartic character. It is a vehicle of purification, a spiritual craft, both a vessel and ability. In its promise of transformation it is a way of leaving the sickness of time behind, of changing one skin for another, one reality for a new for modes of existence. Just like in the movie *The Craft*, where four teenage girls embrace magic to navigate the strained juvenile and transitional angst, it is a period and position of *in-between*, and a balance on a blades edge. This twilight zone puts attention to the *inter-esse* or the in-between explored by Dutch philosopher Henk Oosterling (Oosterling 2009; Oosterling & Ziarek 2011) where modes of symbiotic integration replace the Cartesian atomization and

mechanization of awareness and analysis. As Oosterling notices, to design is to *dasein*, to be in-between, at the inter-being.

The shapeshifting offered by fashion is ephemeral. The combustion of the now, fuelled by desire, is the power that bursts apart the moment to move into the next. In the continuum of time, the continuous shifting character of fashion leaves it active in the time of *Kairos*, of the moment, rather than in *Chronos*, the continuation of time. Fashion is indeed a fleeting moment, a passion, and it helps us escape the chronically actualized suffering of the prolonged persistent. Fashion is the technology of transformation, fuelled by the current of kairos, which makes travel to the Other possible.

Indeed, today we live in times where kairos is at the heart of everyday passion, where cheap fashion allows our everyday with instant gratification, impulsive change and desire permeates our lives. A desire for that next Other moment, the craving, desire, coveting, or that promising daimonic reality we simply wish for.

To be in fashion means to surrender to the elements of time, but also to affect it, be affected and engage in the shaping of time as it washes over your body and through your soul as a mirror darkly. Fashion is not an issue of identity in a static sense, as fashion is always becoming something else, it is a hybrid shape in transit, or even *a sign of motion*. As we step into the changing cabin of the fashion store the mirror offers us to shift shape – "who do you want to be tonight?"

This is the true shamanist aspect of fashion; it offers us a new skin, a passage through the thin membrane dividing the real and imaginary. The fashionista is a shaman, a ritualistic dimension traveller of "spiritual force in which the dream becomes the world-paradigm" (Aldhouse-Green 2005: 172). Using shapeshifting alters the perspective from the engineer's to that of the alchemist or shaman; "to create fire you don't have to first build a match factory; the fire is within the wood and all you need to do is to rub two sticks together until they shapeshift into fire." (Perkins 1997: 25)

The fashion garment is an *objectile*, a product projected into the future, aimed at our aspirations. With the help of fashion, a signifier becoming constantly new and flexible, we can shapeshift into our desired alter ego, liberating the potential of the self, becoming our aspirational representation, someone in our inner wishes, if just for a night. We drape our body in a dream, wordless communication of shared yearnings. A sacrifice of energy to fashion promises inner transformation. It is a continuum; fashion is energy is matter is energy. To shapeshift one "fights fire with fire", challenge the dog by becoming a dog, change shape, change skin. At least this is the dream; by donning fashion one becomes fashion. "What is shapeshifting? In its simplest form, it is changing shape. And what is shape? Shape is a pattern of energy. Change the energy and you change the shape." (Levy & Bruce 2010: 46)

Shapeshifting is change from cellular to personal to legional level to transform in order to transform along the continuum between reason and imagination. We transform from unborn to living, from living to dead, and many times in-between, at every occasion via a rite of passage. The shapeshifting shaman guides his community through the transitions "paving the way for the soul-journey between worlds" (Aldhouse-Green 2005: 174).

Alchemy is the practice of shapeshifting matter. To transpose the energy of substance into another, guiding the flow of becoming towards transubstantiation. In alchemy this is not only an issue concerning form, as in transformation, but the essence of matter and the correspondence between matter and the

transposing will, the soul. The soul of the alchemist had to be purified through ritual, together with the material substances and liquids, otherwise no transition would come to be. Taking on the heritage of Plato's *Timaeus*, this was the *techne*, the art/science of the craftsman, the *demiurgos* (Mohr 1985). As for Plato, the change does not only happen in the realm of the ideal, but is intimately connected to the material crafts, the daimonic techniques of transubstantiation.

What the alchemist or shapeshifter does is breaking into the code of matter or hack the technologies of becoming. The hacker is a dissident crafter, a *design demiurge*. The descendant disciplines of alchemy, chemistry, mechanics, technology, are all codes and programs guiding the technologies of matter as well as the self. In a similar vein we could understand the alchemy of fashion as a technology of code.

Here code does not signify a computer program, but the operating system of matter itself, not too unlike how Manuel DeLanda argues for the actualization of the virtual properties of reality (DeLanda 2002). Code is the command-based shapeshifter, reassembling parts of the actual. Code is the praxis of matter. As noted by media theorist Eugene Thacker; "Code is a set of procedures, actions, and practices, designed in a particular way to achieve particular ends in particular contexts. Code = praxis." (Thacker in Galloway 2004: xxi)

Code is the magical formula of transformation, the enactment of material praxis, like the "hocus-pucus" of the wizard, which generates a transposition of material bodies. Indeed, the magicians' use of "hocus-pocus" derives from the catholic liturgical formula "hoc est corpus meum" – this is my body (Cramer 2005). The religious ritual is executing the technology of self and purifying the soul by confession and redemption. This makes language a special code of religious practice, it puts attention to transformation, just like in magical manifestations and software: "code is the only language that is executable" (Galloway 2004: 165).

The "computational couture", where fashion meets technology (often in the form of electronics), can use the fashion code as actor, actuator, instructor and affector. This was my proposition in the project *Fashion Fianchettos*, where oversized t-shirts were marked with chess coordinates and participants draped the fabric and took notes on the sartorial code of the new shapes (von Busch 2010). These programs explored new ways of disseminating fashion as a set of mathematical functions and minimal algebraic codes, similar to that of chess notations. The result was new drapings that could be sent between fashionistas as Facebook status, Twitter or SMS updates. The project was in itself a code, a praxis, a shapeshifting formula of distributed magic, a spell of transformation, a journey of draping through social media.

Fashion, like most other technologies, works with amplification, facilitation, delegation and in the end; pacification. If we like the promise of the destination, what we see in the mirror, we buy the garment and hook on to the flow of transubstantiation. "Be what you can be". Fashion is a technology that releases new capacities and, user-friendly as it is, leaves us blind to its inner workings. As we use the garment, which is an active choice, we double-click it, yet can't see the code from which it originates and operates.

As shapeshifters we need to become the element we engage with. Just like the fire is *inside* the wood, fashion is *inside* the technology of the self. We ally with the energy of fashion. Reverse engineer, hack and shapeshift. We trace, delineate and become fashion in order to change fashion into what it can be. With a participation of the senses, a cultivation of attention and engagement of skills we can form an

open culture around how to approach wearables through the shapeshifting character of fashion amplifying and intensifying the technologies of the self.

One student at the Fashion and Technology course I ran at K3, Malmo University, Jenny Nordberg, engaged with the stigmatizing processes of fashion. Jenny's argument was that the worst critique you can get for your appearance is silence from your friends. Thus the "digital bruise" shirt was a shirt reacting on a sudden silence. If the ambient noise level dropped the microprocessor activated a hidden aquarium pump, which started "bleeding" out invisible ink from within the shirt. This caused the fabric to bruise until someone started comforting the wearer, that is speaking and once again raising the ambient sound, thus stopping the process. The invisible ink started fading away after a few minutes, "healing" the bruised social wound. This shapeshifting process used wearables to reveal some of the mythic properties of fashion, using several media to shapeshift the wearer and render some of fashion's inner workings visible as social skin.

In Nordberg's example, a microprocessor was used to uncover an everyday feeling of discomfort caused by fashion, revealed through shapeshifting, and also the social rituals that recover the face of the wearer. Every culture has specific social ceremonies connected to appearance and the social skin. Rituals of welcoming and departing, protection against the weather, curses and bad luck. Often they also have specific craft objects to safeguard the wearer. Take for example the evil eye, the gaze of envy, the magical and malevolent gaze (so common in fashion); "The opposite of the gaze of love is not the gaze of hate, but that of envy, passive, unliving in itself, vampirically attracted to the life in others." (Bey)

The Evil Eye is a jinx called forth by the sin of envy – protection can come from symbolic talismans projecting the "good eye", sometimes called the "eye of Abraham" (Ulmer 1994: 11f). With what craft of imagination do we render the good eye visible today?

Here local crafts can play a central role. Not in an exotic sense but with the tracing of the migrations of skill we can find new patterns of relations, new inter-esse in the occulture of fashion. For this we should not only be embracing the techniques of craft but also the folk belief, cottage worship, rural base communities and the local cultivation of esoteric imagination. What does the local demiurge do? What daimonic reality does he conjure through his craft? What does the witch craft?

If we take on the exchange of crafts seriously, not only in simple techniques, but the sorcery of sensory of imagination, we can truly enrich the toolbox for exploring the potential of wearable electronics and "smart textiles". These are the forces and codes we can hack, plug-in, and intensify into new empowering technologies of the self. This local engagement with mythopoetic craft can be the alter movement to the hackerspaces; a distributed heresy similar to that of the Movement of the Free Spirit and a cultivation of the human spirit towards the true "alchemy of the self" (Vaneigem 1998).

Turn passive believers into engaged users; leave no hands idle. Show the fashionistas there is only the softest, mistiest skin between them and their manifested imagination. Release the open culture, share the code and educate the mechanics of the self how to surf on the flow of fashion and become fashionable.

Shapeshift. Become a warlock of vogue, an enchanter of fashion, a *magus à la mode.*

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EVOLVING SPACES ALONG NETWORK TECHNOLOGIES

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Evolving Spaces Along Network Technologies

The research project Public Space 2.0 – Evolving Spaces Along Network Technologies, focuses on the mutual relationship of physical urban spaces and virtual communities established by social networks. Our main interest is directed towards experience-based, lived-through knowledge, gained as today's citizen/users continuously take action in multiple public domains, both physical and electronic. As an interdisciplinary research group, we proceed from theoretical models that depict (public) spaces as a multiplicity of social spheres to overcome well-worn dichotomies: e.g. public versus private. In what follows, we will argue why we are using a methodology deriving from arts based research. We will exemplify our stance towards the field of research, by introducing a project driven methodology to augment design research in the realm of public spaces. We will start of by presenting and then critically reflecting theories of public spaces. Then we will summarize methodological commitments we admitted to and give reasons for each. Finally, we will talk about a series of workshops the group has conducted and will conduct to foster and elaborate our arguments and methodology.

Considering Space

Three well-known models of public space form the basis for many premises of the present work. The models considered share a similar diagram, that is, public spaces as a webbed interlocked multiplicity of possible spaces, a diagram, however, that has been deciphered essentially different by three different authors. We start off with these models, the models by Foucault, Deleuze and Habermas, because All appear to share the dilemma concerning the urge to unbundle the traditional concept of unified, bourgeois public space. Furthermore, their shared structure resembles what researchers claim the structure of the Internet is like.

(1)

The model of Heterotopia proposed by Michel Foucault suggests multiple spaces, as they constitute an endless unstructured puzzle of equal aims. "Bachelard's monumental work and the descriptions of phenomenologists have taught us that we do not live in a homogeneous and empty space, but on the contrary in a space thoroughly imbued with quantities and perhaps thoroughly fantasmatic as well."
[1] Foucault talks of anti-public spaces, appearing forbidden, privileged or holy; marking spaces of transition, crisis or deviation. Assuming, that the exterior is no more constituting for the inside, we have to understand Foucault's anti-Publics as folds of the exterior, while basic categories of inside and outside remain undefined. Foucault maintains that we can recognize the aim for the Public to emancipate itself from the universalism of the bourgeois public.

(2)

Another model promoted by Gilles Deleuze envisions subtly differentiated urban public spheres: the literary public sphere no longer differs from the partly political, subcultural, or artistic public sphere. He rejects a possible outside or center, but rather envisions a de-centered space system, naturalized, non-political, occupied with natural metaphors, almost like a substance rather than a spatial category. "The State no longer has its disposal the political, institutional, or even financial means which would enable it to fend off the social repercussions of the machine; it is doubtful whether it can eternally rely on the old forms like the police, armies, bureaucracies, even trade union bureaucracies, collective installations, schools, families." [2]

(3)

Finally, the Habermasian model renders the public as some kind of super-brain, a space of rational, informal and normative deliberation. However, the plurality of partial public spheres is absorbed by a positive principle of communicative reason, as assumes that public affairs by nature lead to democratic processes and the increase of collective reflection. [3] Habermas therefore relates to one great Public in which citizens may exchange arguments autonomously about how things are run. But in his model, the public takes on a higher order of meta-public, as the dimension of the public does not include public phenomena such as mass media as non-reasoning public instance.

CRITICAL REMARKS

For the present project and paper, we find ourselves in need of appropriating, if not redefining, these contemporary models describing means of space production. The models we mentioned shall help us to specify an appropriate methodology to approach the kinds of spaces produced by virtual world overlapping physical ones. Jürgen Habermas, as he tends to unify public space by rationalizing its conflictuous potential, denies existing social antagonism as inherent paradigm of the public today. In the context of democratic systems, any dimension of public affairs would by definition reproduce democracy in its constituting structure of meaning, as non-democratic impulses would equally remain external to the list of criteria describing public domains. In this sense, he stays with a traditional, humanist notion of hegemonial space, denying crucial distinctions between society and its constitutive elements. Today, economic demands are presented at the same ontological level as for instance cultural demands. Class politics have to construct and articulate a common chain of equivalences with others in the field of politics. Ever since the introduction of digital networks, the concept of hegemonial space no longer seems congruent with current readings of complex space phenomena detached from antagonism and ideology.

Following the post-Deleuzian assumption, the Internet takes on characteristics of a social, public realm. Functioning as floating space system without centers, the main focus became directed at the negation of hierarchy and central organization. Hence, from political theory we have learned that no system ever exists without a center, but then there is none not aiming for centrality as every signifying system aims for symbolization. Total absence of centrality would eventually lead to a radically static status: "Therefore if the Internet was without center, we then had no dislocation which would imply no production of meaning, a frozen world of complete transparency in which every sign would be forced to stay with its natural reference." [4] Taking this as a convincing argument against any further space analogy, we once more turned turn back in history to the methodology of the Situationist movement, established in the late 1960s by the Situationists International. Often associated with the 19th Century mode of "flâneurie", which was introduced mainly in the texts of Charles Baudelaire and Walter Benjamin, the

act of moving in the city took on expanded meanings after 1960s through interventions that were carried out by the Situationist International. When the small group of Situationists teamed up to critique authoritarian strategies of urban planning, one of their interests was what urban planners chose as relevant for their considerations. Taking the subjective view into account, Situationists argued that the city is a collage of individual images stitched together, overlapping and intersecting.

CONSTITUTIVE ASSUMPTIONS

As portable, pervasive, location-sensitive, intercommunicating devices converge with social practices, technologies have become increasingly useful to groups as well as to individuals. [5] The power of smart mobs reaches back to practices surrounding trust and cooperation, as they are being mediated by new communication and computation technologies. [6]

Digital networks have introduced properties such as decentralized access and distributed outcomes, simultaneity, and interconnectivity. While in electronic financial networks distributive effects have led to higher levels of control and concentration in global capital market, in electronic activist networks properties contribute to distributive outcomes: greater participation of local organizations in global networks help constitute transboundary public spheres centered in multiple localized types of struggles. "These are politics which are partly embedded in non-digital environments that shape, give meaning to, and to some extend constitute the event. These forms of activism contribute to an incipient unbundling of the exclusive authority, including symbolic authority, over territory and people we have long associated with the national state." [7] The Sociologist Saskia Sassen refers to "layer ecologies", by which technological properties start to become mobilized. Former unitary bodies of knowledge belonging to specific categories were often housed in closed institutions, start to become disassembeld in small pieces across diverse institutional ordering systems, which then can feed into new conditions including the political, economic, technical, cultural and subjective. The placeless world of wireless communications starts to interact with the place-specific networked computer chips that are beginning to infiltrate buildings, furniture, and clothing. The emphasis lies less on the empowerment of people but rather around the significance of becoming actors.

Methodological Commitments

What the Situationist did and how they did it has a second very important implication crucial to the research project we are engaged in: leaving the save haven of theory, taking part in the field we observe, we also substitute objective view to subjective vista. The very possibility of objectivity in the sciences has been questioned by many postmodern thinkers, our methodology seeks no objectivity but intermingling of various points of view. Those points of view, we felt must not leave aside the view of the actor. The Situationists actively engaged in urban public spaces in bodily means through invented techniques such as the dérive and aimed at capturing subjective experiences through psychogeographic mapping. Influencing other conceptual art movements like Fluxus and Performance Art, the Situationists provided a relevant base for thinking about how individuals may reconfigure political meanings of public spaces. This practice and theory we found to be very helpful to communicate between the fields and points of view.

Based on interdisciplinary collaboration, we cannot be content with pure theoretical reasoning. We found it to be seminal to embed theory in practice and inform it with methodologies established in the

long line of art projects, staged in Western public space. We feel that it is insufficient to only observe and describe public spaces. We felt it is essential to engage and participate in the medium to gain more thorough insight.

Working in the much discussed and little settled filed of "arts-based research" we have to brave methodological discussions, discussions we find necessary to outline in that paper. Our primary premise is staging our arts-based research as a practice with a distinct focus, but with an open-ended process. We set as an experimental procedure in this context, as a journey that could be driven by a desire for discovery in a collaborative environment and shaped along the way through steps taken one after another. Our approach can be identified with what Donald Schön would call "reflection in action", that is to say, to be able to accumulate knowledge on what one works on, while working on it. Thus, we were required to set a process that might allow 'potentiality' to last forever, to define the theme and direction as clear as possible, but at the same time, to avoid forming predetermined estimates for the results.

Going there, engaging, working in those virtual and physical public spaces, is part of that process. As researchers we include discursive fields an increasing list of art projects have opened.

Exemplifying methods

The piece Free the Listening, Joo Youn Paek exemplifies what we seek to expose. She proposes new possibilities for temporary intimate sharing environments to appear. Paek fits a pair of headphones with an additional pair of earpieces that face out, so that total strangers would feel invited to lean over and share the experience of listening to music with the wearer. By making a minimal adjustment in an ordinary everyday technology, Paek ruptures the image of self-sufficient individuals that move in the city within self-enclosed bubbles of sound. The wearer becomes an active provider of a personal choice of resources, as well as capable of playfully influencing others.

Another project that modulates personal sound environments in urban contexts is the Sonic City by Ramia Mazé, Margot Jacobs and Lalya Gaye. The wearable interface of the Sonic City uses gestural movements of the wearer as well as environmental influences that are detected by a set of sensors for personal music creation. That is to say, not only the individual becomes the actual producer of the music through simply moving in the city, but also the personal sound bubble becomes highly context aware, unstable and mutable by external factors. Thus, this piece portrays another type of human agent that creates shared environments not necessarily by actively providing resources, but quite on the contrary, by becoming sensible and capable of mindful observation, absorption and inclusion.
Investigating in the spaces created virtual and physical we make us of projects and inform them with theory. Working as a group that includes engineers we appreciate the hands-on approach the field uses and used to gain their insides. As a critique, we think that especially in the race for theory, the will and courage get the hands dirty has suffered in the last years, or, to be exact fieldwork labeled non-scientific was seldom recognized by those producing the texts. This kind of scission was alien to the Situationists and so it is to our group.
A project we build and tested seeks possibilities to help, assist and foster researchers in public space, by providing a set of sensors and recording tools for fieldwork. These tools can be rearranged and adapted according to the needs of a certain task.

Mobile Sensor Data

We built a kit researches, especially in academically context, can wear to aid and augment their research in as well physical and virtual public spaces. We want to establish a tool that can help to record, track and detect phenomena in the spaces enquired upon, but not ignoring or limiting the interpretation skills and theory building of the researchers: we are not doing what is called hard sciences but building a prostheses for researchers to boost their fieldwork.

Design Research Augmentation Kit: The First Prototype

The first kit was tested in a workshop at PennDesign in Feburary 2011. We provided the students with a wearable device that allowed them to sense and store a variety of data while on the move in urban spaces. The students were encouraged to creatively employ the kit in tracing phenomena concerning their spaces of interest and visualizing their research. Conducting the workshop, our main concern was to engender 'agents' that can mindfully get closer to the phenomena of interest. Second, we aimed to observe how the awareness of being augmented by such technology could foster creativity in different ways. Throughout a weeklong workshop, students developed projects that spread from what sociology refers to as "breaching experiments", to performative pieces, to spy-like endeavors and 3d animations that made use of the registered data.

The wearable kit was composed of two devices that registered two types of data: (1) The environmental device collected data concerning the agent's immediate environment such as GPS position, surrounding WIFI networks, as well as temperature, lig sound ht and intensity. This device was composed of custom built environmental sensors connected to a small notebook that ran the recording and synchronizing software, all wrapped within a shoulder bag. (2) The personal device on the other hand, was a smartphone with a special recording software that kept track of personal communication activities of the agent, such as phone call and SMS logs, visited URLs, and taken photographs.

Reflection in Action

The workshop started with our introduction to the software and hardware of the wearable kit to students and progressed with setting up individual project proposals as well as developing research strategies for each project. Our interest was not only focused on the concrete results, but also on the ways students appropriated the kit in their field trips as well as their individual impressions and excitement about the experience. In personal meetings, we observed how students carried out a "reflection in action," spinning in their theories back and forth, building, testing and revising them along the process.

Techno-Artifact as Reflector

At this point it is important to state that the technology used in this first experiment is by no means meant to be permanent; it is fully open for debate and to be continuously improved. Our aim is to avoid treating the technology as an ultimate solution, but to understand it as an artifact open for evolution. Thus, we seek for possibilities for future students with little or no experience to be engaged in developing hardware and software and manipulating the wearable kit. We believe this approach will let us examine the kit as an artifact that has been informed by various public spaces at a later point in the project. Looking at the kit, we might get a chance to acknowledge a collection of subjective views on public

space and the phenomena that shape these views. We think of the kit as a precious artifact, as all the adjustments, fixtures and add-ons reflect researchers interest in public space – hence, like a broken image reflected in shards, reflect fragments of public space itself. In the same way technologies are shaped by social structures and politics this kit has been shaped and we seek to reverse-engineer what was going on.

FINDINGS AND PROSPECT

In closing we would like to summarize the varying layers of examination and propose a few critical aspects our observation might point to.

Working in the field of architecture, urban planning and building technology, we are still confronted with strong limits regarding the underlying political frameworks reflected in merely top-down planning procedures. Technical properties of electronic interactive domains may soon be included in the list of planning parameters to study and learn about extended forms of communication and social organization. We believe that academic researches leave many phenomena of public space unconsidered, due to constrains of what is regarded as being science. The relevance of the social and the subjective as non-technological variables as well as the particular cultures of use of different actors are relevant to both digital and social networks. As we increasingly learn about the logics and dynamics of electronic network technology, we are given the opportunity to integrate empirical findings of social logics embedded in diverse domains. In this context, open source can not only bring technical consequences, but also social ones. As Saskia Sassen keeps saying, new knowledge practices allow for informal knowledge (versus institutionalized) to get distributed and inform our use and appreciation on communal space. [7] In our research project we hope to contribute to how we may learn to include the subjective within an increasingly objectified world. As digital networks have shown, that distributive power does not necessarily lead to the reinforcement of democratic structures, we believe that designers next to other planning instances will have to start to accept additional political responsibilities.

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THEORETICAL DISCOURSE ON "ART, SCIENCE AND TECHNOLOGY COLLABORATION" AND ITS HISTORICAL DEVELOPMENT

Lioudmila Voropai

The paper analyses historical development of a discourse on "Art, Science and Technology collaboration" from the 19th century till the present. It reviews the key concepts used for a theoretical and cultural legitimization of this collaboration, and implications of the "collaboration"-discourse for a media art practice.

 "I forgot who was the famous philosopher who used to quip that all was well with the social sciences except for two tiny words: 'social' and 'sciences' – with these words Bruno Latour begins his famous article "When things strike back - a possible contribution of science studies." [1] One could probably slightly modify this introductory rhetorical construction to introduce also the most popular subject in the today's media art discourse: Actually, all is well with the "art-science collaboration" except for three tiny words: "art", "science" and "collaboration".

Surely, a "fruitful collaboration of art and science" has a long and rich history and its importance is not to be questioned. But the problem that we are going to analyse in this paper is the growing instrumentalisation of this subject caused by current tendencies in cultural policy and its consequences for a contemporary media art practice.

A common allegation that this "collaboration" is indispensable entails a danger to eliminate not only practically, but also discursively an old good modernist autonomy of art. Attempts to make the system of art education and art practice itself more academic and more 'scientific' are not just an outcome of the notorious Bologna-process, but also a manifestation of some much older structural problem resulted from a traditional role of contemporary art in the society. The worse its precarious position gets, the more intensively a mutual enrichment of both art and science through their fruitful collaboration and the perspectives of their desired symbiotic future are depicted. Publically expressed scepticism and irony towards this agenda are perceived as a kind of a guild interests betrayal and career suicide. The functioning of today's ideology machinery is not any more based on a classical Marx' naiveté-model "They do not know it, but they are doing it", but rather, as Sloterdijk and Zizek have already poited it out, on a maxim of the so called "cynical reason": „They know very well what they are doing, but still, they are doing it." [2]

"We know very well that "scientification" of art often brings quite dubious artistic results, but in spite of that we still make it to our official agenda" – this statement could be an articulation of a common attitude within an institutional art and especially new media art field. Because an integration of media art theory and practice into an academic science context promises at least few jobs and teaching positions, while critical questioning usually ends up with an absolutely unbeneficial resentment.

These observations prove an efficiency of familiar repression mechanisms in service of ideology apparatus, which transform this "cynical reason" background into some saving "new naiveté" that noticeably

coins the present discourse of "art-science collaboration" and invites for an application of discourse analysis methodology in its classical Foucauldian version.

Let us first briefly overview a conceptual history of this discourse and some key notions that were used to theoretically legitimize this "collaboration".

The Renaissance-career of an artist from a simple craftsman to a man of universal knowledge is a well-studied subject of art history. Functional division of labour between art as producing *techne* and science as analytically-contemplating *theoria*, articulated already in Plato's and Aristotle's texts, is often considered to be left aside in early Modern epoch. The whole history of Fine Arts from the treatises on central perspective in the late Renaissance to manipulations with DNA-code in bio-art projects is supposed to deliver further proofs of the on-going "scientification" of art. But actually this process proves only the fact that the old, by Plato established hierarchy, in which scientific activity has a higher social status than artistic one, remains essentially unchanged. However the reason for this higher prestige of science has changed as well as a factual content of scientific activity.

Science today is not anymore some pure self-sufficient reflexive and contemplative *theoria*, but, similar to any other forms of current public production, is a complex of rational goal-oriented activities, aimed at achievement of particular practical results. Being oriented primarily at solving certain practical problems natural sciences take today in economical perspective entirely different position than contemporary Fine Arts with an essential for their conceptual identity claim for autonomy. This inevitably shifts an economic value of Fine Arts into a category of luxury and "status symbol" goods. Natural sciences are considered to be 'useful' for a society and (even if in a long-term perspective) economically efficient, while Fine Arts can be only partly used as storage for a temporary economical surplus. In addition, this temporary storage can only function, if its real economical meaning is kept hidden behind the façade of the key ideological concepts that build bourgeois notion of art, such as "creativity", "geniality", "self-expression" etc.

Historical basis of this economically grounded demarcation is a direct use of scientific achievements for technical innovations during the period of the so-called "industrial revolution". In his early text "Technical Progress and Social Environment" famous German social philosopher Jürgen Habermas has pointed out that pre-industrial forms of practical professional activity didn't imply any connection with the theory. [3] Only with the process of industrialisation a systematic implementation of scientific achievements in the practice has been started. Natural sciences thus became a source of new technologies and inventions, which could result from this implementation.

This was accompanied with the process of institutionalisation and professionalization of sciences themselves, which was manifested in a differentiation of different scientific disciplines and establishment of particular institutions like Academies of Science etc. A new social group of professional scientists has emerged, who were driven in their undertakings not only by a kind of "the will to knowledge", but who also could make their own livings out of this activity. This process is also manifested in the English-speaking context by an emergence of the very notion "*scientist*", which slowly replaces some earlier terms such as "*natural philosopher*" or "*man of science*".

British polymath William Whewell has introduced the term "*scientist*" in one of his texts published in 1834 in *Quartely Review* as a reaction to a changing character of scientific work. This introduction had first a slightly satirical tone: „by analogy with *artist,* they might form [the word] *scientist*, and added that there could be no scruple in making free with this term since we already have such words as economist

and atheist." [4] But later, in his "*The Philosophy of the Inductive Sciences" (*1840) Whewell was not anymore ironical about this term: „We need very much a name to describe a cultivator of science in general. I should incline to call him a *Scientist*. Thus we might say, that as an Artist is a Musician, Painter, or Poet, a Scientist is a Mathematician, Physicist, or Naturalist." [5]

But a real popularity the term *scientist* has reached only at the end of the 19th century. Opposite to German term *Wissenschaft,* French *science* or Russian *наука*, the use of the word *science* in the English-speaking context became reserved for exclusively for natural sciences related activities, while *humanities* (in the continental Europe largely known as *Geisteswissenschaften*) could hardly claim for the status of scientific activity. Since Francis Bacon British "men of science" were primarily empirically and practically experimental oriented, in contrast to their continental colleagues with their affinity for voluminous metaphysical speculations. A notoriously pragmatic Anglo-Saxon spirit has conceived practically useless non-profit *humanities* as a kind of wasteful, but in fact pretty harmless pastime for „*gentlemen of leisure*" with „old money" and „old privileges" similar to *Fine Arts*.

Following this general 'ideological' predisposition the theme of an interaction between *art* and *science* in the 19th century implies first of all the question, what Fine Arts can learn from Sciences in order to become 'finer'. A theoretically articulated programmatic rapprochement of art to science, e.g. to scientific knowledge and methods, had initially a purely instrumental background. For instance, John Ruskin in his „*Lectures of Art*"(1870) and in „*The Eagle's Nest. Ten Lectures on the Relation of Natural Science to Art*"(1872) claims that landscape painter should study biology and geology and also use scientific drawing methods, to be faithful to the nature in their works, which is, according to Ruskin's theory of art, one of the main virtues of Fine Arts. [6]

A further development of an instrumental approach to scientific knowledge and methods and their use for artistic purposes one can find at the beginning of the 20th century in the theory and praxis of Russian constructivism of the 20ies and in the study programs of Bauhaus.[7] The famous constructivist concept of "artist-engineer" should not be misunderstood as a sort of prelude to the today's "art-science collaboration" agenda. Prominent representatives of Russian constructivism, such as Alexander Rodchenko, Warwara Stepanowa or Alexei Gan, spoke about „production art" (russ.производственное искусство), which makes a radical break with the *l'art pour l'art* attitude and formal aestheticism of traditional Fine Arts and offers instead an agenda of a better designing of human material environment. The new type of artist – "artist-engineer" – should resign traditional art forms like panel painting and „consciously manufacture useful things", i.e. s/he should get involved into designing and production of functional objects. A prominent LEF-theorist Boris Arvatov wrote in one of his articles that the mission of a modern artist is "not to depict a beautiful body, but to educate real and harmonic people, not to draw a wood, but to plant parks and gardens, not to decorate walls with paintings, but to paint these walls." [8]

The notion of "production art" breaks in its basic attitude with the modernist ideology of art autonomy. The "production art" as such is an important theoretical forerunner of the contemporary conception of design; therefore an "artist-engineer" should be understood rather as a designer than as an artist in a conventional modernist sense.

 In the first half of the 20th century artists not only very often refer to the modern scientific theories, but also apply some newest technologies in their artistic practice. However this turn to science and technology does have yet neither from the art-historical, nor from discourse-historical perspective any programmatic strategic character. A proclaimed "collaboration" of art, science and technology as well as

certain "scientification" of art practice becomes a more or less articulated agenda only in the 1960ies, largely due to the cultural policy situation in the USA at that time.

In a situation of the armaments drive and generous support of research projects in the field of computer technologies during the Cold War in the USA, American universities and research institutes became a feeding ground for experimental technology-based art projects, which could provide a needed technical production base.

Numerous new art forms, practices and –isms emerged out of intense late-modernist impetus of the post-war art. They developed further a conceptual heritage of the early modernist art (from Dada and Supremathism to Constructivism and Bauhaus) and transformed it according to the changed social and technological environment. Endlessly created new art isms represent this wide range of artistic experimentation with new technologies, materials and scientific conceptions – *Computer art, Algorithmic art, Generative art, Inormation art, Evolutionary art, Process art, Systemic art, Cybernetic art, Kinetic art, Fractal art* and so forth, and so on.

These artistic experiments needed of course a production base, which goes far beyond the possibilities of traditional artist studio. Art institutions of the 60's-70's could offer only exhibiting spaces for a public presentation of these artworks. Appropriate production facilities could be however found only outside of the art institutions context of that time.

Laboratories and research centres at the universities offered in contrast to art institutions not only some technological and material production base, but also support from engineers and programmers, indispensible for a realisation of these artistic projects. This is of sure not a coincidence that many pioneers of computer- and technology-based art come precisely from this context and have their background in natural or computer sciences and engineering.

To mention only the most known examples, a famous pioneer of *interactive art* and earlier artistic experiments with *virtual reality* and *augmented reality* Myron Krueger was a computer scientist, who in the 70's has worked for computer graphics projects at the *Space Science and Engineering Center* at the *University of Wisconsin-Madison.* Due to this job he could get a technical support of his artistic projects from a University staff.

A founding editor of *Leonardo-Journal* and devotee of *Kinetic Art* Frank J. Malina was originally an aeronautical engineer. Many European techno-art activists also came from similar professional contexts. A well-known Austrian enthusiast of computer art and computer graphics Herber W. Franke received his doctorate in theoretical physics in 1950 by writing a dissertation about electron optics. One should not forget here also Roy Ascott, who, before starting his artistic career, was an officer in the British Royal Air Force working with radar defence systems.

From the historical sociological perspective in the second half of the 20th century precisely scientific and technical manpower was primarily a feeding ground for a technology-based art, which has essentially influenced some of its aesthetical and conceptual particularities. Many protagonists of early techno-art were professional engineers, programmers or scientists, who out of various reasons have developed their interest for artistic use of some new technologies. With their technical-artistic experiments they were *stricto sensu* hobby-artists, who, from a sociological perspective, have been producing a sort of 'technological Art-Brut.'

In this respect one could also say that many early technology-based art projects, whether in the field of *Kinetic Art, Holography, Computer Art, Interactive Art, Virtual Reality* or something else, were to a certain extent side-products and experimental deviations in a functioning of different research institutes and scientific laboratories.

Only later these products of rather creative than artistic in a strict sense activity were perceived within an institutional art field as art objects and interpreted as an extension and further development of the modernist art concept. The idea of "Collaboration of Art and Science and Technology" became thus pivotal for a conceptual self-positioning of New Media Art in the 80's.

A critical analysis of the discourse on "Art-Science collaboration" discovers also certain topoi, which play a noticeable role for a theoretical conceptualisation of this subject, although this role was taken due to some initial principal misunderstanding. One of these topoi, which is largely referred in numerous works on history of the "collaboration", is the famous text "The Two Cultures" by British scientist and writer Charles Percy Snow. He describes an essential difference between the *science* culture and *humanities* culture, i.e. between the working methods, canons, systems of values etc. of „scientists" and „literary intellectuals" (that is how Snow defines representatives of humanities). His main pathos is to settle account with a notorious intellectual arrogance of *"literary intellectuals"*, and it is absolutely unclear, what techno-arts have to do with the contraposition of these "two cultures". Since if they are supposed to have something in common at least with one of them, then it should be rather a kind of 'genetic relationship' with *science*and not with *humanities* (at least precisely this suggest the most publications on this subject).

That is also why the whole "*third culture*"-motive, which is very common in the media art discourse since 90ies, is based on some fundamental misinterpretation of both the Snow's position as well as main statements of the book „*The Third Culture: Beyond the Scientific Revolution",* published in 1995 by John Brockman, an American literary agent and author specialising in scientific literature. In contrast to Snow, who optimistically wrote about a possible "*third culture*", in which fundamental differences between *science*and *humanities* can be abolished through the communication between their representatives, for Brockman "*the third culture*" is represented by scientists, who are able without a mediation through literary intellectuals to present themselves the newest scientific developments to the general public.

Despite these definitions the term "*third culture*" was in the 90ies often used in the media art discourse to position media art itself as a new kind of the "*third culture*".[9]An intention of this positioning is quite clear – art, which works with technologies (i.e. media art par excellence), should be established in an academic institutional context and socially legitimized as a kind of mediator between science and general public.

Especially in the USA, where media art institutions were not that actively founded and generously supported by the state as in Europe in the 90ies, media art had a chance to institutionally survive only under the roof of universities and other academic institutes. Teaching and research positions in the academic field became for media artists almost the only professional option to make their living. But even if this positioning tactics in a sociological perspective is very understandable and even unavoidable, one should not ignore those conceptual problems and contradictions, which in a long-term, strategic perspective can lead media art to a real dead end.

Through accepting this merely mediating position, media art basically reduces itself to a kind of popular-educating and purely illustrative work. As a matter of fact, only through an abdication of its artistic autonomy and functional self-sufficiency media art can obtain an approved place in a social system. However the main question, which this situation provokes, is the following one – why does media art that positions itself in this way still need this disputable "art"-addendum, which only brings various practical complications and theoretical contradictions into this kind of activity? Why it does not call itself simply an audio-visual-spatial-etc. design and representation of scientific knowledge and technological achievements, which it does in fact?

Looking back to the history of art in the 20th century this would not be such a radical move. Was the "production art" of Russian constructivists not the first sober perspective onto upcoming tasks of art in light of its disappearing monopoly of visual production due to technical inventions such as photography or cinematography? Or was it not proclaimed by Gene Youngblood in "Expanded Cinema", that artist should become a "design scientist" and practice an "aesthetic application of technology?" [10]

The "art"-label in the whole today's media art enterprise should probably simply help to keep at least some tiny free space in an increasingly efficiency-oriented academic context of the present neoliberal policies. In addition, the term "art" in a mass reception is still reserved for some imagined romantic terrain of an alleged "freedom of individual self-expression", which keeps on recruiting new apprentices into a shrinking media art guild.

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8. Boris Arvatov, "Utopia and Science," in Lef, no. 4 (1923): 16-21.
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BEYOND THE CONFLICT OF THE FACULTIES: A NEW INSTITUTIONALIST CASE STUDY OF THE FOUNDING OF A RADICAL TRANSDISCIPLINARY ART/SCIENCE/TECHNOLOGY PROGRAM

Charles Walker

This paper introduces a critical study of the ideas, agencies and structures involved in establishing an innovative transdisciplinary degree program. Drawing on interview data, it develops an account of the day-to-day lives, experiences and practices of academics, students, practitioners, administrators and other stakeholders operating in increasingly institutionalized electronic arts/science/technology environments.

In 2005, Auckland University of Technology drew together four existing Schools (Art & Design, Communications Studies, Computing & Mathematical Sciences, and Engineering) into a new Faculty of Design and Creative Technologies. In 2007, the Faculty formed an Interdisciplinary Unit to build new experimental research and learning experiences across these overlapping disciplines. The new Bachelor of Creative Technologies degree discussed here is a key part of this larger Faculty project.

Over the last decade there has been renewed interest in interdisciplinary education (Chandramohan & Fallows 2008). However, there have been relatively few explorations of the experiences of academics and students in such programs, or of how they actually learn across changing epistemological boundaries (Robinson 2008). This task would seem to be important, especially given the differing motivations for interdisciplinary research; ranging from top-down imperatives from administrators seeking efficiencies, to researchers' claims for new paradigms that might address the complex challenges of a new century, to a variety of bottom-up, experimental approaches by academics responding to ontological and epistemological shifts or new career opportunities.

Over the last decade too, the dynamic and uncertain conditions of creative practices within a globalized economy have begun to attract serious academic attention. However, much less research has focused on corresponding changes in the institutional environments within which academics now operate. The changing conditions and managerial strategies of higher education have resulted in new divisions of intellectual labour; within which individual academics and students have become increasingly isolated and ever more accountable.

In light of these developments, this paper addresses what educational theorist Ronald Barnett calls "ideologies of calculation" that have come to circumscribe practices within the new university (Barnett 2003:18). These ideological discourses limit how contemporary institutional frameworks can be seen - not only in relation to any academic tradition or professional agenda but to education and intellectual life more generally. Thus, there is a need for debate to be framed within a context of radical change in higher education policy since the 1990s. Three interrelated inquiries are woven through this paper.

First, what are the characteristic qualities of this new institutional field and how (well) are they understood. Second, what effect does this institutional context have on the academic, disciplinary and/or professional identities of people involved? And, third, how do individuals conceive the praxis of teaching

and research *vis a vis* newer institutional ideologies, when they are also embedded in the process and therefore subject to its procedures?

At another level, the program represents an opportunity to develop hypothesis-driven or inquiry-based methodologies for collaboration that might address Ernst Boyer and Lee Mitgang's idealistic and much cited, but less heeded, call for

" a new language driven by the conviction that the standards used to evaluate performance should be organised not so much around blocks of knowledge ... as around modes of thinking: the discovery, integration, application and sharing of knowledge" (Boyer and Mitgang 1996:66)

However, the notable weakness of Boyer and Mitgang's thesis is that it proposes a structure without *agency*; leaving personal agency and the individual meaning-making of situated actors within real institutional contexts relatively unexamined.

Elsewhere, John Robinson proffers two types of interdisciplinary research "temperament" that he suggests are "derived from actual practice". The first is interested in "inter-relationships among disciplines, the intellectual puzzles and questions that lurk at the margins of established knowledge, and ... the intriguing possibility of creating new understandings, drawing from established bodies of disciplinary thought" (Robinson 2008:72). However, even though people may seek to create new insights, the practice itself remains defined and delimited by academic disciplinary norms. By contrast, the second temperament revisits Klein and Newall's (1996) 'issue driven interdisciplinarity' that compels practitioners to navigate the "sometimes uncomfortable borderlands" between the academy and the larger world. (Robinson 2008:72).

Robinson's 'temperaments' recall Bourdieu's *habitus*; an analytical tool that attempts to explain how clusters of apparently objective relations that define any disciplinary field come to be adopted by individuals. It describes a "schemata of perception, appreciation and action that result from the institution of the social in the body" (Bourdieu 1998:127).

Bourdieu's original exegesis can be re-construed as fluid networks of objective relations between legitimate but varying positions. These fluctuating, continually forming and reforming contexts constitute what sociologist Andrew Abbott (2005) calls 'ecologies of practice'; characterized by "interactions between sets of agents, sets of locations, and relations between these - neither fully constrained nor fully independent" (Abbott 2005:249). Despite disciplinary claims for control of knowledge bases or occupational boundaries, any learning environment is a complex interactive system occupied by competing actors, subgroups and forces. Indeed, for the program described here, the merging of individuals or groups into a legitimate whole is less important than the coming together, sometimes only briefly, of ideas and agencies in overlapping constellations of knowledge, research practices and ethical affects.

"The appeal of ecology as a conceptual metaphor is its ability to focus our attention on a temporarily finite set of practices, ideas, and interactions without fixing them in place or investing too much critical energy in their stability." (Brooke 2009:42)

Thus it becomes possible to imagine academics and students of, and in, institutions as simultaneously co-creators and creations of an ecological system. This partially explains the relational environment which the Creative Technologies program has created; a dynamic learning system that continually - and

rhetorically - constructs, construes and re-configures itself under the influence of various agencies - individual or collective – that are both internal and external to the institutional environment.

The new program seeks to shift the traditional focus of creative enquiry from the individual (broadly, fine-art model), to a more socialised notion of collaboration. The notion of our studio as a "collaboratory" - an evolving laboratory for collaboration and creativity - also recognizes that such environments can foster complex, dynamic, risky and opportunistic relationships; between situated agents, methodologies, knowledge domains, technological developments, skills and applications.

Such environments are often also characterised by a playfulness that may make it difficult to recognise, articulate or evaluate the resultant experimental propositions as valid educational outcomes. Given the current international interest in both "creativity" and "collaboration" in numerous educational policy documents and graduate profiles, it isappropriate and timely that the program initiates critical engagement with this "play" - not least by challenging institutional praxis.

Conclusions

This paper has attempted to shift attention from the traditional focus on processes or outcomes, to explore how academics themselves might (re-) negotiate their own roles, in relation to others, within a discursive ecology. In this sense, inter- or trans-disciplinary education can be seen as rhetorical practice; capable of being adopted or resisted by academics, students and administrators operating to construct what Bourdieu called a "space of possibilities", that "defines and delimits the universe of both what is thinkable and what is unthinkable" (Bourdieu 1988: 220).

What would seem to be at stake here is the issue of whether institutional agencies are themselves capable of conceiving, engaging, directing or influencing transdisciplinary education at a philosophical or cultural level, and so stimulating new modes of practice for a complex and uncertain world, or whether their role is confined to debates over epistemology, funding, institutional management or marketing. The contribution of this study is to shift attention from institutional discourses of compliance towards a broader field of possibilities for creative *praxis*.

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PAINTING FURTHER ALONG THE RIVER

James Faure Walker

The impact of 'digital painting' on regular painting is a complicated story. Until the nineties 'computer art' was predominantly abstract and about systems. My painting has always been lyrical. It has moved between electronic and 'physical' forms without much pain. Increasingly these distinctions matter less and less.
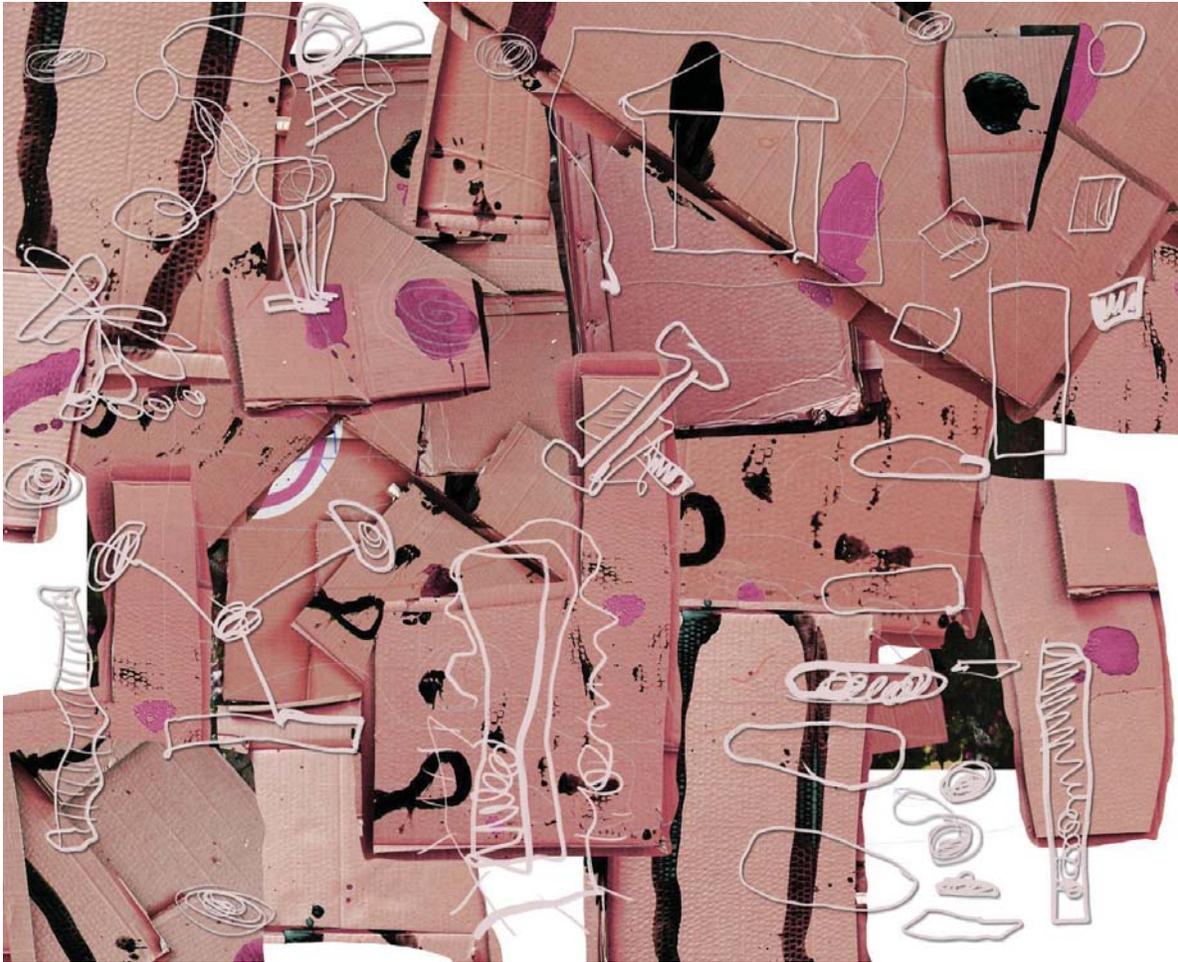
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In the 1970's there was a lull in the dispute between abstract and figurative painting. In fact exhibitions of what we would now term 'conceptual' art claimed to go 'beyond' painting. So painters of all kinds bunched together and forget their differences, intent on showing that they were still going strong. There were ideological arguments against painting too, condemning it for just being 'colour art' or 'playing with paint'. The strands of painting that developed through the decade - from free form abstract painting, pattern painting, new image painting, neo-expressionism – tended to be more liberal and baroque than the uptight doctrines of minimal and conceptual art.

This was the period I came of age as a painter. I was also editing the magazine, Artscribe, which came to be the UK's leading (and artist-run) journal of contemporary art. By the eighties, once 'post-modernism' became the obligatory catchall for curators, whether I put a fish, triangle or blob of orange in a painting did not matter that much. It was a free-for-all, it was all 'imagery', it was all equally meaningful or equally meaningless. Yet in my own mind I was not a believer in the relativism of post-modernism. I suppose it was a lingering belief in 'modernism', the idea of art re-inventing itself and moving forward.

Before considering the impact of digital painting it is worth mentioning this pluralist context that persisted throughout the eighties. Put simply, there was little appetite for 'the next big thing' – nobody was putting on exhibitions called 'the new art'. The computer art of the seventies had largely been connected with constructivism. It was mathematical and disciplined, and in my opinion not massively significant as art. It did not look revolutionary.

I came to computer graphics rather late, in the mid eighties, but was overwhelmed (and this was unexpected, in that I associated computer art with a rather sterile and systematic approach) by the freedom it offered in the way of colour, and the speed of composition. I had experimented with an early Canon digital camera in 1990, but did not own one (an Apple QuickTake) till 1994. So I had seven years of playing around with paint programs – the first being Dazzle Draw on the Apple II, then Deluxe Paint on the Amiga – before I could integrate photos into the process. My main problem was coping with the freedom of digital painting, and then returning to the practicalities of regular painting. I still work in both forms, in parallel, though increasingly I think of it all as 'just' painting. The difficulties have never been technical. There are methods for going from 'screen' to canvas, including stencils, printing, projecting, or just remembering. Equally, I often photo 'paint' and work it back into a digitally produced piece, and enjoy the way viewers cannot tell the difference. The difficulties, rather, are the difficulties of painting.

There has also been a general misapprehension. Using digital gadgetry does not of itself make you a revolutionary artist, nor – if you work as a painter – does it take you beyond the borders of the discipline. A blue is blue, whatever the medium. Nor does 'digital' painting have to be logical, geometric, weird, cyber this or cyber that. My own approach has always been somewhat gestural, even expressionist. The wobbly territory between so-called abstract and representational painting stays much the same. Yes, we have the freedom to scan anything and throw it into the mix – and I do this as irresponsibly as anyone else – but sometimes you just get Photoshop soup. The 'regular' painting world is now more alert to the digital world than it was - how could it not be? - but I have yet to see purely 'digital painting' that would blow those old methods away. I prefer to think of myself as enrolled in the big city of painting.

In my presentation I shall show how my preoccupations have remained more or less constant, even when the 'medium' switches between the physical and the electronic. To talk about colour, light, movement, the flow of a line, doesn't seem to be saying anything very much - neither original nor significant. But I hope it is enough just to get a painting to come to life. As to the presence or absence of 'images', to this question of representation and abstraction, I am not too troubled. If it works, I have no problem in introducing a horse, or a trumpet-player. My approach is quite superficial in that respect. On the other hand, I have attempted to make paintings from encounters with wild-life, from the Great Barrier Reef in Australia thirty years ago, to a stag that stared me out in Suffolk, England, this year. I have called the talk 'further along the river' as an allusion to the book I wrote 'Painting the Digital River: How an Artist Learned to Love the Computer' (Prentice Hall, 2006).

DESIGN FOR LIFE

Meredith Walsh

It is argued that design technologies developed for synthetic biology capture a surplus essential to life. [1] However, I suggest that life's emergent capacity is not being controlled by or inappropriate to design. Rather to explore the potential of life for novelty what is required is a new vocabulary of design. A vocabulary that can be drawn from architect and product designer Greg Lynn.
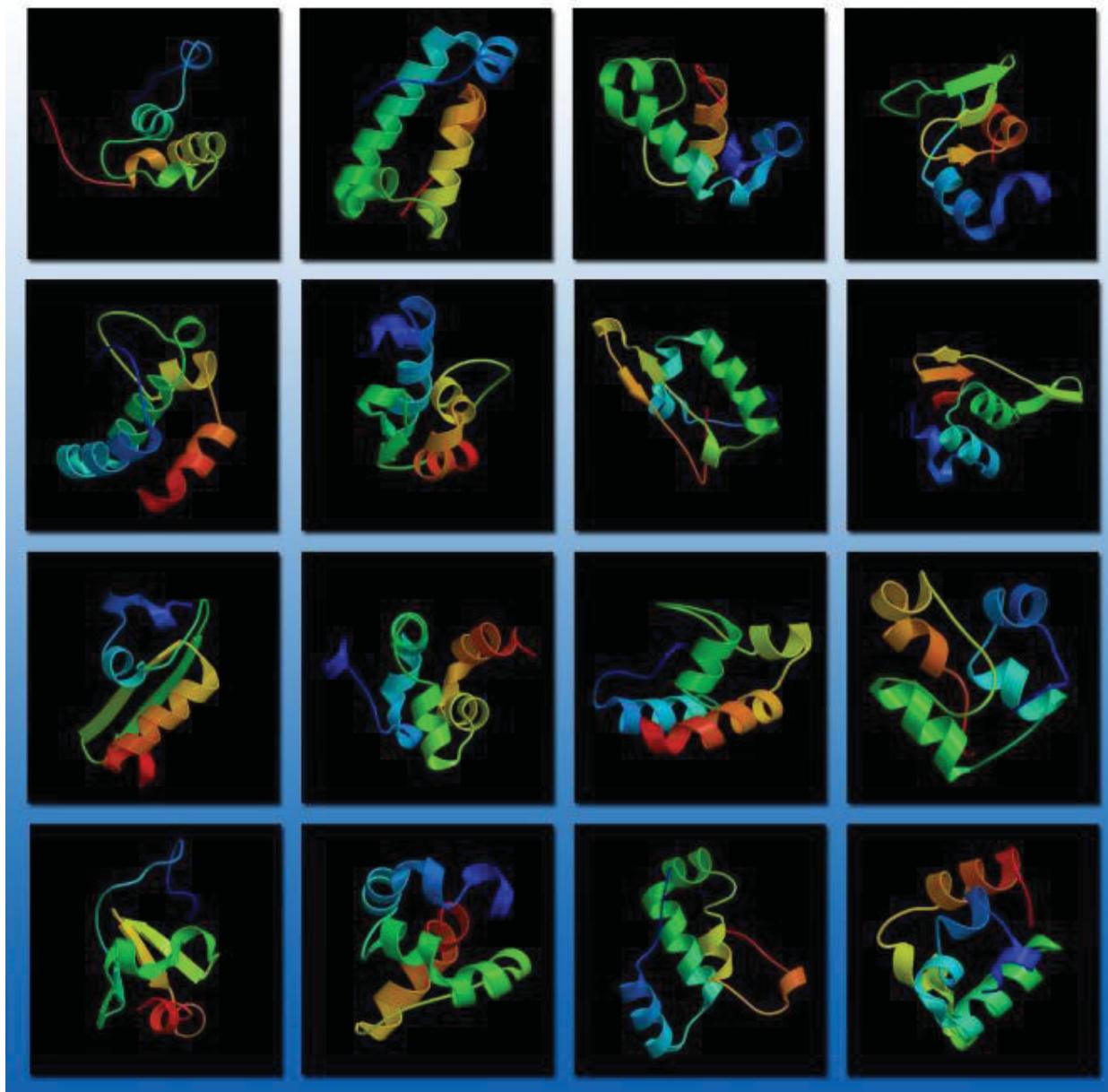
A selection of proteins synthesized by Pier Luigi Luisi Synthetic Biology Laboratory, © Pier Luigi Luisi Synthetic Biology Laboratory.

Introduction

To design novel biological systems synthetic biology has created new software technologies such as *GeneDesigner, Rosetta*, *Foldit*, and molecular graphics programs such as *Chimera* that draw on areas of design including architecture, fashion, media production and electrical engineering to manipulate DNA and produce novel protein structures – the work horses of cellular function. Grouped under the heading of bioengineering, these new design technologies it is argued capture a surplus essential to life within a web of aesthetic and cultural practices aimed at mass producing novel life integral to the digital economy and biocapital. [2] In contrast to design, these arguments continue, novel life emerges chaotically or randomly. Therefore, the design of novel DNA and protein structures either attempts to control [3] or is inappropriate to this capacity. [4] However, I suggest that life's emergent capacity is not being controlled by or inappropriate to design, but the current language of design is limited in its ability to articulate the potential for life. Rather than opposing design and emergence synthetic biology requires is a new vocabulary of design. A vocabulary that can be drawn from architect and product designer Greg Lynn's use of geneticist William Bateson's idea of symmetry breaking.

To discuss developing a new vocabulary of design, because of the fundamental role proteins play in cell function and therefore synthetic biology, in this paper I will focus on the synthesis of novel proteins. As my motivation for exploring a new vocabulary of design is the opposition of design and the chaotic emergence of novel biological systems on the basis that it is an inherent capacity of life, I will look at the Baker lab's software Rosetta –as it is arguably the most common way to design new proteins –and the randomisation of DNA by the Luisi lab in Rome, where I was recently an ANAT (Australian Art and Technology) resident. To articulate the workings of these two techniques, I will first sketch out the very basics of protein coding and function.

Design v. Randomisation

A relatively small segment of the genetic code, genes code for the synthesis of proteins. Through the production of an intermediary code via a process known as transcription, the four bases of DNA, GATC are translated into a sequence of amino acids. Comprised of 20 different discrete amino acid residues as they are called, these sequences are ordered in various lengths as specified by the gene code. After an amino acid sequence is formed, for a protein to work, generally speaking, it must fold into a structure specific to its function. Specified by the order of its amino acids, the structure of proteins plays a functional role in producing different types of cells: particular protein structures produce hair cells, liver cells, skin cells, etc.

Synthetic biologist David Baker describes protein design as the hunt for the amino acid sequence that will fold in such a way to create a protein structure that carries out a desired function. [5] The number of different ways a protein could fold, however, is astronomical. Known as the sequence space, for an amino acid sequence of only fifty residues, the possible combinations of sequences is 1065 (20x20 x20 etc. for 50 residues). Given that a particular sequence codes for the protein's structure, each one of these possible sequences can potentially fold into a different structure. This is a staggeringly large number: For structures that are nanometres in length, the combined weight of possible amino acid sequences for just fifty residues would be equivalent to that of the earth. What's more as most proteins are longer than fifty residues, the number of possible combinations of amino acids is even larger.

As the possible number of amino acid sequences is so staggeringly huge, some means had to be found to reduce the variables needed to be calculated, which would yield a novel protein. To reduce the number of calculations, Baker's protein prediction and design software Rosetta uses banks of known amino acids structures. Instead of using individual residues, Rosetta takes short fragments of about 9 residues from larger structures and variously assembles them into new structures.

When used in its predictive mode to provide the most likely structure into which an amino acid sequence will fold, Rosetta takes a known sequence and assembles nine hundred possible structures, from which it ranks the top ten. For each of these structures, Rosetta then gives the x, y, z, co-ordinates of every atom. Taking these co-ordinates the proteins are visualised as folded three dimensional static structures, using molecular graphics software.

When it is used in design mode to create a novel protein rather than predict the structure of an amino acid sequence, Rosetta uses a reiterative approach. To begin its reiterative approach, the designer inputs an amino acid sequence for which there is no known structure into Rosetta. Deploying its predictive feature, it then ranks the top ten most likely structures for this sequence. After ranking the most likely structure, this amino acid sequence is fed back into Rosetta and the process is repeated. Once again, sourcing fragments of known protein structures Rosetta assembles and ranks the top ten structures. Using this technique, the Baker lab created the novel protein Top 7.

However, despite successfully designing a novel protein using Rosetta, Baker's approach is criticised by both synthetic biologists and its commentators. Criticising the bioengineering style design claimed to characterise synthetic biology, both camps argue that the systematic and various assembly of extant genetic components found in databanks runs counter to the inherently emergent function of life. Commentator on synthetic biology Adrian Mackenzie for example suggests that the design of novel biological systems, using standard parts and assembled components in manner drawn from electrical engineering and other product design typified by drop down menus and drag and drop objects controls life's essential chaotic function. [6] Assembling and rearranging parts in an orderly fashion for an intended functional outcome, according to Mackenzie, by definition controls the chaotic capacity by which novel living systems emerge. From within the laboratory, the Pier Luigi Luisi laboratory similarly argues that bioengineering is unsuited to the emergence of novel life. Writing on the epistemology of life which informs his experimental research, Luisi argues that life did not occur nor changes by design. [7] As with Mackenzie, for Luisi bioengineering design is characterised by a modular means of modifying or producing novel biological systems developed from electrical engineering, which relies on the assembly of extant genetic components or biobricks stored in databanks. And similar to Mackenzie, Luisi argues that variously assembling banked genetic components does not take into account the emergence of life.

Drawing on systems biology and autopoeisis, novel biological functions he argues do not causally derive from the reassembly of single components; they randomly emerge and cannot be causally identified as the sum of their preceding parts. [8] On this basis that novel biological systems *emerge*, he further suggests the attempt to *design* novel living systems is unlikely to have little more than isolated success. Though, Baker has designed a novel protein, and Venter developed Synthia, using a cut and paste logic, the design of novel life he says assumes that when taken out of their systematic context components such as single enzymes and metabolic pathways will retain their specific functionality. [9, 10] Taking a top-down approach, as the lab refers to design, is therefore unlikely to be broadly effective. While the lab acknowledges that there have been some remarkable one-offs, using a bioengineering approach they argue, design has not provided synthetic biology with a roadmap. [11]

Though I empathise with the lab's argument for emergence, by defining the capacity of life as emergent, the Luisi lab's position resonates with the objections to design of Mackenzie and others. While the lab does not overtly argue that the chaotic capacity of life for novelty is being controlled by design, they do argue that design cannot emerge novel proteins because it is intentionally directed at causal outcomes, unaware of life's emergent capacity for novelty. [12] Despite their differences, both Mackenzie and the Luisi lab effectively insist that emergence is an inherent capacity of life.

In keeping with their assertion that design is at odds with life's emergence capacity, the lab has developed a technique to randomise DNA as a way to create novel proteins. Rather than relying on the assemblage of extant components or biobricks to design a protein with a preconceived function, they have developed a means to randomise the order of the four DNA bases GATC, in an attempt to code for amino acid sequences that may fold into novel protein structures. As the possible order of amino acids for even a fifty residue sequence is astronomical, randomising the order of the four DNA bases GATC even a restricted amount of times generates a significantly large number of amino acid sequences. Since not all amino acid sequences will necessarily fold into functional protein structures, the large number of sequences generated constitute a pool (approximately 109) in which to fish for those that may fold, and do so in novel ways. (While the lab has generated a significant number of folded structures, the lab is still in the process of exploring the function of the proteins they have synthesised in comparison to already known proteins. As such, it is not entirely clear whether they have created any which are novel. [13] Given the large number of sequences, to fish for novel amino acid sequences which may fold into functional protein structures requires a means by which to select possible candidates which will structure when inserted and expressed in a living cell. It is not practically possible to test them all. Since it is not possible to test all sequences, the lab must use some form of protein prediction software. Enter Rosetta. Despite their attempt not to use extant components of any sort, the Luisi lab's random technique relies on Rosetta's use of statistically averaged structures assembled from existing protein fragments to predict the likely structure of the amino acid sequences they have generated. While they assert that novel systems emerge randomly, their technique remains reliant on banks of extant components. And their approach snared in the tenets of protein design.

Rather than design either controlling or being an ineffective means to create novel proteins based on life's inherent emergent capacity for novelty, I suggest that the current method of protein design is limited in its ability to experiment with creating novel proteins. Importantly, what I mean by 'limited' differs from any claim about the affectivity of design or otherwise in regard to the inherent capacity of life. In contrast to claiming that design is ineffective on the basis that life is inherently emergent, a limit as I propose it is coupled to the idea of potential. Potential does not inhere in life. Rather, potential is an opportunity for novelty that may occur through the temporal interaction of the components of a system which may themselves change. Though I will detail this idea below, simply put a potential for change is not an inherent capacity of life because it does not pre-exist in life *prior* to the temporal interaction of its components; it occurs *during* the interaction of its components, which may themselves change. Taking into account that the potential for novel life occurs temporally, bioengineering design cannot be argued to either control life or lack efficiency because it does not acknowledge its inherently emergent capacity. Instead a bioengineering approach can be seen to be limited in its capacity to explore life's potential because it does not factor time into design. Static structures assembled out of given components which are statistically ranked have no dynamic temporal dimension, and therefore no opportunity to interactively change.

Rather than eschewing design on the basis of life's inherent capacity for novelty, I suggest a new vocabulary of design is required to experiment with the potential for life to produce novel proteins. A vocabulary that can be fruitfully explored by drawing on the language of architectural and product designer Greg Lynn.

Design for Life

Rather than Darwin geneticist William Bateson is Lynn's hero. Coining the term genetics in 1905, Bateson inspired Lynn's design vocabulary for which he is renowned. [14] Drawing on Bateson, Lynn broke with the static design of organic structures to reconceive architectural design through animated forms. Arguing that static approaches to architecture were limited by structure being the determining force of design, Lynn turned to Bateson's interest in the exception rather than the ideal form. Conceptualised in terms of symmetry breaking, exceptions occur whenever there is change in the symmetry of an organic form to asymmetry. Contrary to the idea that a symmetric form is a source of information about its structure, according to Bateson when organic forms become asymmetrical information is generated and when they return to symmetry it is lost. To apply Bateson's idea of symmetry breaking to architectural and product design, using calculus Lynn developed his vocabulary of animated structural change.

According to Lynn, the calculation of time is possible through the mathematical language of curvature. And calculus is the language of curves. In contrast to static structures and ideal forms, Lynn's interest in calculus is "... the creative structural role of time and force ..." [15] A creative role that he marries to Bateson's idea of symmetry breaking to generate a design language of continuous form and exceptions, information and its loss. Using calculus to generate exceptions, Lynn reconceived the architectural idea of a static form that exists in empty space to a manifestation of dynamics forces that are temporally shaped. "Continuous curvature", Lynn says "is the graphical and mathematical model of the imbrication of multiple forces in time." [16] Dimension in Lynn's design vocabulary is not conceived in terms of ideal units and discrete components, rearrangeable in empty space. Instead, the assembly of a large number of components loses its modular quality: Wholes and parts are no longer discrete points, but a continuous stream of relative values inseparable from the creation of their form. [17] Conceived as a current of forces, the subdivision of the components of a form is more complex than in empty space. Instead of a neutral abstract space which is an empty container in which given components can be discretely located according to their x, y, and z co-ordinates, space is an active force of design. Significantly, in terms of the difference between Lynn's vocabulary of design and a classic model of empty space and ideal structures there is no essential structure to the forms that manifest which exist relative to the shapes which occur. There is no deviation from an ideal. Forms occur according to their own logic of differentiation and exchange of which active space is an irreducible part. [18] Occurring according to their logic of differentiation and exchange, symmetry breaking is not necessarily arbitrary or chaotic but is co-extensive with the logic of interactions as they occur. Randomness or chaos is therefore not in simple opposition to a logic of forms.

As proteins are curved structures there is an obvious applicability of Lynn's vocabulary to protein design. However, while there appears to a reflexive fortuitousness in proposing to apply an architectural vocabulary inspired by an early geneticist, I am not interested in Lynn's language of design because it is underpinned by an essential definition of biological life: A definition that will replace the error of others on which the opposition of design and random emergence is based. I am not suggesting any sort of corrective correspondence between Lynn's vocabulary and a definition of life drawn from Bateson. On the

contrary, it is the shift from a language of given components and ideal forms to a language of differentiation and exchange which does not correspond to any pre-existing capacity that I suggest offers the opportunity to develop a language of design articulating the potential for novel proteins to occur, and indeed novel biological systems generally. When emergence is asserted to be a pre-existing capacity it is equated with life itself. Equated with life, both design and the randomisation of DNA are placed in relation to its essential capacity: *the design of life, the randomisation of life (*even as the latter is asserted to correspond to its inherent definition) and their opposition is drawn. Exploring the potential of structures to form during temporal interaction on the other hand, shifts the language of design understood as a manipulation *of* life, to designing *for* life, for the way it may dynamically occur in future.

With Hugh Fisher of the Australian National University, I have begun to explore just such a language of change. Drawing on the structurally creative aspect of time and force we have begun to address the possibility of developing a language of protein design which steps outside of the opposition between design and randomisation on the basis that life is defined through its inherently random capacity for emergence.

While I'm unable to discuss our attempt so far in this context, and I've only offered a sketch of Lynn's work as it might be applied to protein design, seriously entertaining the idea of such a vocabulary I suggest generally offers the opportunity to shift arguments in synthetic biology away from the design *of* life to the design *for* life.

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INTEGRATING WEEBLY AND GO DADDY INTO A STREAMING MEDIA AND AUDIO PRODUCTION PORTFOLIO COURSE

Daniel Walzer

This abstract focuses on integrating Weebly and Go Daddy as effective tools for teaching streaming media in an audio production curriculum. By combining these web elements, audio production students are introduced to convergent and integrated broadcast media concepts while building their final portfolio to graduate.

As traditional media outlets converge towards a fully integrated digital platform on the internet, the need to address these changes in an audio production curriculum is essential. Capitalizing on the myriad of web-based portals to simulate broadcast environments is both cost effective and an excellent tool for building a comprehensive portfolio as students near graduation from the academy. By creating class projects that teach the essential aspects of simple web design, video blogging, podcasting and audio production, students are exposed to a well-rounded set of course competencies that foster creative thinking, entrepreneurship, and effective promotion. By incorporating this comprehensive approach, students are better served to navigate the demands of a changing media landscape while learning to creatively express themselves using simple web-based portals.

According to Britt and Eppes (2003), audio production curricula have grown considerably over the past decade in large part due to the powerful marketing and interconnectedness between popular culture, media, and electronics technology (1). Students in a typical baccalaureate audio program are exposed to sound for picture, MIDI production, electronics, video editing, mixing, music production, live sound, sound for animation, and multimedia web production. As technology has become more integrated with the internet, aspiring audio professionals have the ability to create and upload sonic content almost instantaneously.

According to noted American author and educator Mark Prensky (2005), 21st century audio production majors are fully immersed in a "digital native" culture (2). Prensky defines digital natives as "students [who are] native speakers of technology, fluent in the digital language of computers, video games and the internet". (Prensky 2005, 2)

Streaming media and web-based production courses are specifically designed to showcase student work and facilitate creative multimedia expression in a cost effective fashion while observing the changing trends in Web 2.0. According to Brown and Adler (2008), the rapidly changing influence of technology has infiltrated the educational marketplace and students are now poised to powerfully influence multimedia expression on a global scale in an extremely cost-effective way (18).

Generally a course of this type would showcase student demo reels and occur in their third or fourth year of undergraduate study. At this point of their degree matrix, audio production majors should have taken foundational courses in digital audio, video editing, computer applications and studio/live recording classes. These varied courses would also serve as appropriate prerequisites for the convergent

streaming media class.   A streaming portfolio course could also serve as a perfect capstone for the internship and/or graduation.

An audio-focused streaming multimedia course is set up in two distinct ways. The first is a lecture-based format in which students are exposed to the basic theoretical principles of streaming media. During this portion of the class, students learn about web- delivery formats, audio and video-specific codecs, Web 2.0 principles, and the general history of media production for the web. Students learn about the aspects of effective web promotion through the analysis of metadata, search engine optimization and effective keywords. Additionally the students learn about the evolution of social networks and their role in the media marketplace, and a history of media players as well.

The second portion of the course focuses on laboratory work, where students produce and refine various types of media content. In considering the space and web design limitations, a web-based portal serves as an effective host for student websites and audio/media portfolios. The comprehensive "reel" and corresponding website are built over the course of the term in stepwise fashion.

Weebly is a website with dedicated web templates that allow students to customize the layout of their site with a number of multimedia options. Some of these options include embedded video, music players, and slide shows. The students are given short weekly video assignments in which they review a product, provide instruction about some facet of audio production, or present a video diary. Other students chose to produce sonic poems with still photography and original compositions. Once the students produce a simple two-minute video, they'll transfer the raw footage into Final Cut Pro and proceed to edit the projects as assigned.

The web videos are then exported using Quick Time conversion into a streaming format that was small enough to fit on a website quite easily. Over the course of the term, each student will produce six to eight finished videos, complete with edits, fades, and the appropriate slate. Each student is required to tape a "video greeting" which will appear on the front page of their website.

As a part of each lab time, the students critique each video and are encouraged to develop a mini-series based on these short video exercises. The goal is to foster a creative mindset for producing short-form content. As a result of this, by the end of the quarter each student's web videos increase in depth, production value and overall content. This portion of the project also familiarizes them with multiple video compression formats and multiple delivery streams. Some students chose to create their own YouTube channel as well. By cross-promoting their YouTube channel, they drove traffic to their content in a quick fashion. This is a great benefit to lab time as Weebly also has a multimedia feature that allows web site builders to link to other media outlets as well.

After the students build some momentum in the video realm, they were encouraged to take pictures with a digital camera and create a Flickr account as well. Since Weebly allows for a Flickr slide show, the students already have two or three significant elements for content on their website. A portion of each week's lab time is dedicated to exploring the Weebly templates and each student receives instruction in how to drag and drop the elements into their website.

Weebly has a feature that allows for configuration of a domain name from an external source. In this case, the students are presented with two options. Most of the students in the course upgrade to the Weebly Pro account for a nominal fee. This allows them to further customize the html to their specific

needs. By doing so, they can embed their current resume, contact information and additional portfolio pieces.

Go Daddy is one of the most visible domain hosts on the internet. Students in the class researched the available domain names and then encouraged to purchase their domain name through this site. By doing so, they could register the name and then reconfigure it with Weebly's site. In total, the cost is under thirty dollars for the Weebly Pro and Go Daddy registration for six months.

Once the students purchase their domain name, the final step of the process involves redirecting their Go Daddy domain name with Weebly's site. In the FAQ section of Weebly, there is an entire tutorial in how to configure a customized domain name with their server. The students redirect their Weebly default address to the customized domain name. Within a few minutes their individual domain names appear with the Weebly website they have just built from scratch.

Students started including additional audio and post-production projects that serve as appropriate demonstration recordings. Some choose to link these videos to their YouTube channels, and others take advantage of the Weebly music and video players. In all, the students are required to submit three finished web videos, three finished audio mixes, an updated resume and contact information, and their other multimedia projects on the Weebly site. The final element includes their personalized video greeting. This video greeting helps personalize the site and is a memorable alternative to a standardized cut-and-paste cover letter that is written. Additionally these elements take advantage of the simple multimedia tools that are at the consumer's disposal.

By the end of the quarter each student has an individually designed web page that is truly reflective of their personality and interests. In the beginning of the term, the students often express apprehension in trying to build a website without much experience. This alternative has been most effective in showing them how to be empowered in the Web 2.0 era. The project gives them a tangible item they can continue to revise after the course is finished. With a simple click of a mouse, potential employers can peruse the student's demo reel and portfolio, thus increasing their chances of standing out in the job market, all while giving the student a viable avenue to display their originality and creativity.

By configuring Weebly and Go Daddy into a comprehensive semester or quarter-long project, audio production students test out the web domain without serious complications. Secondly they learn vital web-based design skills while fostering an entrepreneurial mindset through search engine optimization and metadata manipulation.

In this digital era, audio production students need every advantage they can in order to foster a creative multimedia presence on the web. As the paradigm changes with media convergence, this project has created a synergy between technology, entrepreneurship and the stated learning objectives of the course. This project has also been a cost-effective solution to limited server space. And most importantly, it has reinforced the importance of well-roundedness as our audio production majors enter the job market after graduation.

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A LAYERED PROCESS: LYRICAL IMPROVISATION

Beth Warshafsky

As an artist bridging influences, practices and histories, I am interested in the expressive development of form through process and in poetics in the broadest sense of the word.

Fig 1. Still from Behaviors 2010, Video Projection for live performance with Gerry Hemingway at Follow the Sound, a jazz and new music festival, deSingel Internaitonal Kuntscampus, Antwerp, Belgium.

A Layered Process: Lyrical Improvisation

As a young poet turned painter and printmaker, I was always interested in how content shifted as it moved between mediums. While I was enamored with painting and the formal innovations which propelled modernism, I was also concerned that some of the things I wanted to express did not lend themselves to paint. Digital media was not yet on my horizon, but I was surrounded by non-narrative filmmakers who were also grappling with the formal properties of their medium. While I never made films myself, by the time I started to work on the computer, I was already looking for something.

Right after graduate school in the mid 1980s, I entered the emerging world of broadcast and cable graphics and animation and immediately started experimenting with this new medium. It was natural for me to transmute some strong painterly and expressionistic qualities to this canvas. The directness as well as the mutability of the computer made an immediate hit with me, while the ability to work both with multiple images and time became my focus.

As a tool, the computer makes it easy for an artist to work with the same material in different contexts. For me this means moving between stillness and motion, between abstraction and representation, between image and sound, incorporating dance, text and data driven "materiality into my work. The fluid overlap between these sources and processes allows my work to lean in different directions, depending on what it is I am trying to express.

Working in multiple mediums also expands the possibilities for metaphor, not only between sound and image, abstract and representational form, but through new expressions of materiality. The word "brush" now includes the whole body through both photographic sources or data capture. These practices are extensions of basic expressive tendencies.

Because we are inherently multi-sensorial, I experience a strong feeling of materiality and an engagement in my body--a certain energy-- even when I'm working with multiple layers in a complex computer interface. Seeing it means feeling it, whether the tool is code or paint. This orientation toward process and through the body informs so much of what I do.

This is furthered in my collaboration with the musician and composer Gerry Hemingway. We have worked together for almost 20 years and have established a way to dialogue about sound and image which shapes the content of our pieces. Often we work back and forth, moving between multiple layers of sound and image to create a compositional whole. This allows for overlapping correspondences and associations in content.

I am going to be discussing two directions in our latest work -- visual music and lyrical form.

"The Visiting Tank" is a 13-minute piece Gerry wrote as part of a program of Chamber Works, originally performed and recorded for Tzadik Records in 1999. In 2010 I created a visual score, which was projected behind a string quartet at the Kleintheater in Luzern, in a show named "Step Across the Border." This evolved into a single channel video, an emotive tone poem. It was inspired by the events in the former Yugoslavia, which had left it's legacy of destruction and devastated so many lives. Gerry composed the music in a kind of narrative format, imagining, in sound, a story about the war from the perspective of the children who survived it.

This piece was a departure from our previous collaborations in that I composed a visual score after the music was written. While it is not necessary for the audience to know these details in order to appreciate the work, both Gerry and I incorporated elements from the countries involved in this conflict. Gerry used parts of the Bosnian and Serbian national anthem in a violin section, and I trolled the Internet for video references. My sources (from UTube) included images of nature and war gleaned from home movies and news. This was the first time I used material from the internet, some of it already poignant, and I feel it's important to acknowledge that these experiences which moved me so, were not my own.

Our next piece, Behaviors, which is a work in progress, focuses on visual music for live performance. The image score was projected behind Gerry's performance last year at "Follow the Sound," a jazz and new music festival at the deSingel International Kuntscampus in Antwerp, and this year at Guilph Jazz Festival in Canada. In this incarnation, we consider the projection as a layer which is positioned between the live music and pre-recorded sound textures which Gerry triggers during the performance. Musical transitions, from continuous transformation to fast changing juxtaposition, form the structure of the sound and image.

While I sometimes curse the limitation of the computer environment, I love the fact that it provides a space for me to try to forge these kinds of connections. Often I feel I am working on a platform as an alchemist, shifting source materials into new amalgamations.

I am interested in the expressive development of form through process and in poetics in the broadest sense of the word. As an artist bridging influences, practices, and history. I believe that it is as important for me to continue to engage the "painter's eye" as it is to adapt new kinds strategies into my work. I think this creates a dynamic dialogue with the past, allowing for new and even unexpected inspiration. Following these threads wherever they lead is not only "the state of art" today, but it is part of what makes contemporary art practice so interesting and exciting.

CLASSICAL HOLLYWOOD AS AN EPISTEMOLOGICAL NETWORK

Birk Weiberg

The paper discusses optical effect techniques of the 1930s and early sound film as intrinsic practices of commercial cinema. The approach only to be sketched here is to discuss structures, machines, people, and institutions as tantamount agents of an epistemological network where education turns into means of development and control.

Perhaps no other medium has been described, analyzed, and understood in relation to other media as much as film has been. Theatre, photography, and magic provided a framework for understanding the intermediality of film as an exchange between people, objects, and techniques. In what follows I shall leave aside the peculiarities of these entities, and shall instead regard them as equivalent containers of knowledge – a reduction that resembles Bruno Latour's concept of an ontological symmetry of human and non-human actors. [1]

The attempt to describe Hollywood around 1930 as an epistemological network immediately raises the questions of how much external knowledge was necessary and how much was digestible to support the development of a relatively young medium like film at that time? I shall claim that Hollywood progressively excluded external 'actors' and therefore was forced to establish its own structures in order to compensate this loss or integrate knowledge on its own terms.

The fact that most people working in the industry did not have higher or specialized education proved to be favorable for achieving independence. Autonomy here means self-referentiality as opposed to intermediality.

1 Hollywood & Education

In 1927, banker Joseph P. Kennedy, who had recently made his first ventures into the movie business, organized a lecture series at Harvard Business School. It consisted of speeches by Hollywood representatives – most of them producers or executives. Kennedy's interest was to show to the upcoming economic East Coast elite that film was a legitimate and rational business. Furthermore, he used the course to consolidate his industry network. Kennedy later published the lectures under the title *The Story of the Films* [2] and sent myriad copies to leading figures in the film business.

An invitation to Harvard was considered prestigious. Therefore, even the seriously ill president of MGM, Marcus Loew, accepted. Deeply impressed by standing in front of highly educated young men he started his speech as follows: "I cannot begin to tell you how it impresses me, coming to a great college such as this to deliver a lecture, when I have never even seen the inside of one before." [3] The notion of Hollywood as a place of "widespread illiteracy" [4] was cultivated inside and outside the system. The two seminal descriptions of 'the movie colony' by Leo Rosten (1941) and Hortense Powdermaker (1950) remain internally inconsistent about the educational level of their objects of study, both perpetuating and discounting the cliché. "The fallacy of our stereotypes about Hollywood is strikingly illustrated by the

fact that whereas uneducated captains of industry are praised as 'self-made men,' uneducated movie executives are dismissed as 'illiterates.'" [5] But even in its delusiveness, the notion of illiterateness was constituent for both the dynamic and the self-image of the film industry. "Since many of the fortunes are made by men with little training or special ability, the idea that they can be made by anyone persists." [6]

Whether the level of general education among Hollywoodians was below or above that of other social groups, initially there was no chance to gain expertise through formal education. Just as the lecture series at Harvard remained a singular case, the 1920s and 1930s did not see film programs at American universities or established art schools – with the exception of the University of Southern California (USC). There were a variety of offers by private technical schools whose main aim was not to educate but to make profit, exploiting dreams of film careers in acting, script writing, cinematography, or film projection.

Despite the awareness that Hollywood had its own needs for education, universities were first of all seen as a market and not as a source of knowledge. With the introduction of sound in the late 1920s, the option to produce educational films and distribute them for teaching and learning purposes seemed reasonable. Films with lectures were not only cheap to produce but at the same time could sanitize the image of the film industry. The entry of film as a teaching aid also paved the way for teaching film. But universities initially showed a genuine reluctance toward commercial film production, and confined themselves to courses for amateur filmmakers.

With World War II, the focus shifted from educational films to training films that conveyed technical rather than propositional knowledge. The U. S. military was confronted with huge amounts of green recruits who had to learn how to fight. Know-how here was more important than know-what or know-why. The thousands of films that emerged within a few years – with a few exceptions – were not produced in Hollywood but by newly established or expanded military institutions like the U. S. Navy's Photographic Science Laboratory in Anacostia, Washington, D. C.

The military qualified not only soldiers but also film professionals as part of its communication and reconnaissance tasks. They were the first filmmakers who learned their craft outside the film industry. When the war was over, movies seemed to be a legitimate career option for many of them. The University of California Los Angeles (UCLA) only in 1947 started its first practical film courses and thus provided knowledge independently from the industry.

The dissolution of the studio system after the war was hence not only a result of the triumph of television and antitrust legislation. The shift in epistemological structures as it was caused by the education within the military and subsequently in universities had a similar effect as the divestiture of the economic monopoly.

2 Film Knowledge

How was the acquisition and production of knowledge organized until a formal education of film production existed? We can roughly distinguish here between two phases. During the first phase, any kind of epistemological network, including Hollywood, tries to constitute itself. Therefore, at first Hollywood gathered knowledge (again in form of information, people, and machines) from other networks, i. e.,

photography, theatre, fine arts, and magic. When in the 1920s the network had reached a significant degree of coherence, it tried to translate stability into autonomy, and therefore tended to reject external knowledge. This included not only techniques of production but also tasks that might be considered external, such as censorship, which it effectively internalized through the notorious Hays Office.

Hollywood, it seems, aimed at a greater degree of independence than other industries. "The stimulus of contact with those from other fields of endeavor, which is so accessible in most big cities, is lacking in Hollywood. For the most part, people work, eat, talk and play only with others who are likewise engaged in making movies." [7]

Besides the studios, unions, and guilds, the Californian film industry created institutions whose main aims had an epistemological but non-scientific character. Three such institutions that shaped knowledge in Hollywood are the Society of Motion Picture Engineers (SMPE, today SMPTE, founded 1916), the American Society of Cinematographers (ASC, founded 1919), and the Academy of Motion Picture Arts and Sciences (AMPAS, founded 1927). SMPE organized conventions and published a journal with the aim of technical advancement and standardization. Though these are important tasks, SMPE lacks traits that cannot be found in other industries.

With its emblematic motto 'Loyalty, Progress, Artistry,' the ASC is a rather specific organization that offers membership by invitation only to cinematographers and visual effects artists. Its primary aim is to create an exchange of information among its members which at the same time informs a wider public about the state of the art. From the outset, the ASC published its own magazine containing reports on current productions and interviews with its members. Later the magazine was supplemented by a yearly updated handbook with various information a cinematographer might need while working on a film set. Both publications display the society's ambivalent aims in collecting and distributing knowledge (on techniques and the role of the cinematographers alike) and in building an elite.

AMPAS until today is best known for its annual awards celebration. But the academy's research and educational purposes were at least that influential. Its research council by the end of the 1930s consisted of 36 technical committees. While the ASC limited itself to camera issues, AMPAS could deal with all kinds of questions.

The greatest change cinema saw after its initial establishment was the introduction of sound in the late 1920s. As David Bordwell has described, the production of sound films was not only a technological but also a structural and financial challenge. For shooting a silent film on location, it might be enough if a cameraman brought along his own apparatus. Talkies asked for specific sound stages, built up of sound recording devices and multiple blimped cameras mounted on dollies or cranes. [8]

With increasing expenditures, the studios' small machine shops turned into in-house research departments. Cinematographers and sound engineers tried to compensate for the shortcomings of the equipment from outside manufacturers by improving details or developing their own devices. These inventions – such as the mike boom – were later handed over to manufacturers for mass-production. This way the whole movie industry could profit from them. Industry institutions took on a crucial role in this process. Innovations were often discussed at conventions and later presented in trade journals. In this way, innovators received both credit and appreciation for their work while seeing it advertised at the same time. [9]

This structure was helpful in solving conflicts that overshadowed sound innovation as a whole. Sound technique was developed outside of Hollywood by the telephone and radio industry. A first step toward bringing cinema and sound together came with a variety of contracts, acquisitions, and mergers resulting in structures like RKO Radio Pictures, controlled by the Radio Corporation of America (RCA). One reason why the economic integration did not entail an integrated practice was that sound engineers had quite different notions of what it means to record sound, as James Lastra has shown in his analysis of early sound film production. [10]

As a result of newly arising conflicts, the studios started to retrain their workers. AMPAS in cooperation with the University of Southern California (USC) organized a course program which about 900 employees passed through within two years. "One of the chief merits of the program as far as academy executive Lester Cowan was concerned was the opportunity to train current studio employees to become soundmen instead of importing the latter from other industries." [11] This policy accords with Bordwell's observation that the style of Hollywood cinema remained surprisingly stable while sound recording and mixing practice was developed with strict image-sound analogy. [12]

In addition, we can assert that from an epistemological viewpoint the introduction of sound amounted to a major turnover, as it consummated the electrification of film production. Silent film was at its core an opto-mechanical operation that required little theoretical knowledge. Sound technology contained elements that no longer could be seen or even touched, and which therefore required a sublimation of the production process. This passage from technical knowledge to propositional knowledge – from knowing how to knowing that – meant an intellectual challenge to Hollywood that slowed the transition.

3 Optical Effects

The development of optical effects received less attention than that of sound technique. One reason might be that due to the smaller market for corresponding devices, it was difficult to activate larger networks. While sound knowledge circulated between studio technicians, industry associations, and external manufacturers, optical effects during the 1930s remained a topic for the studios' trick departments. Bordwell claims similarities between the post-production phases of image and sound, attributing the fact of consistent terminology ('fades,' 'dissolves') to the equalization of both domains. [13] Besides, we can assume that through the necessity of sound mixing, the post-production of films received increasing attention in general. Likewise, optical post-production could profit from the controlled environment of sound stages.

Two techniques that reached maturity in the 1930s are rear projection and optical printing. One precondition for the regular application of both practices was the increased quality of film stock, which allowed additional generations in the printing process. Compositing, i. e., the consolidation of various image layers into one coherent composition, was by then achieved through techniques adopted from theatre and photography. These included painted sets, miniatures, glass paintings, and double exposure. Though these techniques – especially glass shots – produced satisfactory results they amounted to constraints in shooting. One regular assignment was to complete a building of whose first floor was the only storey that was actually built; additional stories were painted on a glass plate in front of the camera. Such painting had to be done on the set in order to have a fitting perspective and shading. The industry had an interest in postponing these parts of the job to post-production phase for reasons of flexibility and additional creative options. There are two central figures who advanced the two techniques that were in need here. Farciot Edouart, Head of Transparency Department at Paramount Studio, worked on rear

projection while Linwood Dunn of RKO Radio Pictures refined optical printing. Born only ten years apart, Edouart and Dunn signify a shift from imported to acquired knowledge, since the former could draw on a family heritage of photographic craft.

Before Dunn started his career at RKO, he worked his way up as a cameraman without any formal education. Remembering his first days in optical effects, he said, "I learned by doing. […] I knew really very little. I'd done a lot of trick work in the camera in the silent days – composites, mattes, split screens, things we all did. The first optical printer I saw there was nothing but a lathe bed with a Mitchell camera stuck on it, facing a projector." [14]

Neither Dunn nor the apparatus were literally 'informed' in a Flusserian way. As there was no regular way of learning visual effects, there was no long-term practice of developing the machines for it. Due to a lack of research budget in film production, studio technicians used current productions to develop their infrastructure. It remains for further research to determine if this dependence on day-to-day production substantially influenced optical printing and other techniques, or if it only deferred developments.

That optical effects were an important but not yet essential part of film production becomes clear when looking at how Dunn had to promote his activities. Since the early 1930s, he was active in SMPE, ASC, and several other institutions. He lectured on optical effects at conventions and published articles in trade journals. In one of them, he not only lists 13 different studio departments that profit from the "Optical Printer Handy Andy" [15] but also describes how a virtual Landscape Department might benefit from his apparatus as well.

Dunn's optical printer at RKO was of course not the only one of its kind in Hollywood. Most studios had similar devices, but all of them were unique. This singularity had the effect of embedding the features and procedures of effects production. Technical knowledge was produced and circulated as it had been in pre-industrial crafts or artists' studios. In order to keep effects-knowledge available, it needed to be packaged in a distributable form – a process which the history of science calls 'blackboxing.' "The word *black box* is used by cyberneticians whenever a piece of machinery or a set of commands is too complex. In its place they draw a little box about which they need to know nothing but its input and output." [16]

Just as a black box itself is a stable object, it helps the building of such a device to have a steady environment. Though the studio system as a whole can be described as stable, this does not apply to the position of optical effects, as Dunn's efforts to strengthen his position have shown us. The network that was needed to finish his optical printer was provided only when the USA entered World War II and the military upgraded its media infrastructure. The aforementioned Photographic Science Laboratory was built in 1942 and 1943. It was supposed to provide the Navy with all still and motion picture services required, i. e., aerial reconnaissance and the production of films for training and publicity. The Eastman Kodak Company was assigned to plan and equip the laboratory, but had to learn that the optical printer they needed was not "a commercial 'shelf item' product." [17] As a result, a network was established that would produce the first apparatus of its kind that was patented and later could be ordered as such. The inner network consisted of Linwood Dunn at RKO, his studio assistant Cecil Love, who was serving at the Navy laboratory, and the Acme Tool and Manufacturing Company, a machine shop in Burbank that entered the movie business when modifying animation stands for Walt Disney.

Having been built with both external support and internal knowledge, the Acme-Dunn Optical Printer stands as a contradictory object: from an ontological viewpoint, it marks an idiosyncratic break or watershed, when film shook off the old allegation of merely reproducing reality and took on the status of self-referentiality, by filming film and thereby opening up the potential of using copying as a creative process. At the same time, it encapsulated knowledge of the studio system and helped to transmit the very same structure forward into the post-classical era. This device transcended some of the tasks for which it had originally served, and accelerated the medium's advance.

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ENCOUNTERING THE BODY IN ART, ONLINE: VAINS (VISUAL ART INTERROGATION AND NAVIGATION SYSTEM) THE ABJECTION APPLICATION AND THE NEURAL ART NAVIGATION TOOL

Lee Weinberg & Eleanor Dare

VAINS is a curatorial art platform, focusing on repository, search and content recommendation tools adjusted to art content online. It is dedicated to repositioning the body in HCI and deploying thr embodied and situated nature of human users as core resources. curatorial methodologies and ways in which digital art is reshaping curatorial practice are discussed. Experimentation with Abjection Application and Neural Art Navigation tool described
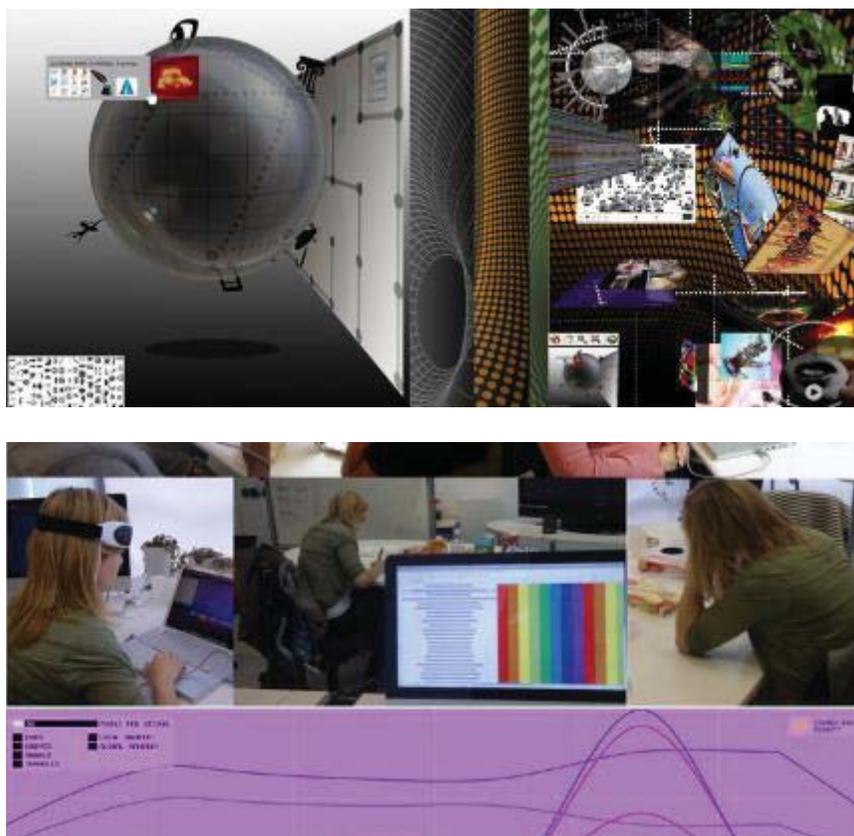
Project Outline

VAINS is an interdisciplinary work in progress. It aims to be an interactive website which offers repository, search and content recommendation tools tailored to viewing digital art in an online environment. The website is composed of different function areas: an archive that can be accessed through cre-

ative search tools; curated spaces, corresponding with the idea of exhibition halls; a research / education centre and a social network. Each of these areas would like to offer users different services, resonating the main principles of the ICOM Code of Ethics for Museums[1]. VAINS Archive draws upon the database of the Computer Fine Arts Collection, courtesy of artist and collector Doron Golan[2], but also aspires to expand its database dynamically by encouraging user generated content, combined with curatorial initiatives.

During the past 18 months we have been developing some of the VAINS tools, placing special emphasis on experimenting with search engines. This paper will outline two of the latest tools created for VAINS: "The Abjection Application" and the "Neural Art Navigation Tool", while positioning these within the context of our methodology.

Background and Methodologies

Artistic practice is becoming increasingly embedded with digital media such as mobile devices and the Internet. This embedding is complex as the technology is both a medium and a dynamic agent in the structure, dissemination and reception of artworks. As such these artistic practices introduce new challenges to curatorial practice which have already been acknowledged by prominent figures in digital media.[3] These writers address a lack in suitable and innovative means for filtering and navigating online art content while referring to the fragmentation and anachronism of many online art contexts. In practice, online art remains, generally speaking, inaccessible to the wide public.

Accessibility in our view is both the ability to reach content, and the ability to offer tools for a flexible understanding of the content retrieved. In engaging with art works, accessibility might also mean supporting or enhancing an "Aesthetic Experience" [4].

Traditional curatorial practice uses established means such as exhibitions in order to create a context that highlights a possible narrative for interpretation. Viewers, relatively trained in reading exhibitions, intuitively understand "context" on the linear, physical level they offer. These display and classification mechanisms are based on a relative stability of accepted hierarchies between viewers and object-based art works.

Implicit in Western thinking[5] about the image is its role in preserving and encapsulating the past. In Computer Fine Art, programmes, which present themselves as images, actively record, accumulate data, and change according to the viewer's interaction with them. The presented image therefore becomes a platform for a relationship – blurring the safe boundaries between viewer and the image - subject and object. In this sense it disrupts orthodox hierarchies between viewers and artworks. Such artworks, therefore, naturally question the curatorial agency and its approach to representing and preserving art works which are centred on process. The theoretical contour which is usually formed by traditional curatorial means is blurred.

To cope with this, and reconstruct the familiar experience, we found that online interfaces fall into two main categories, either they adopt the familiar economics of "transparent" [6] text-based design[7], or they imitate and re-produce the experience of the art encounter offline[8].

We are interested in asking what an art encounter might mean in a fluid, online environment and how the context within which, and with which, these art works are created, can be brought to the viewer. VAINS would like to offer a metaphorical architecture, where walls are in essence, the programmes that lie beneath the interface, that filter through which content is retrieved. Curatorial practice in this context is not about the selection and classification of artworks, rather it is about exposing the means through which those are selected, and the filters with which classification and categorization are performed.

***

Central to enhancing a meaningful art encounter is the relation to sensual and bodily experiences. In this sense, our methodology has been supported by close readings of enactivist and situated theories of cognition, in particular readings of Alva Noë[9], Maturana and Varela[10] and Lucy Suchman[11].

These writers validate the proposition that human beings are entangled corporeally with their technologies and with complex, relational and temporally bound systems of agency. Although many of online art works are commenting on tensions between the absence and presence of the body in digital or "virtual" worlds, curatorial platforms online seem to neglect (theoretically and technically) questions of bodily or sensual experience in the encounter with art works online. Hence, a core methodological commitment embedded in this project is the confrontation or re-framing of the body in the experience of viewing art online. This is supported by an examination and challenge to the *a priori* separation that is assumed between computers, humans and the ready-made separations that are projected between subjects and objects (including viewers and artworks).

To clarify the relationship of VAINS to these ideas we would like to frame them within a historical context in which computation has been dominated by top-down, disembodied and propositionally based structures. Enactvism offered a radical break from this construction, emphasizing the way that organisms and human minds interact with their environments. The methodologies represented by enactivism and situated cognition offer the possibility of constructing an alternative form of digitally curated space, one that deploys embodied subjectivity and situatedness as valid and valuable resources in the generation of new creative insights in the field of online arts.

This reframing is an opportunity to integrate the body into new epistemologies and methodological approaches. As Grosz[12] states, eschewing disembodied, computational models of cognition represents an opportunity to '*displace the centrality of the mind, the psyche, interior or consciousness (and even the unconscious) in conceptions of the subject through a reconfiguration of the body*'. But, in reconfiguring the body we might also seize an opportunity to reconfigure the inter-subjective and technological boundaries between bodies and computers; viewers and images.

In reintroducing the body in art encounter online, we found that negotiating the centrality of text and language in designing online interface might go beyond breaking the façade of the historical narrative embedded in online interface design. Recent Neurological research into attention divide, suggests, as Claudia Roda[13] explains in her comprehensive introduction to this subject, that: "*the processing codes dimension predicts that analogue/spatial processes use a different set of resources that categorical/symbolic (e.g linguistic) processes.*" Therefore in creating an immersive visual experience, we are interested in experimenting with platforms that avoid the use of language based navigation.

We would also suggest that a key obstacle in building a flexible context to art works is the predictability, which is currently embedded in the way browsers and search engines are programmed. Keywords are not only filters used by the programme to retrieve the content desired, they are also the filters through which the viewer is interpreting and builds a relation to the content retrieved. It therefore becomes meaningful to avoid predictive means of retrieving content, so that boundaries of interpretation could be stretched beyond the limitations of these.

The *Abjection* Application

One of the first tools we have offered VAINS visitors is a mobile application called *Abjection*. The application encourages users to investigate the bodily traces they have left within their digital equipment while viewing artworks. The identification of such visceral traces may be seen as an interrogation of the notion of the immateriality of our interaction with digital technology, and, perhaps even a challenge to the notion of a stable virtuality.

More significantly still, and in keeping with Julia Kristeva's[14] framing of abjection, it is offered by VAINS as a challenge to the stability and sovereignty of the self in relation to the image and to the technologies that enable both its creation and its conception.

In addition to the visceral and bodily traces left by users of digital technology, we also invite visitors to consider the many other traces of themselves that they (often unwittingly) leave behind. Bruno Latour[15] has framed these traces as representing a significant erosion of the differences between the private and the public.

Collecting and instrumentalising data from users of web sites, whether covert or consensual, is now part of the materiality and medium specificity of the web. But the traces Bruno Latour writes of are arguably rarely made visible to the users who have left them. VAINS makes these traces part of the materiality and navigational structure of the platform.

The Neural Art Navigation Tool (N.A.N)

The Neural Art Navigator is a physical computation system that deploys EEG to sense the electronic brainwave frequencies of individuals while they are visiting online art sites. The system analyses the patterns of electroencephalographic signals and matches them to suitable art works based on a collaborative filtering algorithm developed over the last two years. The system has been empirically tested and the reactions of users qualitatively observed while they experience a seemingly sub-symbolic, autonomic process of interaction with online art works.

Thus far the architecture of the Neural Navigator has been influenced by an enactive and situated methodology that privileges action over *a priori* goals, and instead seeks an emergent, fluid and constantly changing set of navigational pathways. In pursuing a loosely enactive methodology the EEG based system currently configures itself uniquely to each individual, first observing the flow of their

brainwave activity in order to calibrate the system, then allowing for a period of further observation before forwarding users to artworks that have been curated with consideration of the putative 'states of mind' that might correlate to alpha, beta and gamma waves (etc).

In a recent experiment, 11 users have tested the N.A.N system. The goals for this experimentation were: 1. Evaluate how the system functions; 2. Examine the ability of the system to enhance a different viewing and browsing experience; 3. Test whether an embodied experience has been encouraged through the use of the system; 4. Finding whether the use of this system has enabled a different relationship between the viewer and the artworks, and between the viewers and themselves.

Our results have revealed that the use of the N.A.N tool has increased the occurrence of self-reflective thoughts and bodily awareness in most of the users' experience. Interestingly, it seems that more than anything else, what enabled an elongated encounter with the artworks, as well as a relationship to them, was the appearance of the system as reflecting the user's state of mind, suggesting a subjective interrelation between the viewer and the content.

We have also found that most users, while using the N.A.N tool were considering issues of control and arbitrariness. Many of them testified that they were questioning their control over the technology, as well as their control over their own mood and their own mind. This is significant in our attempt to create both unpredictable means of discovering content online, but even more importantly; it seems the use of the system has enhanced a liminal system of interaction, where users find themselves on the threshold between control and non control; self awareness and immersion in external content. These conclusions have been meaningful to our interest in developing a system which questions relationships between subject and object generally, and specifically in the context of computational and technological environments. It has also been a stepping stone in creating a system that leaves users open to interpretation.

Conclusion

The VAINS practice hinges around the tensions inherent in the construction of subjectivity, singularity and collectivism, but, as many of the writers we have referenced maintain, we cannot easily reach a consensus as to what a subject is or even if such an entity really exists. This ambiguity and fluidity is an instrumental presence within this practice, to quote Barbara Bolt, it is a practice in which *'the materials are not just passive objects to be used instrumentally by the artist, but rather the materials and processes of production have their own intelligence that come into play*'[16]. This becomes a case in point in our deployment of collaborative filtering within the VAINS platform. In VAINS collaborative filtering assumes both non-instrumental and instrumental qualities according to the unpredictable materiality of the dynamic system at play. Non-Instrumentality is described by Low-grade as 'aesthetic, lucid and social qualities'and instrumentality as 'usability' and 'usefulness'.

In the case of VAINS we are producing a system that is open to interpretation on many levels, from the interface itself, to the overarching significance of the entire system.

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THE IM/POSSIBILITY OF TIME REGAINED: NAVIGATING THE UNSTABLE PAST, PRESENT AND FUTURE OF INTERNET ART

Annette Weintraub

Anxiety about the passage of time is traced from Proust to the current obsession with data overload and real time is interrogated by looking at historical and current work in various media of art that embodies either slowness or time adrenalized. The experience of duration in web-based art and adaptation to rapid change in the preservation and conservation of art made for the Internet is also touched upon.

Fig 1. Industrial Strength [CitySliders], 2011, Annette Weintraub, JQuery animations, dimensions variable. ©2011 Annette Weintraub.
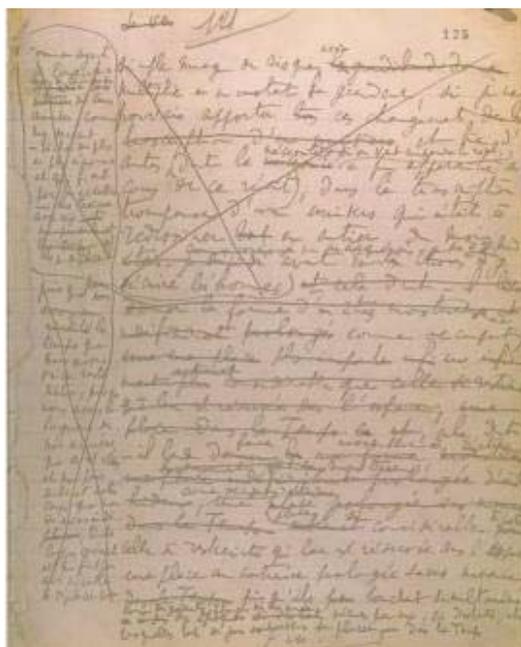

Fig 2. Time Regained, manuscript last page, Marcel Proust, 1922, Gallica Bibliothèque Numerique, Bibliothèque Nationale de France. Public domain.
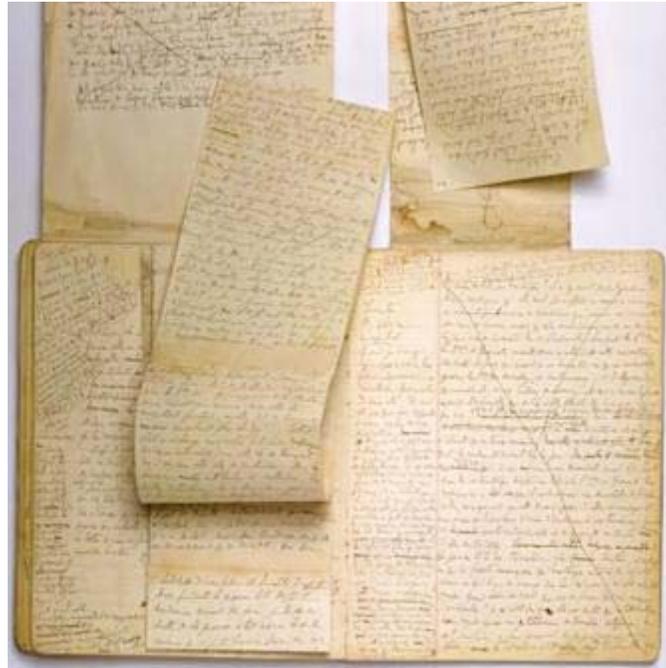
Fig 3. Time Regained, manuscript notebooks 69 and 75, 1916-17, Gallica Bibliothèque Numerique, Bibliothèque Nationale de France. Public domain.

The perception of time accelerated

By titling the last part of his three-volume novel "In Search of Lost Time" ("À La Recherche du Temps Perdu") as "Time Regained" ("Le Temps Retrouvé"), Marcel Proust, in the first decades of the 20th century, captured and anticipated our contemporary anxiety about time and consciousness of time passing. The last manuscript page, so poignantly layered with excisions and edits reads like a time-lapse image of his process, a one-page hypertext. [1]

A modern phenomenon, the sense of the onrush of time is a result of the increased rate of change since the Industrial Revolution. In recent decades, and with electronic media, this change is perceived as an unstoppable tidal wave of 'too much information.' Consciousness of change has evolved, from a general awareness of accelerated time, to an acutely internalized sense of change. This paper will examine the experience of duration in some web-based art and briefly touch on issues of adaptation to rapid change in the preservation and conservation of art made for the Internet.

ANXIETY AND CHANGE

"The enormous multiplication of books in every branch of knowledge is one of the greatest evils of this age; since it presents one of the most serious obstacles to the acquisition of correct information, by throwing in the reader's way piles of lumber in which he must painfully grope for the scraps of useful lumber, peradventure interspersed."   Edgar Allan Poe

In 1845, Edgar Allen Poe raged against the explosion in book publishing; his perception of the threat to attention and quality anticipating both Alvin Toffler's (1970) book "Information Overload" and Richard Saul Wurman's (1989) work "Information Anxiety." Toffler reported on the increased stress and impaired judgment consequent to rapid change, while Wurman offered coping strategies for information overload.

More recently, Nicholas Carr [2] has hyperventilated about how the Internet, social networking and the culture of instant response might be actually changing our brains and making us less able to engage in focused attention and deep thinking. While most of this is overheated rhetoric, there is pervasive unease over the perceived acceleration of change and the flood of new sensory inputs and flow of information.

WHAT IS 'REAL TIME'?

Yet if speed, fracture and overload are the outcome of the 20th century celebration of dynamic change, there are also works of contemporary art which engage 'real time' and slowness as counterweight. It's also possible that 'real time' as an artistic investigation became of interest just as our perception of actual real time in lived experience was eroding.

In Warhol's "Empire" (1964) [3], time is experienced minute-by-minute, with a slowness that can be meditative, contemplative, immersive or alternatively boring, suffocating and lacking drama. Warhol's film was shot at the offices of the Rockefeller Foundation in the Time-Life Building on July 25 from 8:06 p.m. to 2:42 a.m. It was shot at 24 frames per second but is projected more slowly, at 16 fps, so that 6 hours and 36 minutes of footage take about 8 hours to screen.

"Empire" focuses our attention on an iconic structure, seen over time. A viewer might zero in on the minute changes of light, color and background detail even as she twitched in boredom after hours of viewing. Or, she might settle into a reflective and highly conscious state.

From 1999 to 2004, in a web project that recapitulates that history in an homage to the Warhol film, Wolfgang Stahle installed a webcam in his office at The Thing which pointed at the Empire State building, and sent a stream of frames to an exhibition in Germany. [4] The project, called "24/7," changed the sequentially projected frames of Warhol's film into a discrete and even more attenuated sequence, making us aware of the continuum of time extended.

Experimental film of the 1960's also explored the perception of elapsed time. Michael Snow's influential film "Wavelength" (1967) captured non-dramatic time in a way that produced a hyperawareness of each second of duration. Snow is said to have described "Wavelength" as "a continuous 45-minute zoom across a New York City loft." [5] But it is much more than that. We see the continual play of shifts in color, apparent visual changes due to time of day, double exposures and very slow changes in framing, all belying Snow's simple description. Experientially, it is a 45-minute rollercoaster journey into the minutiae of daily life and a deep exploration of the relative perception of time.

Both Warhol and Snow's work may be seen as antecedents to entire genres of online work that incorporate continuous feeds from webcams, surveillance video or CCTV camera.

TIME ADRENALIZED

Yet even 'real time' isn't safe from acceleration. The 'real time' format of the TV series "24" is paradoxical: the minute-by-minute equivalence between plot action and viewing time is precise, yet the action in each moment of narrative is hopped-up and feels like real time on methamphetamine. [6]

The ticking digital clock, like the timer on a bomb, counts down the minutes of the hour, the quad-screen format multiplies the sense of urgency. The digital clock makes us aware of the moment, but alienates us from being in the moment. Perversely, as it ostensibly matches real minute for narrative minute, "24" gives us a speeded-up reality that is the opposite of "Empire." In Warhol's film there are many moments where nothing 'happens' and it feels like pure existence. In '24',' life is reduced to pure speed, with instantaneous choices and action at an unsustainable pace. The artificial tempo has an interesting effect: it intensifies duration and makes momentum addictive; the perfect format for an ADD (Attention Deficit Disorder) culture.

EXPLOITING DURATION IN INTERNET ART

The image of real time adrenalized is an apt framework for looking at the challenges to artists working with technology. For early internet-based work, slowness was not a problem, it was a condition. In the era of dial-up, and of web pages of less than 33k in size, it was a priority to speed up download, hide the delay while preloading in the background, or use a progressive jpg to 'animate' the wait time. GIF animation, which was invented in 1987, also provided an illusion of speed, as did meta tag refresh animation.

Recently, the image blinking and color cycling of '90's GIF animation has been reinvented as a retro popular practice that paradoxically embodies both speed and slowness. The GIF animations of Tom Moody [7] have the frenetic and wacky quality of early GIFs but with a new playfulness and sophistication, while Nicholas Sassoon and Sarah Ludy, members of the artists' group Computers Club, have used GIF animation meditatively, particularly in a dreamily slow installation titled "Wallpaper" (2011) [8]. The repetition and cycling in their GIF animation creates a receptive space for extended duration: optically fast, but experientially slow and attenuated.

CHANGING PERCEPTIONS OF DURATION, ACCLIMATION TO INSTANTANEITY

The constant competition for our attention span is certainly a factor in how we perceive duration. With growing availability of broadband there has been an explosion of sites online: currently there are 346,004,403 unique Internet hostnames compared to 18,000 in August 1995. [9] There is too much to see, and not enough time. This parallels the 'real world' as in the "8-second rule," a widely-reported statistic that calculated the amount of time a typical museum viewer spends in front of a work of art.

Coincidentally, 8 seconds is also the estimate of how long a web viewer waits on a download before hopping to another page, (although it now is being downgraded to 4 seconds). As we juggle multiple devices simultaneously, there's less tolerance for 'the wait' and more asynchronous I/O attention; it's packet switching instead of network switching. Online, slowness is by default defined as a problem, and the expectation is for immediate response and constant stimulation.

DURATION PROFILES

The duration profile of different media is something I've considered since my first web project in 1995. At that time, because of bandwidth considerations and access mostly by dial-up, the Web was strongly text-based. "Realms" used paired text and image to create an intimate bond with the reader, develop an online narrative and to mitigate the download time.

At home, at a café, or in a gallery, a work that's on an individual computer can connect in a way that is altered when the same work is projected for multiple viewers. The one-to-one relationship is appropriate for the intimacy of storytelling. Text also has an internal metronome that is constant—while a phrase or headline can be taken in at a glance, reading, even rapid reading, requires duration and self-limits speed.

My online projects since have mixed reading, hearing and seeing, using the intersections of repeating content in different formats to create a layered experience. This can produce a mediated overload, in which repetition or the restatement of themes, iconography or ideas emerge as the viewer cycles through overlapping iterations of text, audio and image. It also provides a way for the viewer to become immersed in a narrative environment.

"City Sliders" (2011) is a series of in-progress JQuery animations that explore the surface of urban space using moving text fragments and images. These animations construct a visual narrative about the texture of urban space using a repeating rhythm of horizontal and vertical directionals that change scale, weight and pattern and which represent the 'skin of the city.' The images are overlaid with texts that speak to the relationship between underlying structure and external appearance. "City Sliders" incorporates original photographs and images from 3D models that were built, lit and texture-mapped in Cinema4D; a later iteration will add ambient sound and audio monologue.

"One Text, Many Stories" (2009) was based on the idea of repeating a single text in a variety of visual contexts in order to elicit different readings through alteration of visual context. An original text composed of nine short passages describes an urban space reconstituted in memory, and is interspersed with short extracts from Michael de Certeau's "The Practice of Everyday Life" and "The Production of Space" by Henri Lefèbre. The text fragments can be read in varying order (not necessarily in entirety) and reinterpreted as the images and page structure change. Each page was configured differently in CSS so that page elements expanded, changed format or position, re-sequenced or were given different emphasis, depending on the dimension of the browser page and the viewer's interaction.

"Crossroads" (2000) mixes overlapping sound, moving image and text in purposeful cacophony to represent the visual and aural landscape of Times Square. "Crossroads" also explores how film genres and advertising culture shape our sense of place. Based on elements of the mythic and actual Times Square and 42nd Street, each page has several looping texts and animations; the audio monologues are activated by rolling over the animations, but play independently and are not synched. Two actors speak from different perspectives: a film buff describes how Times Square has figured in film and a storyteller presents a series of fictive narratives in monologue. "Crossoroads" also represents for me the difficulty of conserving or migrating Internet projects in an era of rapid change. The original (and still extant online form) which included programmed QuickTime, Flash and Javascript has been updated several times due to changes in scripting versions and is more easily seen in an archived video. [10]

RIDING THE WAVE OF RAPID CHANGE: CONSERVATION, ARCHIVING AND ADAPTATION

As an artist making projects for the Internet, I am aware changing technology pushing me forward in new work at the same time as I am looking backwards at projects that have been stranded or mutated unpredictably through browser obsolescence.

This pull of simultaneous opposing directions creates a Proustian nightmare in which the involuntary memory is not the savor of a treasured bite of the past, but a nightmare reverie on the instability of past, present and future. In this context, slowness takes on a different meaning: an awareness of the quicker and shorter life cycle of a technology.

Humans are said to be the only animals that have foreknowledge of their own death; new media artists now have inescapable foreknowledge of the possible loss of their work. The 'shelf-life' of art made in the context of this rapid evolution, can be short and this may be inherent in the environment, a feature and not a bug. Electronic arts pose difficulties of conservation, archiving and preservation that are of a different order of magnitude than other arts media. These works can have a long gestation and a short lifespan.

Old media can be subsumed by newer media and their characteristics can migrate (leaving the signature of the older media behind, but transferring essential attributes, as in the evolution of wet to digital photography). But while media can migrate, individual works may disappear. The rapid evolution of web tools creates an underlying instability that is a constant in making work for the Internet. While a work may embody some aspect of slowness, the context of the work is anything but slow.

MANAGING SHELF-LIFE

Net artists are particularly aware of the issue of retrofit fatigue: anyone who has gone back to update old projects understands the conflicted emotions of wanting to preserve older work while preferring to do new work. There are also issues of temporal context, of how to frame work that utilized or incorporated some technical element that was notable at the time, but which is incomprehensible or seems unremarkable once its moment has passed. Retrofit is more straightforward when content is central, but shifts in technologies do alter meaning.

There are several options for dealing with this issue: accept the expendability and ephemeral quality of net art and let it break; migrate the work to the current net environment by updating; or show the work in another format that may convey the appearance and preserve the content, but is no longer the original work. In the case of work that has stopped functioning, or which is beyond reconstruction, documentation seems the only course, and in fact, this is the approach taken by many Net artists who show screenshots or make videos of a web project interaction.[11]

SLOWNESS AS WILLED EXPERIENCE

To work on a constantly shifting platform and in an environment of short shelf-life is to live with instability. To make work that asks the viewer to slow down in an atmosphere of accelerating change is paradoxical, perverse, even counterintuitive. It resists much of what we think of as the inherent properties of life online: speed, instantaneity, divided attention, a 'quick read.'

But like meditation, slowness can be thought of as a practice, and a willed experience. And like meditation, the practice of slowness opens up space for reflection and engagement. Returning to the online images of Proust's manuscript pages, his handwritten notebook pages overlaid with bits of pasted paper, the 'paperoles,' [12] extend out from the parent page, and seem to also expand outward in time and space, in a visually apt metaphor for the lived duration and layered experience they inscribe.

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W0RDM4G1X. OR HOW TO PUT A SPELL ON MEDIA ART ARCHIVES

Nina Wenhart

Aaa, sdafsda, sxjhk hfjk asfjkl. What reminds of onomatopoeia or a poem by Ernst Jandl, are actual tags found as descriptive metadata in online Media Art archives. I call these words magical because they conjure up works and knowledge from the depths of the archive. Magical also, because who but a magician would know about the "spell" sxjhk hfjk asfjkl?

What and if we actually find something in an archive significantly depends on the quality and accessibility of the descriptive metadata assigned to the artworks. "Word magic" provides insights into ways of capturing ephemeral Media Art via descriptive metadata and creating a system of order.

The objects of investigation of this paper are database archives for Media Art. As such I define databases that are mainly documentation archives and have in large parts taken over the role of the classical archive for the field of Media Art; archives that do not necessarily refer to a parallel physical storage/collection, but the (online accessible) documentation archive that can also exist on its own. For in Media Art, what is left to archive very often only consists of documentation material. Such a database archive is about creating order by managing sense, by making statements through this order, by creating a "Grammar of New Media".

Database archives for Media Art can vary greatly in scope and focus. Some collect physical assets like art works or documentation material, others just describe them; some include their own institution's projects only, others group their archive around research topics. The database archive typically makes intensive use of language to manage and describe the assets. For the system itself, a term is just functional, an index to correlate the assigned data with. On the human (input and output) side, these words also have meaning. The differences in meaning for humans are what make the words such a crucial issue. In these database archives, knowledge and histories are not only stored and managed, but also created and constructed. Because of this, there needs to be a thorough consideration of the processes involved and of how these systems are created. In addition to describing content, a database archive also manages assets and creates order by naming and relating. Most databases are still organized in the manner of a shelf, although no physical constraints force them to re-implement what was only meant as a metaphor in data-space. "The categorization scheme is a response to physical constraints on storage, and to people's inability to keep the location of more than a few hundred things in their mind at once." [1] What might have been useful at a time when digital storage was new – using a metaphor to have something familiar around – now proves to be a real obstacle for the sustainability and further development of the archives: "Now it means that the user has to adopt to the creator's specific view of the world, it has become a dogma. It seems that the GUI and all its metaphors has come into our way. It *seems* natural. How terrible." [2]

The Lack of a Standard Terminology

One of the major problems discussed in the context of descriptive metadata is most widely known as "the lack of a standard terminology" for describing Media Art, as defined in "Capturing Unstable Media" by Sandra Fauconnier and Rens Frommé from V2_ [3]. I question whether this really is a problem or if the observed "lack" offers the key to a new concept for "capturing" and describing Media Art. A lack generally means an undesirable condition. Something is missing, and therefore something else is impossible to achieve. The lack has to be removed. In other words, without a standard terminology, it is impossible to correctly and comprehensively describe Media Art. Over the years, several attempts have been made not only to describe Media Art, but also to capture the correct terms and their interrelations; attempts to settle the preconditions for any valid definition hence on. As of now, the goal has not been reached; and looking back at the histories of these attempts, it can legitimately be assumed that it never will. For good. No final standard terminology could ever be assumed, as no final point of knowledge can ever be fixed. However, the problem addressed in the "lack of a standard terminology" is a question of language, the necessity of using it, the observation that the existing methods are not sufficient for the task at hand, the fact that language is an unclosed system, and the difficulties arising from dealing with this fact.

Terminologies do more than just name objects and stick labels on them. By not just being assigned to the artworks, but also being ordered themselves, they create structures, a "Grammar of New Media". The goal of a standard terminology is to find the agreed meaning of a term and its unique place in this world, of the correct assignment between an entity and a term (i.e. a manual for correct application) in order to decrease semantic heterogeneity. The term is treated like a physical object. The standard terminology should make meaning and order clear and self evident - "natural", not to be doubted, but being attributed universal validity, truth value, true or false, following a bivalent logic, black or white, no gray in between, good or bad – it is, in short, a simplifying model that is achieved by a reduction of complex situations. By offering a limited number of preferred ways of naming and ordering, by creating unambiguity, by erasing doubt, belief in this "god" equals belief in the creator of the database archive. The creators are interpreters of the existing sources. For the descriptive metadata, their selection is based primarily on their own interpretations (fact is dealt with separately). Essence and interpretation are both problematic when it comes to creating order, because they *appear* to be natural instead of culturally constructed. The resulting system is absolute.

Semantics on the other hand consist of creating a dense network of interrelations, of having multiple – even conflicting – relations, of creating meanings through nets of relations and of revealing sense and meanings on a context-dependent base. A standard terminology would erode multiplicity and density that are necessary ingredients of semantic networks in favor of *the* preferred way of reading. Homogeneity instead of heterogeneity, hegemony instead of free and open choice, creation of one for many and not of many for many, static instead of variable media through static instead of variable language. In the end, this is a question of exercising power and authority; it becomes, it*is* political from the very beginning.

Dealing with Diversity

The "lack of a standard terminology" does not mean that there are no terminologies. As a matter of fact, many different vocabularies are in use, in different database archives, created by different authors, covering different aspects, etc. The problem of the "lack of a standard terminology" is a matter of how to

deal with diversity of expression, of perception and interpretation. And it has various effects: the process of perception is influenced by multiple factors, like previous knowledge, the culture of the interpreter, awareness, different goals and contexts, just to name a few. Different interpreters perceive different aspects and name them differently. The same term can have multiple meanings for different people or in different disciplines and contexts. Diversity is a matter of meaning, of the use of language. As previously discussed, in a database archive words not only have a naming function, but these names/labels are structured and structuring. Terms are functionally implemented in the database archive, language becomes a technicality. The result is that out of technological necessities of the database models applied, the many meanings and places of a term are often reduced and narrowed down so that preferably only unambiguity remains. This is then called the "preferred way of reading". The impacts on openness, the character of the resulting knowledge base and finally its sustainability are massive and therefore need to be analyzed critically.

To briefly summarize an analysis of current database archives I created for my Master Thesis shows that the challenges and problems identified in current database archives are:

1. **Rigid hierarchical structures** that very often are one-directional and exclusive and hard to change once they are implemented. This specifically poses problems for the further development of a database archive, which is unavoidable. Each new category challenges the system as a whole.
2. **Faking fixed meaning** ignores that one word can mean different things and have different connotations in different disciplines and contexts (incommensurability, terms used are relative to a scheme) and also ignores that Media Art draws elements from a variety of disciplines. A model of fixed meaning results in a narrowing down of these many perspectives, roots and influences, which can in the best case be described as incomplete, in the worst case it leads to wrong results.
3. Vocabularies follow the the **internal logic of their creators**. This poses a very real and practical problem: as people mostly do not enter a database archive from where its creators plan, namely the platform's start-page, but from a search-engine, they will rely on the words and associations they come up with. The logical consequence for database archive creators should be to respond to their users and to incorporate as many different associations, meanings, ways of spelling, synonyms, maybe even typos... they can think of. Even if the creators would succeed in finding the perfect expression, how would the users know how to find it? How would they convey their word magix to their audience? Creators of such database archives need to address these semantic and interpretation issues, if they successfully want to build and sustain their projects.
4. **A standard terminology for Media Art contradicts itself**. Media Art feeds from various disciplines, crosses boundaries and unites them, resulting in not just a mix of the latter, but also in additional new meanings ("the sum is more than its parts"). Currently applied terminologies reduce the many dimensions to just one (over simplification) or mix what shouldn't be mixed (incommensurability).

I suggest that Ludwig Wittgenstein's concept of Family Resemblance offers a viable model to avoid the problems caused by current approaches.

Ludwig Wittgenstein's Concept of Family Resemblance

"The idea that in order to get clear about the meaning of a general term one had to find the common element in all its applications has shackled philosophical investigation." [4] In Wittgenstein's own Philosophical Investigations, he introduces a new paradigm for ordering. The concept is easy to explain: Instead of finding one assumed core element that is necessary and common to all members of a class, they are connected by a whole series of criss-crossing and overlapping features. Not by identity, but similarity. This kind of relationship is what Wittgenstein calls Family Resemblance. It offers a solution to what cannot sufficiently be defined by a class-system or – as Wittgenstein wrote - to avoid "the bumps that the understanding has got by running its head up against the limits of language." [5] With this concept, Wittgenstein rejects all taxonomic classification as essentialist and shows the limitations of any hierarchical system built on words: That reaching final accuracy in language is an ideal.

A class is defined explicitly by a core element, a family on the other hand is described by its rules. And – as he continues in his concept of Language-Games [6] – these rules are not fixed once and for all, but made up and modified "as we go along." [7] They are the (temporary) results of a common activity, and to be effective and meaningful they have to be agreed upon by the "players". While the traditional classification system was not correct, but effective in pre-computer times, nowadays Wittgenstein's model of a non-essentialist ordering system provides a real alternative for descriptive metadata and ordering systems. What does Wittgenstein mean by "rules" and how could this concept be weighed against the concept of classes?

The importance of rules or of following rules is one of Wittgenstein's main interests in his analysis of games. Rules are conventions. They are not right or wrong in a logical sense; they are just useful. The meaning of a word is the result of following rules. So to fix the meaning of a word by linking it to a thing is just one particular view, not *the* view. What makes a rule different from a definition is that it describes an action, a move, gives direction, but remains flexible. A definition on the other hand cements the flexibility of a rule by locking the meaning. To fall under a definition, necessary and sufficient characteristics have to be fulfilled. A rule on the other hand is much more open. The members of both family and class are interlinked with each other. But instead of resulting in a hierarchy, a fixed order, a non-extendable model and ideal based on mental entities, a family is a network that can grow by sharing and passing on parts from one member to the other, remixing characteristics and adding new ones. To paraphrase the parent-child metaphor of class-subdivision: Unlike in a traditional classification, in the model of Family Resemblance, reproduction can happen naturally: sex instead of in vitro fertilization. Isn't that more realistic?

Assets are connected and sufficiently ordered by the connections that are established by Family Resemblance. This is radically different from the essentialist tradition. Precisely defined classes are not necessary to understand what something is or what relations it can have. To follow a rule is an action and an expression of a specific view of the field. As there are many ways of interpretation, there are also multiple families something can be part of, multiple connections that can but need not be shared by all members of a family. "And the result of this examination is: we see a complicated network of similarities overlapping and criss-crossing: sometimes overall similarities, sometimes similarities of detail." [8] What still makes the prospect of a standard terminology so attractive is its relative lack of complexity. It reduces the different perspectives to just one, something simple and easily comprehensible and takes away the burden of making a decision. Family Resemblance on the other hand results in a complex network and is rhizomatic. It shows a huge number of connections between things, very general as well as

very particular ones; it does not weigh what is important and what is not. This is a subjective decision and thus part of the process of filtering (on the user side).

In Media Art archives we sort knowledge that is already present. The order is not implemented to discover new relations, new qualities, but the result of pre-perceived classes and pre-assumed relations between them. New things have to fit in an already established world order, which is created and manifested in technology before the assets are filed in. The effect is that we order what we have known before. We remain in already established Language-Games, that have not been developed for Media Art. [9] Instead of developing its own language, Media Art archives play pre-existing Language-Games. This does not mean that the order created is entirely wrong. What *is* wrong is that it presents itself as the only true way of looking at Media Art when it is in fact only one perspective. Only one dimension is highlighted while most information remains in the dark. It is in the nature of such models of (a piece of the) world, that they demand universal validity. We have to remind ourselves that with descriptive metadata we are dealing in the realms of language, something that is not precise. Again, Wittgenstein reminds us of this when he writes: "We want to establish an order in our knowledge of the use of language: an order with a particular end in view; one out of many possible orders; not *the* order." [10] Because of this limitation of perspectives, archives are filters. In current archives, filtering and thus reduction is part of the data-entering phase. Filtering is an important part of getting qualified information. The crucial question is: when does this filtering happen? To avoid a narrowing down of possible perspectives, this process should be an option that is up to the user. Applying the concept of Family Resemblance would allow as many connections as possible in the dataentering phase. The filtering process as a temporary closure would be better suited to being an option for the user.

Conclusion

If the hierarchical structure of vocabulary means a limitation – as Toni Peterson pointed out [11] – why has this remained the building principle for so many database archives' terminologies? I want to recall what Petersen wrote: "The semantic network of a hierarchical structure stretches just over broader and narrower terms and through synonyms and near variant lead-in terms. Building a network of related terms [...] takes on additional significance, especially for the representation of knowledge in a field." [12] Hierarchies cannot just be turned over into semantics without a significant amount of additional effort. Semantics and density of the net are a result of bringing together actual uses of language, from merging vocabularies and allowing multiple relations for each term. A standard thesaurus for Media Art and a semantic net are therefore, in my opinion, two oppositional and conflicting concepts. The semantic net can inform a lexical corpus, but a lexical corpus will not result in a semantically dense net. This investigation is centered around the question of a standard terminology for Media Art or what the lack of such a terminology means for the field. It showed, that contrary to expectations of a solution, a standard terminology poses new and even more severe problems by narrowing, excluding meaning and thereby closing the concept of art. The impact of a decision for such a model is underestimated, as descriptive metadata not only have a naming/labeling, but also a structuring function in the knowledge base. When the weight of a whole system is put on a rather arbitrary choice of words, when meaning is fixed and the number of the building blocks closed, one can not endlessly build upon the resulting structure without experiencing the limitations of the weight it can bear. To avoid limited and limiting database archives, I argued for an alternative model of structuring and labeling, an open framework instead of a closed and rigid structure, one that is based on Ludwig Wittgenstein's concept of Family Resemblance. With an open concept of art and a polythetic approach to descriptive metadata, we comply with the constant changes in and the interdisciplinary nature of Media Art. A network of relations frees us

from the threats of collapsing, overstrained hierarchical systems. Applying and adapting the concept of Family Resemblances values and sustains the conceptual openness and rhizomatic interconnectedness of Media Art. We need to get rid of apriori schemes all together and shift from a fixed corpus to an open framework to develop a sustainable model for descriptive metadata.

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(HE)ARTBREAKING TO THE CORE. ZOMBIE DATA AND THE ARTS OF RE/DE/TRANSCODING

Nina Wenhart

Digital corpses all abound, zombie data that is still there, but cannot be performed anymore. Besides archivists' efforts to revive the work in its original state, artists have developed their own strategies of embracing errors and glitches of re/de/transcoding processes and open up a dialogue of sameness and change, obsolescence and progress, memory and forgetting, positioned as an antithesis to constant technological progress and perfection.

An Art Historical Perspective on Methods

With net.art and non-programmers learning to write in html, it first became widely used that artists would use code as material. From the very start they played with its rules, modified existing systems, tinkered with obsolete data. Through intentional creative abuse and a playful disrespect for industry/proprietary protocols they rip open a Wunderkammer for re/de/transcoding, compression artefacts and feedback. Of omnipresent obsolescence, endless errors, forced failures, and grown glitches, thereby defining a New Language of New Media, full of references and relations, ruptures and departures. Defining Media Art as a process, not as a product.

Art Historically we can find similarities to the Situationist International's détournement, appropriation art, readymades, sampling, cut-up, bricolage. The list is endless. Yet, there is something radically different between Digital Art and its predecessors. It is the direct impact code has on an artwork, its operability as well as its look and feel. In pre-digital artistic practices, new layers of information and meaning were packed on top of the old. With reusing and modifying code, the layers in the back are reworked. The artwork is opened up, declared unfinished, its multiple dimensions and unrealized potentials exposed. Signal processing is de-&reconstruction in its original architectural sense: it reworks the very statics of code.

This approach is often described as creative abuse; a mutiny of the inscribed politics of protocol. Artists such as JODI, Rosa Menkman, Sven König et al go on a quest to discover and exploit the flaws of these systems, find their loopholes and weaknesses to tweak and bend until a satisfactory mayhem results. An assault on code as an assault on culture "for language under technological rationality is functionalized, rendered pure instrumentality; and its repeated use is also internalized as social behavior." [1] Or, as Herbert Marcuse writes in One-Dimensional Man, "the Great Refusal - the protest against that which is", the axioms of consumption as the unquestioned a priori of our culture are under attack. "Whether ritualized or not, art contains the rationality of negation. In its advanced positions, it is the Great Refusal – the protest against that which is. The modes in which men and things are made to appear, to sing and sound and speak, are modes of refuting, breaking, and recreating their factual existence." [2]

In analogy to what Tilman Baumgärtel writes about game art, this approach "is critical and ironic, disrespectful and deconstructivist. The artists do not take technological dispositives for granted, but rather

manipulate and abuse, circumvent and modify," [3] thereby not only altering the source code, but on a meta level the very structures inherent to it; the rules for working with&&in a particular system. The game of Digital Art is taken to the next level, playfully, skilfully. The modifications are simultaneously texture, context, code, law, functionality. These interventions make the immaterial code tangible, concrete poetry, dys/functional, stuttering image. The text is speaking in an unfamiliar voice, often nonsensical, abstract. The artists lead us into semantically unnegotiated space, a new territory where what we perceive does not have meaning yet.

Baumgärtel describes "customizing or even redesigning digital code" as a form of hacking. Hacker culture has become a role model for artistic political disobedience, critique and aesthetics. Out of a "lack of respect for technological givens" technology is challenged and disputed on its own terrain [4], playfully driving any system into schizophrenia and towards epic fail, pure and absolute aggression and irony, "laughing terror" (Thank you, Mr. Bazon Brock). Just like in game hacks the artists test their skills against the systems/authorities, pervert the rules and declare them suspended, defining anything as potential playground. To analyse these processes, we have to unwrap them from their original form/ula/tion and focus on the data's shapelessness, its sleeping potentials. We enter the realms where colorless *green ideas* sleep furiously (Thank you, Mr. Noam Chomsky).

Antimatter

Art that conceptually includes failure poses a juxtaposition to technotopia's hysteria of constant progress, i.e. perfection, crystallization. Failure is unmodern, misplaced in our culture, it is the omni-present / ever-absent meta narrative, an "endless progression of catastrophe and death" (Thank you, Mr. Walter Benjamin). This topos of the "dark side" of progress can be found in steampunk, in dystopias, in the night tales of romanticism. As Slavoj Žižek points out in "Grimaces of the Real", the subject of Enlightenment was the monster. I want to take this a step further and say that it is not only the subject, but the real result. The return of the monster, i.e. the uncanny, a reestablishment of the force of the unknown. These monsters are built and constructed out of reused, broken remnants of once shiny and promising, then discarded futures. They are failures. Cyborgian organisms. Eternal heterogeneity. Always in flux. Conscious of their partiality, temporality, temporeality, temposurreality. They are temposensitive devices with a strong sense of morbidity. Forever undead. Zombies.

When code is reinterpreted, re-repaired, and re-re-reused its function and meaning changes.-This change creates dis/continuity, sustains connections via references. It is relational, pointing to a historical rootedness. JODI's "SOD", while removing most of the recognizable parts of the original, still carries the reference in its title. Rosa Menkman's "Collapse of PAL" is a straight-forward obituary to the death of a standard. Jeff Donaldson commits his artist alter ego noteNdo to a single system. Melissa Barron's Apple II hacks and her glitch weavings pay tribute to a very specific historical computer model and pre-computational contraptions. In all these cases, even though there is a strong connection to the past, the intention of re/de/transcoding is not to dwell on lost times, but to discover through it something new, not yet realized. Therefore this approach can hardly be defined nostalgic. Rather, it is magical. It is about finding the right spell to conjure up the invisible. The meta material is the absent, a constant referrer, permalink to a lack. The conjunctions are simultaneously breaking points, fragile alliances, fluid, because of their original brokenness. Artists tear these apart, rip them open. "Rip it up and start again", as a song title by Orange Juice says. It's a digital punk attitude. Through these processes of ripping, scarring and safety pin mending the antimatter materializes, its potentials shape-shift from immaterial to material.

It is in the "nature" of the medium, this potential to create and evoke certain effects. It is in the politics of the protocols to discard most of them. If one dares to intentionally misinterpret, misuse, refuse to accept the underlying axioms and the closure of the system and hack open this black magic box, Alice's rabbit hole lets us slide into a plenitude of marvels and potentials. Artists take hostage of the information within the hacked systems, re/arrange and corrupt it, make their own interpretations and thus create something new, not in the scope of the policy makers' original intentions. They are politically incorrect so to say, intractable, unruly; digital punk; it's a hacker ethics and aesthetics.

Hacker Aesthetics and Digital Punk Approach

What Karl Popper calls "critical imagination" is the ability to think creatively, outside of the box, to break through given limitations. An unbound curiosity for the hidden potentials and unknown aesthetic qualities of a medium are the driving forces behind art practices devoted to failure. The aesthetics are a consequence of these ethics and just as much a result of the artist's skills as they are inherent to the particular medium chosen, purposely breaking with aesthetic stereotypes of future and progress. A materialization of the medium's crisis and its cries of torture. It is the process that the artists are after, redesigning and redesignating the originally inscribed purpose and aesthetics. Hacking into the magic code that can make miraculous things appear. Working in the spirit of hacker ethics creates hacker aesthetics, as Florian Cramer writes: "Ever since BBS underground culture of the 1980s and net.art of the 1990s, 'hacks' and intentional crudeness of software and hardware design have been embraced as an alternative computer aesthetic. By themselves, they perfectly conform to classical philosophical notions of the sublime as the opposite of beauty. […] It is an aesthetic, however, that constitutes itself as the symmetrical opposite of neo-Pythagorean beauty ideals that have governed computer science from Knuth to fractal geometry, the 'art and beauty' from white-hat hacker culture described by Steven Levy, and the human/computer interface designs of mainstream, high-tech media lab arts." [5] The beauty of this approach lies in the process itself, which is still reflected in the crudity of its temporal appearance. It is Baumgärtel once more who identified that "this ethical believe is at the core of all creative use and more importantly the creative abuse of computer technology." [6]

Making Things Strange

What makes failure so attractive is its surprise effect. Failure "hacks the possibility of automatized perception" as consumption, it's the anti-control. Intentional errors are an anarchic gesture towards the System, and, as Harald Szeemann puts it, have a poetic dimension as they are "allowing the fiasco to actually take place." [7] Delightful terror, beloved destruction, welcomed mayhem, a diversion that upsets the peace of mind of the audience, their learned attitudes. It forces reaction and dealing with the situation by alienating expectations. This strategy gained special prominence in the work of Bertholt Brecht. His "Verfremdungseffekt" (alienation effect) is based on the concept of ostranenie, coined by Russian literary critic Viktor Shklovsky. [8] Ostranenie alienates by means of making familiar things strange, by estranging us from what something used to mean. "I stare at the glitch as a void of knowledge", says Rosa Menkman. [9] While formally indistinguishable, everyday language and poetic language belong to different spheres. "Making things strange" lives of redesignations, decontextualization, violence to the usual and terror to established connections of symbol and meaning. Working with failure creates a poetic language that is simultaneously a meta critique of that language's implemented politics, i.e. the rules of acceptable usage within the system. It is poetic digital disobedience.

Shklovsky defines the purpose of art as "to impart the sensation of things as they are perceived and not as they are known." [10] Baumgärtel quotes Shklovsky in the context of game art / art games, thereby referring to the ludic, playful qualities of ostranenie. Ostranenie refers to playfulness and code=text in yet another way, the game of constructing meaning in language. Language Games, as Ludwig Wittgenstein defines them in his Philosophical Investigation [11] and the necessity of rule-following [12] in order to play the same game. In artistic code interventions such as JODI's or Cory Arcangel's, the rulez of the chosen system are followed, but the rule-following itself is perverted, resulting in ostranenie. The game of meaning is the battle/play//ground for renegotiations on code and meta code levels. While pretending to play the game, subversive actions are taking place. The game is not played, but played *with*. We make up the rules as we go along, says Wittgenstein. [13] These Language Games enable us to leave accustomed positions and open up the magic circle (as in virtual worlds) for the sublime, the strange, the miraculous. It is this otherworldliness that turns something polemic into being poetic. "Poetic language must appear strange and wonderful." [14]

Archival Issues

"It is obvious that our work is against HiTech", JODI say. [15] As diverse as the artworks in this context may be, what many of them share is their interest in decay and a refusal of planned obsolescence. In its own way, such an approach is therefore a form of preservation. Reusing opens up the artwork for its inherent, unrecognized poetic potentials that seemingly defy archival interests while disturbing learned perceptual mechanisms and critiquing unquestioned obedience to the protocols of code and culture. This possibility of opening up a work as well as the necessity to do so in the light of technological obsolescence poses questions whether and how it is possible to archive Media Art. For the scope of this paper, I only want to focus on the question of what accepting the errors and resulting differences to the original look and feel means for preservation. This mainly is a matter of what constitutes a (digital) original.

Reusing and altering finished works seemingly runs counter to all goals of preservation, against the perfect in the sense of the finished, the hard, the crystal. Media Art resembles a Cyborgian organism that rapidly decays, aware of its timeliness. It stands there, amidst the utopia of constant progress of consumerism and continuous future, as the antipode of forever, of crystallized moments and formats, of perfection. "All these moments will be lost in time like tears in the rain", are Batty's final words in Blade Runner. The (unreachable) maxim of eternal life (i.e. the archive) is the perfectly lossless timond (timond = time + diamond, a concept used for example by Morgan Higby-Flowers in "TIMONDs are forever", http://bit.ly/psQYbA). With Media Art being process, not product, stretching over time as well as space, what remains of this concept? If with preservation we mean to keep the original alive, what after all IS the original? For Walter Benjamin, it is defined by its aura, and aura is about presence, the co-presence of work and spectator. Isn't this precisely what is realized by copies and their dissemination nowadays? The aura, it is not lost, as Benjamin predicted. Like a form of energy, it only shape-shifted. If the aura is related to presence and presence is realized by ample dissemination, regardless of a specific format or quality, then true originals are possible on every computer. Viral dissemination processes via YouTube, Tumblr, and other social media platforms create digital originals in zillions of places simultaneously. They are – not only, but also – preserved by being spread. The archive is not so much a place on a single hard drive, but torrents of bits and pieces distributed and shared over legions of community networks. Similar to the dystopian concept presented in Fahrenheit 451, this is how we remember, by re-storing, retelling, remixing, sampling, scrambling."With wide implications for the media archaeological methodology, the archive is increasingly being rethought not as a spatial place of history, but as a contemporary

technological circuit that redistributes temporality in other ways. This is how Wolfgang Ernst suggests theorists and artists to rethink media archeology; not only as an excavation of the past, but as an intensive gaze on the micro-temporal modulations that take place in computerized circuits of technology." [16] The concept of the original – the holy cow of art history – will be slaughtered and Walter Benjamin's seminal text "The Work of ® in the Age of Mechanical Reproduction" has to be reread with a different mindset as "The Work of Art(&facts) in the Age of Viral Remixing".

Being in constant flux as a state of being here to stay challenges traditional archiving and its impossible stasis. For digital media to live, there is no alternative to change. Even doing nothing does something. It creates zombies. Undead shelf corpses that brainlessly stroll around some museum every once in a while. Digital Media Art is an active process, or - in reference to Umberto Eco – an Open Work. Its archiving/preservation has to adapt to this and remain flexible. For now, I would like to call such an approach that embraces variability of all kinds, virality of dissemination, shifting from format fetishism to Free Software liberation "speculative archiving". Media archaeologists Jussi Parikka and Garnet Hertz stress on this aspect, too, when they declare obsolescence of media as an opportunity for active artistic practices rather than merely an archivist and conservative drama. Not the product, but the process, "the circuit, not the past, is where media archeology starts – as an excavation of the timecritical processes of culture; its not only a mode of analysis, however, but a mode of creation as well. This extends the idea of criticism from a second-order reflection on things into a mode of creation. [17] Media criticism within the medium. This indicates a new notion of archiving, criticism and art making alike. A procedural culture instead of a static one. One that fulfills its purpose of keeping alive not by means of crystallization, but by change and dissemination. A digital diaspora. This is not yet another utopia, it's everyday life reality already. We are becoming Johnny Mnemonic. With digital technologies and their obsolescence we seem to move back to historic means of storage, old school fairy tale communities, in which stories are retold and passed on from person to person, generation to generation. Something is lost and something new is added by every passer-on. Some things are remembered, some forgotten. Everyone involved in that game becomes an organic part of this body of knowledge. Digital viral communities resemble oral communities and their ways of preserving knowledge. We are all torrents of information. To the advantage that while a single instance might have a faulty memory, the chance of survival and sustainability of the (fragmented & reassembled) whole are increased. The multitude of storages does more than just make up for individual copies' errors. Repetition is a form of fucking change (Thank you, Mr. Brian Eno).

P.S.: With the recurring "Thank you, xxx" I was trying to find a way to escape the limitation of characters in the footnote section. I hope this is acceptable for you, for this text was intended to be as relational as the artistic practices discussed.

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LIMINOID ACTS

Emma Westecott

This paper applies Victor Turner's notions of liminality to game culture in the context of a particular indie game. This is done via an analysis of both the internal tropes of design exhibited by that game and the broader climate of cultural expansion as typified by the rise of indie gaming.

"Our current experience of life "betwixt and between" recalls what the anthropologist Victor Turner termed a "liminal moment," a moment of passage. It is a moment of anxiety, but it is also a moment of invention and creativity. When Turner spoke of liminality, he understood it as a transitional experience, but for us, living the tension between physical and virtual and between analysis and simulation, seems a permanent state of affairs, our permanent existence on the edge of things." [6]

"Liminality is a temporal interface whose properties partially invert those of the already consolidated order which constitutes any specific cultural "cosmos"." [7]

"One *works* at the liminal, one *plays* with the liminoid." [7].

Introduction

Turner's notion of liminality as a core aspect of society offers a productive model from which to consider the movement of digital games into a creative centre ground as a major art form for the 21st century. Limen [the Latin for "threshold"] in this usage is interested in movements in society whether collective, functional and integrated ["liminal"] as part of rites of passage or individual, critical, idiosyncratic and along the margins of society ["liminoid"]. Turner's interest in broad wide-ranging sweeping change in social structures points to ways in which belief systems have largely been replaced by entertainment in our post-industrial and post-modern society. Modernity has replaced the liminal function in society with multiple liminoid acts that offer a balancing mechanism, a way in the contemporary setting to work through our understanding of core aspects of digital life. It is possible to see game culture crossing a tipping point, or threshold, of cultural acceptance that makes gamers of us all.

Turner's work has proved attractive to game studies scholars interested in the social and cultural impact of digital game form. Dovey and Kennedy [1] use his framing of liminality to point to the generative potential of digital play as "…not just a source of creativity but also a site for the generation of alternative social orders, for political interventions, for utopian imaginings." (Dovey and Kennedy 2006, 35). This paper is interested in extending this view in the context of a particular indie game through an analysis of both the internal tropes of design of that game and the broader climate of cultural expansion as typified by the rise of indie gaming.

Game Culture

Game form is rapidly expanding; its cultural impact grows in significance as turn of the century gamers mature into the mainstream; as knowledge workers, artists, playful parents and creative practitioners. The ongoing movement of digital gaming from a culturally peripheral activity, once the province of a technologically literate subculture, to a mainstream leisure activity and beyond is significant. Games have always been the killer app for technology yet the metaphor of game now reaches beyond any particular technological specificity as material for the current creative generation to identify with – homo ludens indeed.

The inherently active nature of gameplay blurs the boundaries between game player and game maker and many digital games re-frame gameplay to provide spaces to play with rather than games to play through. Sandbox games like Minecraft [2009] successfully illustrate collaborative relationships between gamer and developer in both the openness of the play experience as well as the ongoing technological development of the game itself. The playable art of Minecraft lives on private servers whilst the public display of prowess populates fan video channels across the net refiguring the art gallery space forever. Running alongside the rise of the status of digital games as a contemporary art form are the complex interconnections between game art [in all it's multifarious form] and indie games; do indie games count as part of this art movement? Are we re-playing the false high/low culture divide if we exclude certain types of indie game from the art game canon? How do we ascribe aesthetic value to the sprawl of indie games springing forth like wildfire across the network? Who gets to say which game is art in what way?

Game Design Abstraction

There has long been an amateur game-making community from bedroom coders playing with home computer technology onwards. Digital distribution has enabled these independent game-makers to release their games direct to players in a range of ways: from free-to-play to revenue generating this has grown amateur practice into independent development. At the same time game-making tools continue to become more accessible to aspiring game-makers removing the requirement for programming skills to develop and deliver novel gameplay experience. The aesthetic impact of small development teams is significant, a wash of retro-imagery and lo-fi values break down expectations for the gloss of pro-productions. It may be too early to complete an art history of indie games but it is possible to trace strands of abstraction in many of these experiences. These abstractions are multiple and range from visual style through to game mechanic, although there is often a tendency to prioritize visual production above experimentation with gameplay experience. From pixel art, to minimalism to psychedelia as identified by Magnuson [2] and beyond to the 'bad art' of Cactus et al., the monochromatic silhouetting of Limbo and others, to the hand-drawn line art that dominates many iOS games. This broad stylistic experimentation is both playful and necessary, there is good practical reason for the rise of abstraction in indie games. This aesthetic is often 'cheaper'[1] in terms of production time and allows for designers to focus on the gameplay experience, play with different types of collaboration and to rapidly develop game concepts.

In this context it is interesting to dig in a little deeper to pixel art; as one of the first natively digital art forms pixel art exposes both the history and the apparatus of the screen. Videogames are a digital form and early titles were extremely technically constrained, literally limited in visual display to a specific number of pixels in a set range of colours. Kopstein's [3] Motherboard article "Lo-Fi and The Lost Art of The Pixel" points to the connections between pixel art and past art movements including pointillism,

mosaic and tapestry work. The article also features Cottee's 2010 mini-doc "Pixel – A pixel art documentary" in which game artist Jason Rohrer discusses his attraction to pixel art. Rohrer feels that this type of inherently digital abstraction gives room for player interpretation, allowing a type of space in which meaning-making processes can productively take place. At the same time, in this view, the pixel shows us the hand of the artist literally showing us the rough edges of digital imagery magnified on modern high-resolution screens.

Superbrothers: Sword and Sworcery

Abstraction allows small teams to experiment with different types of collaboration and approaches to development. One such approach is exemplified in the 2011 release Superbrothers: Sword & Sworcery for iOS devices [http://www.swordandsworcery.com/project//]. This much lauded indie release is the result of collaboration between a pixel artist and animator, a rock musician and an indie game developer. Framed[2] as a '21st century re-interpretation of an old school' adventure game S: S&S has been built around an original prog rock musical score that creates an atmospheric and multi-layered responsive aural landscape.
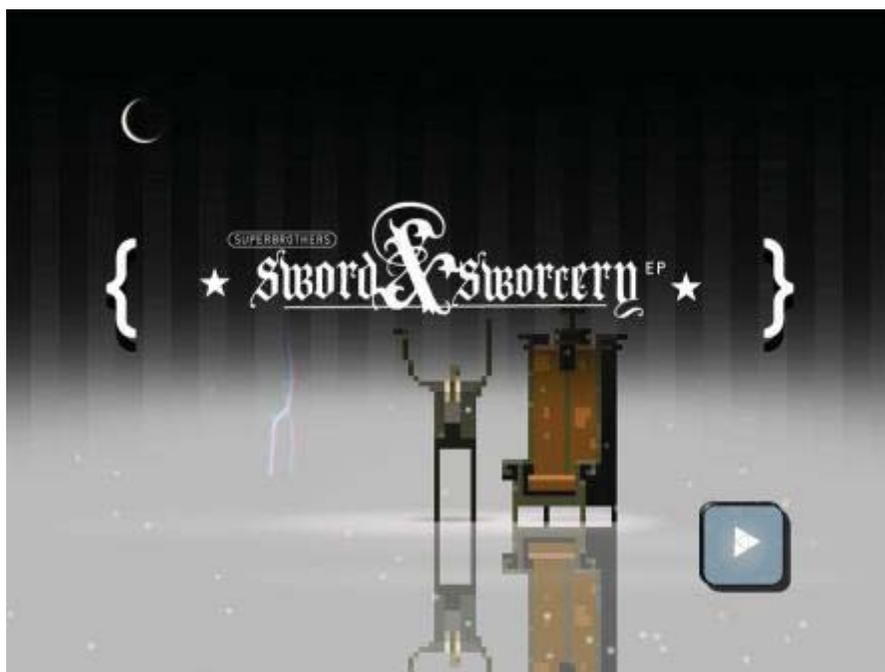
Fig 1. Title, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

The title of the game itself pays homage to a specific sub-genre of fantasy storytelling originating in the late 20's through the work of Texan Robert E. Howard. Sword and sorcery tales typically deal with lands and protagonists in transition and out-of-balance leading to an increase in conflict and also in freedom, in the midst of the liminal moments that accompany key stages of life, specifically in this instance those typical of adolescence. Closely connected with Jungian theories of archetypes, apparent in the multitude of phallic snakes, swords and powerful women, this pulp fiction spawned a rich vein of American literature. This sub-genre is deeply bound to the pre- and early- history of videogames as one source for many role-playing games. S: S&S is full of this mythology, as typified by the naming of the Amazonian

player character Scythian after a lost Eastern European nomadic tribe to offer a protagonist who is an all-powerful and eternal heroine. The interest in Jungian mythology is reflected in the game in its central dreamscape, lunar cycle and magic casting. The developers have blended multiple sub-cultural tropes to build a rich mythic world.

Fig 2. Hiking, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

 Superbrothers game work is clearly identifiable and speaks of a purposeful strategy for minimalism that has then been layered back up to create a distinct visual style. S: S&S is more interested in exploration of a lush landscape as central mechanic, coining the term "scenic gameplay", than in tightly timed or fast paced challenges. Mindfully designed for touchscreens the title is all about exploration. The game is tactile and mode-oriented [with explore and combat modes accessed through rotation of the iPad or iPhone]. Zoomable screens allow the player to move through sparse game and dream worlds connected to a lunar cycle. Conveniently, for my interest in exploring liminality in and around digital game form, S: S&S is generous enough to use the exact word in the course of dialogue with the player. There is an interesting design decision here as the game's player character refers to her experience using a first-person plural voice, e.g. "We", "Our", etc. during the progression of play. This is a design trope of much interactive fiction and directly acknowledges the presence of the player in the gameplay experience. S: S&S features three non-player characters; Logfella, Girl and Dogfella, another character, The Archetype, appears within the Megatome, or in-game guidebook, to provide ongoing clues along with the rest of the supporting cast. Most of the laconic game text segments can be tweeted enabling players to both share progress and promote the game. The game text has a uniquely Canadian voice, dry and understated that works both with and against the fictional mythos of the game world. This contrast creates a game that both looks back and forward to show one way in which modern game design can reflect the culture of its production.

Fig 3. Jim Jam, 2011, Superbrothers, Digital image, Copyright Superbrothers Inc.

The soundtrack and sound effects of the game are both immaculately layered and respondent to game progress and interaction patterns. This genre of music is particularly well suited for mythic world creation and together with a sparse, yet beautifully animated, pixel art style of muted natural colours [described by the artist as 'rustic 21st century minimalism'] S: S&S builds a unique and evocative game world. It is relatively rare to find a game whose initial design has been primarily driven by music and even rarer to find one that succeeds in blending distinct art practices to create a holistic aesthetic experience. In these, and other ways, S: S&S reveals its ambitions for a loosening of the definition of game; clearly steeped in authentic admiration for game culture this indie title challenges the expectations of the old-school gamer as to what a game should and could be.

Turner's [7] essay refers to the first two of Csikszentmihalyi's distinctive features of "flow experience", which, not coincidentally, are much referenced in contemporary game design, as:

1. The experience of merging action and awareness
2. Made possible by a narrowing of consciousness to a limited focus of attention

This would seem to point to the possibility for minimalism in games to be a more successful strategy for engaging a player in a focused "flow experience". The tendency for tight constraints to be more productive than spectacular excess in creating opportunities for flow is significant. Technological evolution is relentlessly forward facing, chasing realism in an endless loop of repetition on display in much commercial game design. It is not a radical statement to say that much mainstream game design is broken, being too expensive to make to allow experimentation and innovation in form. Yet one of the things that is possible to see on display in games like S: S&S is a looking back - a working through of ideas spawned in early game worlds. This reflection functions as both homage to the early pleasures of game form and as a way of understanding, remembering and recreating the magic of early period games. Through this practice we can see game artists re-visit inherently digital practices like generative art and pixel art not purely as a nostalgic act but constructed as one way forward for innovative game design practice. Games like S: S&S self-evidently represent a next-generation design approach via an original blend of development collaboration and a layering of highly crafted media production onto game mechanics.

Conclusions

Returning to Dovey and Kennedy's [1] work on game culture, the authors point to a collapse of the integrity of play due to its co-option by consumer society. This leads to the type of digital play that we are interested in becoming a form of commodity, a form of productivity in itself. "Play therefore has an ambiguous status - it cannot be said to lie completely outside of dominant systems of power since it is now productive of enormous wealth." (Dovey and Kennedy 2006, 101). This makes the liminoid acts of the independent game industry ever more essential as a critical force for an equitable human future as expressed in and through digital game form. The importance of culturally liminoid acts as a driver for a broadly expressive digital ecosystem in the wider setting cannot be overstated.

Digital technology can be remarkably myopic, in commercial terms this makes absolute sense driving the consumer to always desire the new thus keeping the cogs of capitalist society ever-turning. Yet there has been well over a generation of quotidian living and working with digital technology now surely normalizing our ecstatic dread of the implications of the digital. As the game sector fragments from a multinational mainstream publishing industry to a diverse phenomena supporting multiple development and play practices it seems especially important that we nurture these liminoid acts.

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[1] Meaning easier for small teams to produce

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LOCAL COLOUR AND NETWORKED SPECIFICITY

Mitchell Whitelaw

Local Colour deals with the interplay of specificity and generality – the relationship between the local and material, and the abstracted and systematised domain characteristic of the digital. This paper applies these concepts to digital fabrication, and describes an approach to fabrication that emphasises the specificity of its materials.

Local Colour (detail), 2011, Mitchell Whitelaw, cardboard, dimensions variable.

Local Colour uses generative software and fabrication processes to reflect on digital materiality. This paper briefly outlines a way of viewing the digital / material relationship through the binary of generality and specificity, and applies this view to fabrication. Like other digital systems, fabrication often treats matter as an abstraction, a neutral substrate: Local Colour experiments with an alternative approach that embraces the specificity of the material.

We can describe the world of networked computing – a world where we all spend ever more time – as an infrastructure of generality. It deploys a system that is standardised, formally defined, highly structured, and internally consistent. If I send you an email, I do it trusting that the interlinked systems of hard- and software, the data protocols, the network switches and servers will hold together so that the email you receive is the same as the one I sent. We could say that the network 'generalises' between our two locations.

As I draft my email it exists as a material pattern of voltages and magnetic flux inside my computer. To transmit that pattern effectively, the digital network must correct or resist any local errors or inconsistencies that it might encounter along the way, so that they do not matter. This process applies to all computation and digital media. As Matthew Kirschenbaum writes, "computers ... are material machines dedicated to propagating a behavioral illusion, or call it a working model, of immateriality." [1]

Generality is another term for this "working model"; it is that tendency of computation to function across substrates, to make matter not matter. We can find it at multiple levels: locations on a memory chip, pixels in a display, nodes on a network; in each case the elements are physically distinct but functionally equivalent. Yet computers are material machines, so at every point, the digital is embodied: it occupies a substrate – whether light in optic fiber, magnetic charge on a disk, or holes in a punched card. That substrate is specific: this, here and now. Thus specificity is the twin of generality: in this 'transmaterial' view of digital media, the digital is always and everywhere material, even if it pretends otherwise.

The past few years has seen a wave of digital fabrication work sweep through digital art and design. [2] Fabrication as both process and practice offers a fascinating case study in digital materiality; in particular it is often framed through a distinction between the digital and the material. In an article boosting the revolutionary potential of digital fabrication, Chris Anderson declares that "atoms are the new bits." [3] Generator X 2.0, a 2007 workshop on fabrication in art and design organised by Marius Watz, carried the subtitle "Beyond the Screen." [4]

Anderson's catchphrase suggests a neat opposition between the digital and the material, bits and atoms. In this view, fabrication is a way to make the immaterial material. This is a false dichotomy, however, because the digital was never immaterial. Fabrication is not a process of materialising the virtual (it was already material); instead it opens up new specificities and substrates.

Rather than an ontological leap from bits to atoms, fabrication shifts the cultural needle on a continuum between generality and specificity. In the everyday functionality of digital culture, the specificity of the material is suppressed or suspended; in the recent wave of digital fabrication in art and design, the material comes forward. Yet fabrication as a process depends entirely on the functional generality of everyday computing. The relative emphasis of specificity and generality may shift, but the two terms always occur together.

Local Colour uses fabrication itself to explore these ideas; it is particularly informed by the way fabrication typically deals with matter. Its materials are almost always uniform and homogeneous: sheets of ply, acrylic or cardboard; feedstocks of resin or powder. In an echo of digital generality, they are standardised, interchangeable substrates. In the software that drives a digital fabricator such as a laser cutter, these materials are represented only as a set of attributes such as dimensions and density. So fabrication applies the functional logic of the digital to its materials: it deals with them as abstractions. As such fabrication often enacts a culturally distinctive attitude to matter, in which it is passive and inert, a blank 'stuff' to be shaped by human will.

The Local Colour bowls test out an alternative approach. Here the materials are physically distinctive rather than interchangeable – each bowl is cut from a single box, with its own dimensions, folds, holes, gaps and printed graphics. Fabrication here is a process of negotiation with the materials, as well as a way of thinking about the relationships between matter, specificity and the digital.

At times, material specificity 'reaches back' into the digital process. This tangles the simple causality that fabrication often implies, where matter is a passive thing to be formed. In this project the material feeds back to cause the digital form even as the digital form ultimately shapes the material. For example the dimensions of the bowls are constrained by the source boxes (as well as the laser cutter). The number of slices – and so the height of the bowl – is also constrained by the material available; again this reaches back to inform the algorithm generating the cutting instructions.

At the same time, the digital logic of generality can readily embrace the specificity of the material. For example, a key challenge here was fitting the cut pattern around the folds and holes of a particular piece of material. A logical solution was to measure and roughly model the sheets in a drawing program, then lay out the slices accordingly. The specifics of that sheet of cardboard become digital features: the digital domain encodes some of its attributes, in a way that can adapt to its idiosyncracies. This digital ability to 'fit' the specific is illustrated powerfully in practices such as projection mapping, where the screen – a classic architecture of generality – is adapted to a specific site. [5] Again digital generality is turned towards accommodating and intensifying the material and specific, rather than ignoring or abstracting it.

'Networked specificity' names the way that the functional generalisations of the digital can turn towards specificity; it is an attempt to hold together the generalising demands of the network with the local distinctiveness of its nodes. In one sense this is simply an account of networked culture as it really is; for each node is, after all, already local and distinct. But more interesting perhaps (especially for the arts) is what the network does. As Kirschenbaum says, the computer acts as if it is immaterial; the network acts as if its nodes are equivalent; fabrication processes often treat matter as a crude abstraction. This need not be the case, as this project begins to show. Rather than simply materialising the immaterial, fabrication can be better understood as an instance of 'transmaterial' digital culture; in which the digital is always material, and its abstractions serve to intensify, rather than dilute, our being-in-the-world.

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THE (RE)MEDIATION OF EXPERIENCE. A CASE STUDY

Florian Wiencek & Stephanie Sarah Lauke

In this paper we introduce our approach in (re)mediating the aesthetic experience of a video installation into a digital dispositif by developing a simulative and a transformative display model, which should highlight the experiential possibilities of the installation. Thereby our research focuses on the theoretical implications and limitations of a translation of experience and strengthens the interpretative component of these transformations.

Experience plays a crucial role in understanding video installations. Each video installation evolves a genuine relation between moving images, display and visitors. By dealing with video installations in the fields of art history and preservation, experience has to be taken into account as a result of this relation. Therefore, the approach of our case study is to introduce a dynamic notion of experience, taking into account the multimodal nature of experience in video installations. A second argument is given by the fact that aesthetic experience is subjective. Meanwhile, these fields also emphasise the necessity to register visitor-experience, although no standardised methods have been proposed so far. In the last decade, several art preservation studies have taken into account the experience of video installations (inter alia Inside Installations (2004–2007), PRACTICs (2008–2011), Mörth/Hochmayr 2008, Wolfensberger 2009, Jones/Muller 2009). These case studies reveal empirical data on visitor experience and discuss the outcome in relation to the artists' intended ideal experience. Additional, a number of documentation models on interactive video installations have been developed, some of them also involving experience (Docam Documentation Model, Capturing unstable media conceptual model and Giebeler 2009). The applied methods, such as video documentation, qualitative as well as quantitative interviews and video-cued recalls, were used from the fields of ethnology, history and social sciences. No doubt, experience is an issue both in art history and art preservation. Problems occur, when for documentation purposes access to the installation in presence is not provided anymore.

Challenges in Viewing and Translating Video Installations

Howard Besser defined in 2001 two challenges regarding electronic art, namely "the viewing problem" and "the translation problem". [1] There he addressed the fact, that devices which deliver information for different senses all become obsolete at some point and the information has to be translated into new generations of delivery devices (viewing problem), which possibly affects the meaning of the art project (translation problem). When it comes to documenting video installations, which is foremost done by photography, video or text-based descriptions, a double bind occurs: Although experience is necessary for understanding video installations, the experience itself, whether aimed by the artist or performed by the visitor, is lost in the documentation, as the experience is bound to the presence of the video installation in exhibition. Moreover, with the documentation or translation of the artwork into a digital archiveable format the information on space, the temporal components, interactivity and experiential possibilities of the installation are obscured. At the same time "[t]he relationship between the work of art, the space and the viewer's own body strongly determines the perception of the work. The

internal spatial relations and the position of an installation in space are difficult to represent two-dimensionally but are at the same time of essential importance when it comes to description and re-installation." [2] But nevertheless these archived versions of the artworks have to serve as the basis for research and education in many cases and oftentimes become a surrogate of the art project. Therefore we propose an expanded notion of art documentation by highlighting the experiential possibilities of a work and maybe allow a pseudo-experience of the work, which should come near to the real-life experience or at least create a mental representation of it.

In terms of experiencing video installations beyond their exhibition, we acknowledge case studies and generated material on the experience of video installations. However, within our case study, we want to experiment with transforming the video installation into a different media dispositif and therewith mediating the experience by the means of digital media in terms of dissemination and communication and in the same time remediating it in the sense of Bolter and Grusin. [3] The aim is to create an understanding of the possible experiences in a specific installation and to find a workable solution which can be used in everyday documentation work. Moreover, the translation should be usable in online-archives, especially enabling to re-present projects which would be difficult to access or reinstall otherwise and therewith make them better accessible for research and education.

Simulating and Transforming Visitor-Experience

Our case study consists of two phases. Phase one is an evaluation of the conceptual implications and limitations for (re)mediating the experience of video installations by the means of digital media. What are the challenges of (re)mediating experience and in which respect digital media can overcome these challenges? We aim to answer these questions by developing two display models, a simulative and a transformative display model. Hereby, we work with selected video installations, taking into account their various concepts of experience.

DISPLAY 1 – SIMULATION:

 For this simulative approach, close to the outer appearance of the installation in presence, we want to evaluate amongst others virtual reality applications such as virtual worlds or metaverses as one target dispositif. Following a paper from Narcis and Roc Parés (2006) virtual reality can be seen as a rule-based system. There exists a striking similarity to installations involving interactive elements and therefore it qualifies for this approach. [4] Moreover, metaverses enable the co-presence of visitors and therefore expand the virtual experience. We see these translated versions literally as digital re-presentations or re-installations and the presentation environment as digital display in its own right. The research project 'Inside Installations' already evaluated the use of 3D modelling for documentation purposes as "3D-techniques enable installations to be reconstructed and made accessible on the screen in such a way that researchers can obtain a much more intense experience than by studying the two- dimensional sources." [2] Following up on previous experience of the Netherlands Media Art Institute with the use of 3D models in documenting spatial artworks our research focuses more on the theoretical implications and limitations of a translation of experience and strengthens the interpretative component of these transformations in a second display approach.

DISPLAY 2 – TRANSFORMATION:

This display model uses a more transformative approach by referring to Alain Depocas' theoretical consideration "[d]ocumentation on new media art must not be a mere illustration, but rather an interpretation, an attitude. To reflect this attitude, the documentation must adopt a structure similar to its subject's." [2] First, this approach critically engages to take the real and ideal visitor-experience into account. Secondly, the notion of "adopt[ing] a structure similar to its subject's" [5] can be referred to what Rudolf Frieling in his book 'When Formats Become Form' (2005) once called 're-formatting'. The concept of re-formatting is used by Frieling to follow the specific affordances of exhibiting cinematographic or online displays, in producing for them a second or third version of the art project. Adopting this concept of re-formatting to enable visitor-experience of a video installation beyond its exhibition display provides a more flexible basis: visitor-experience is no longer reproduced or simulated within the display model, but its structure is transformed and actualised by following the specific affordances of the display-related dispositif, ideally revealing both, real and ideal visitor-experience.

These two types of display will be realised to simulate and transform a selected video installation in dispositifs different from exhibition. Following up on this test phase we will conduct an empirical study in phase two, in which we will analyse the possibilities and limitations of the displays developed. With the use of empirical methods we will evaluate, in which way the experience of the displays resembles or respectively differs from experiencing the installation in presence, and thereby overcome challenges in documentation, which we described at the beginning.

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THE AESTHETICS OF PRIVATE FOOTAGE AND YOUTUBE WITHIN AVANTGARDE VIDEO ART

Paul Wiersbinski

"Video art is a subdivision of home-made video" _Vito Acconci

Looking at the early video works of fine artists in the 60s and 70s the connection to today's aesthetics in Youtube is more than obvious. Often the tapes have been documentations of performances and it is stunning to see the connecting of reoccurring standards. Today these works have become cultural classics, shaping the identity of one of the youngest art forms.

Despite the ongoing commercialization of youtube by Universal´s Channel Vevo, one of the most popular titles on the online video platform remains "Evolution of Dance" [1], which was uploaded almost five years ago and has since received over one hundred million views.

Judging this video from its purely aesthetic qualities, it is presented in a rather unprofessional manner: Its camera position and resolution as well as sound quality are modest, there is no sign of editing and the performer leaves the frame of the recorded picture at least partially on various occasions. The work's only distinguishing quality is its focus on the performer's body and action and the absence of any formal commentary.

Although one can only assume that this video's performer does not consider himself a video artist, it is still striking to see how this and the most popular works among the other consumer-created content on youtube feature many standards and conventions of artists' tapes created in the 60s and 70s: documentations of performances, use of a fixed camera (today's webcam), little or no editing, the focus on the performer and his or her body. The works of Marina Abramovic, Vito Acconci, Bruce Nauman and the Vienna actionists have by now become cultural classics, shaping the identity of one of the youngest art forms.

Technical limitations and the lack of professional training forced many of these video pioneers to compromise their works. They often produced their tapes in one shot because there was simply no way to edit the footage. On the other hand the unique aesthetic they produced originated from deliberate choices, such as the direct manner of the documentation of their performance pieces or even the attack on viewers' expectations of video as shaped by conventional cinema.

Today the average producer of homemade video footage is probably far more experienced in terms of visual consumption and has access to means of production exceeding by far the possibilities of these artists, as high definition cameras are by now included in every smartphone and free basic editing software comes with every new computer. One could therefore assume that most user-generated content would mimic popular Hollywood films or pop music videos, using fast camera movements and a high-tech editing as well as a lot of visual effects.

While many such videos do exist, they are not always particularly popular. The most obvious reasons are the economic gap between a home video and a professional MTV production and the exploitation of visual ideas by generations of innovative talents long before youtube was created. Still the question remains why videos of people dancing in their apartment or playing their favorite pop hit on a guitar receive million of hits, thus gradually entering and shaping our perception of a contemporary cultural canon. [2]

Looking at this phenomenon from an elitist perspective could lead one to initially dismiss videos featuring pretty girls, house pets or heavy reference to pop content as having no deeper cultural function apart from offering easy access to the lowest forms of entertainment and the public humiliation of others. Yet this view ultimately overlooks a crucial point in the aesthetic of many of these works, in which the performer directly faces the camera, the picture does not move and there is no sign of editing. The consistent repetition of these strict aesthetic elements suggests that these recurring phenomena have hidden function. What if million of consumers watch these clips exactly because of their minimal formal language and the consequential realistic elements within them? A viral consumer-created video is "screening the real" and therefore "functions as the screen that separates us from the Real […] When a screen intervenes between ourselves and the Real, it always generates a notion of what is In-itself, beyond the screen (of the appearance), so that the gap between appearance and the In-itself is always-already "for us." […] the Thing in itself is ultimately the gaze, not the perceived object."[3] Consumers sitting within their limited haptic reality stare at their often-embarrassing digital doubles exactly because they depict traumatic experience within the seemingly removed and unlimited realm of the virtual.

Images that receive such widespread attention penetrate society in various ways. Especially when private footage and recording methods suddenly become means to operate politically in public, striking similarities to video art become apparent. For instance videos produced by Osama bin Laden or suicide bombers' statements feature the exact means of aesthetic representation invented by early video artists and brought to widespread fame by youtube consumers.

According to Boris Groys these similarities occur because Islamic terrorists "have gone through the western system, have enjoyed western education, operating with western techniques and media and therefore possess a knowledge of the western symbolic economy." He also mentions the videos produced by the wardens of the Abu Ghraib prison to document their torture of Iraqi prisoners, analyzing them as symbolic answers to the threat of terrorism towards western civilization and pointing out their connection to art history: "It is extremely strange that most of the supposed sexual excesses were staged especially for photo and video recordings. They were first and foremost art – just typical contemporary art. […] the intellectual and artistic revolt of the 60s and 70s succeeded in undermining the traditional values and the conventional dignified image of humanity in the West and exposed the truth of the acephalic, sexualized body hiding under the humanistic surface […] American soldiers grew up in a culture in which the exposure, exhibition and derision of the human body is normal…" [4]

Another recent example in this war of images is the US government's immediate publication of private footage after the assassination of Osama bin Laden…together with a note that pornographic images where found among the captured data. The footage shows an old man kneeling and rocking in a blanket while switching the channels of a tiny TV set with a remote control. This video too is shot in the aesthetic conventions mentioned above and has attracted millions of viewers on youtube. [5] This publication not only superficially destroys the image of a man who presented himself as a dignified freedom

fighter, but also fully integrates him into the language and traditions of fine arts. After all it is easier to deal with a dead artist than with a martyr.

While video artists have further developed early aesthetics towards more sophisticated, psychological and sometimes narrative scenarios, these contemporary videos still refer to or even mock earlier products of the genre and change forms of transgression into calculated shock reactions. The early "Heidi" from 1992, for instance, represents a milestone in this shift of focus. [6]

Today's successful videos often exhibit poor quality and deliberate imperfections not out of a lack of resources but due to deliberate aesthetic considerations. Critical statements and social debates have become less important, while "shock and delight that is second to none" [7] find contemporary critical acclaim. Today's artist is "floating on the surging crests of the digital boulevards, and his sole intention seems to be enjoying the dynamic complications of hitherto unprecedented experience. Going along for the ride is a pleasure." [8]

Video art reflects both the success of its own tradition within mainstream consumer culture while at the same time longing for a transcendental field of expression. Images no longer function as an illustration of intellectual discourses, but use the visualization of "the Real […] insofar as it lacks any possible mediation and is the essential object which is not an object any longer, but this something faced with which all words cease and all categories fail". [9]

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FLYING, SPINNING, AND BREAKING APART: LIVE VIDEO PROCESSING AND THE ALTERED SELF

Todd Winkler

When viewing our own altered image, live video processing has the ability to influence sensation, movement and expression. While artists have explored extending the body via video projection, scientists have made significant progress in understanding how we perceive and locate the body in media environments. Here, scientific research is used to examine the body in interactive video performances and installations.

*Fig 1. Participant with bright reflected light filling the body*
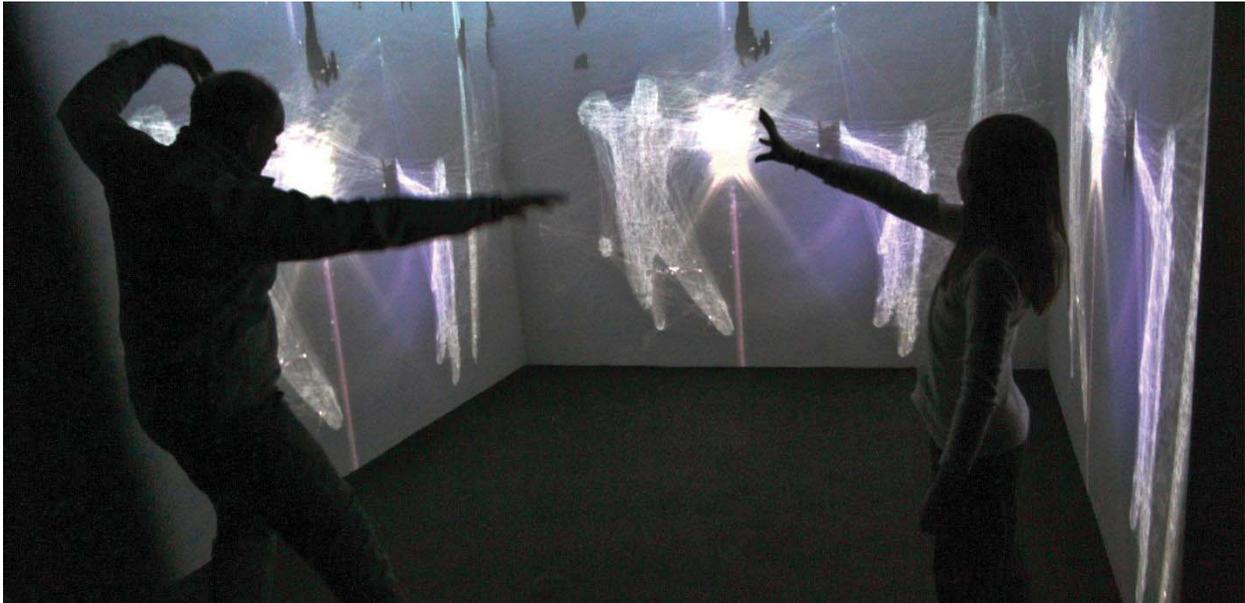
Fig 2. Two participants attached by webbing

1. Introduction

From the early sixties video synthesizers, to recent iPad2 apps, people have always been fascinated with fantastically altered versions of themselves. As real time video representation of the body becomes more and more common through video chat and teleconferencing, some people will want to exert creative control over their image. And although the video image is wholly constructed with digital data, and therefore capable of infinite manipulation, it is tethered to a live human being. No matter how abstract the image becomes, its gestures are not that of an algorithm, but a spontaneously acting person –the language and expression of a moving, sensing body. However, video processing is not "neutral," it changes our perception, which can be keenly observed when viewing an altered version of our selves.

This paper draws from recent studies in cognitive science, and observations from the past fifteen years of the author's creative work in dance and installation to examine the experience of live video processing and the body. In these artworks, scale is important;the projections are approximately life size to act as a mirror to reflect back the participants' movements. Whole body movements are also important; the participant is fully engaged with freedom of movement, a sense of balance, and kinesthetic response. While theses works deal with the translation of the physical to the digital, what is most interesting is the feedback loop back: the digital image alters both human movement and sensation, which, in turn, alters the processed image. Viewers tend to imitate their altered image, finding a limited repertoire of movement that "resonates" with their digital double. They often report a feeling of immersion or presence within the video image.

How do these processed images add new knowledge of our selves? How do we "feel" when observing our bodies extended, warped, colored or delayed in time? How are group dynamics affected when people find themselves interacting with others in the same altered world? Video processing adds new information, changing the meaning and perception of our own image.

In previous work using movement-activated sound for dance and installations, I noticed a strong intuitive tendency for participants to use gestures that match the physical quality of the sound. For example, high impact sounds caused by breaking or hitting, would elicit sharp, quick movements, while quieter ambient sounds would suggest longer sweeps with the limps. Thus, participants' efforts are closely aligned with imagined physical forces required to make the sounds.

In a similar way, live video processing suggests forces that influence participants' movements and feelings in their body. People attune to their altered image, just as they attune to each other. One collaborator, dance artist Cindy Cummings, described her performances with her altered video double as "a contact improvisation with an alien version of my self," each being mutually influential.

Each video process suggests to the viewer a new kinesthetic vocabulary as they view their own body in real time, flying, spinning, or breaking apart. When disruptions are reflected back to the participant, it creates a dynamic interaction that fuses the physical body with its electronic extension. As we will see, these boundaries are often quite blurred.

In an attempt to further understand the experience of being digitally transformed, I have been pulled into some inspiring research in cognitive science dealing with presence and movement. Although I am not a scientist, I have found support and insight for my artistic hunches, gained from personal experience and from conversations with others. I hope it will be helpful to summarize some of the relevant research here, in a very condensed form, while taking some license to speculate on its potential for understanding the experience of participants immersed in a reflective, digitally altered experience.

2. Presence and Perception in the Mirror

Although much has been written about embodiment in virtual reality and telematic systems, a special case can be made for artwork dealing with "video mirrors," where there is a deliberate relationship created with a participant and their video double. Unlike telepresence, which can be tricky to connect with another individual or correctly locate the body, we immediately and intuitively know and believe that our reflected image IS our body. We are real in two places.

To fully examine our embodied experience in these situations, along with the physical (objective) body and the virtual body, we must consider the body image and the body schema. While the body image deals with perceptions, beliefs and attitudes about thebody (a huge subject beyond the scope of this paper), the body schema deals with the, mostly unconscious, internal representation of the body that controls posture, movement and location in space.

How do we reconcile the discrepancy between the location of our physical and virtual body? Research shows that our body schema does not always correspond with our physical body.

3. Body Ownership – Where is the Self?

"Our bodies seem to be infinitely mutable, while they never ceased to be our bodies." - Susan Kozel [1]

Botvnick and Cohen's discovery of the "Rubber Hand Illusion" in 1998 opened up a rich vein of ongoing scientific research on body schema. [2] In the original experiment, a fake hand was placed on a table in front of a participant, while the real hand was hidden from view. When the index fingers of the real and fake hands were touched simultaneously, the participants attributed the location of touch to the rubber hand, identifying it as their own. They key finding is that the physical body is falsely located – *the self is located where touch is seen.*

A slew of experiments have repeated this effect, with infinite variation. Several researchers have shown that virtual limbs and whole bodies in virtual reality systems can be "owned;" when simultaneous touch is introduced, participants (falsely) locate their bodies in the virtual environment. One study showed the promise of producing unusual sensations in the body by addressing physical orientation and visual perspective. Participants felt sensations of floating by seeing a video of their prone bodies above where they were actually lying. [3] Visual realism of the hand or body did not seem to play an important role, and anything recognized as a body or a hand seemed to be an acceptable substitute. [4] This identification with body morphology suggests why people identify highly altered video images as themselves.

In these experiments, vision locates the body, and touch proves it. What is especially relevant to artists, however, are findings that free movement, or action can have a similar effect, with more unified results. One study concludes, "Sensory mechanisms generate a sense of body ownership based on fragmented local representation of individual body parts, but action provides a coherent sense of bodily self." [5]

Even though much of this research deals with a first-person perspective, I believe it helps to explain some of the powerful effects of unencumbered whole-body movement within reflective video installations. These works combine action with sensation: feeling the pressure on the feet, a sense of balance, proprioception, kinesthetic response, or the touch of a friend's hand – all of this would go towards making participants feel that their body was both in physical space, and believably in the projected space. The physical exertions, effort, pain, balance, and other sensations one experiences from the physical body, also seem to emanate from the projected body.

Participants most often confirm their on-screen existence by waving their hand and seeing an immediate result. If they have come with a companion, they often try to touch each other in the virtual world. Synchronization is key to the mislocation of the body. Even small time delays may disrupt the effect, although video delay can offer a different kind of uncanny feeling, being in both the present and the past.

In my own experience viewing my altered double, I locate myself simultaneously in both my physical body and in the projection. It is not an either/or situation, but rather, a continuum from being fully in my own body and simply observing patterns of projected light, to feeling fully immersed, present and engulfed by the projected space. Most of this has to do with attention. In virtual reality environments, for example, very little attention is on the physical space, as we can't see our physical body or the room. On the other hand, "mixed reality" installations, such as those referenced here, usually attempt to minimize outside sounds and maintain visual focus by clearing the room of objects, and having the projection(s) as the sole visual material. The continuum of body location would be more balanced in these situations, and may change with the participant's focus.

4. Identifying Movement and Self-Recognition

Video processing can color, bend, warp and distort images to the point of abstraction and unrecognizability. However, we have a great ability for recognizing human movement, even from the most minimal of detail. Numerous perception experiments that abstract the moving body image to just a few "point lights" (illuminated dots representing the joints of the body) reveal that the distinctive timing, articulation and pathways of human movement are easily recognizable. Even when further distorted by masking, timing or viewing angle, the human form in motion is still visible. Point-light experiments have also shown the inherent "readability" of the expressive body, with our ability to recognize such things as gender, intent and emotions solely from abstracted movement information. [6] I would speculate that with more information, such as that provided by a silhouette, the reading of emotion and meaning is further enhanced.

We have a heightened sensitivity to self-identification in point-light images. Despite the fact that we rarely see ourselves moving, except the occasional look in the mirror, we are able to identify ourselves in a highly reduced point-source image, much more readily than even the abstracted image of a good friend (with whom we have much more experience viewing). We show the highest ability to recognize our own free and expressive movements, such as dance, rather than pedestrian movement. This suggests that our own kinesthetic experience contributes to the visual analysis and perception of movement. [7]

This helps us understand why, even in live video projects where the body is highly distorted, the viewers will recognize and "feel" the familiar rhythm of their own bodies, which will lead them to identify the new image as "me." Even a literal faint glimmer of the body's movement can result in self-recognition, as in a scene from the author's installation "Entanglement Witness," where the audience's body appears only as a subtle play of light filtered through autumn leaves.

5. Social Interaction and the Loss of Self

"Synchronous multisensory stimulation blurred self-other conceptual boundaries even when the perceived other was a total stranger." - Maria-Paola Paladino [8]

Once a second person enters an installation, everything changes. We are highly social creatures – there is nothing more interesting to one human being than another! A participant's experience of the artwork immediately undergoes a highly complex and rich transformation with the inclusion of other people. Live video processing can foster empathy while breaking down the barriers between the self and others. In abstraction, the face is often obscured, or not readable at all in the case of silhouettes, and the details of the body and clothing are missing, allowing many people to experience a liberating loss of self-consciousness. Various problems with eye contact, camera angle and gaze are eliminated. Everyone is in the same "boat" and appears to be made of similar material. As was previously mentioned, the morphology of the body seems to be most significant and this may lead to multiple participants having a feeling of embodiment with their altered image or possibly with others. The focus then turns to the expressive movement of the body, in social interaction with real and "virtual" people, all responsive in real time. The abstract body is still highly expressive, and people will read these images as having emotions, intentions, and personality traits.

I have frequently seen a playful connection and merging with others in my video installations. Some multisensory researchers come to similar conclusions, noting that many interactive social situations present all of the elements for a loss of the real body and loss of self. [9] Others show how sharing embodied experiences enhances social cohesion, and heightens our awareness of similarities between individuals, rather than superficial differences. [10] From a purely sensory experience, subjects felt closer and more positive towards strangers, with a high degree of "self-other overlap," which is typically experienced with close friends and family. [8]

6. *Glint*: Movement and Meaning in the Abstract Body

"*The human visual system appears to be well tuned for the detection of both physical and social characteristics of the human body in motion.*" - Maggie Shiffrar [6]

Glint is the title of my recent audio/video installation where viewers see their projected life-size silhouettes filled with various video images and video processes. The specially built room has large projections filling three walls, with an infrared camera used to capture participants' silhouettes. A hypnotic soundtrack assists in pulling viewers in to a more complete and immersive world. In one section, viewers reported feelings of movement and unsteadiness when seeing their bodies filled with moving water. The discrepancy between their real body on solid ground, and their flowing virtual body, often made them loosen their limbs and sway in sympathetic movements with their video double. If the "Chameleon Effect" has shown that people unconsciously imitate each others behaviors, and if mirror neurons are known to fire in a similar pattern when someone acts or simply watches another act, then isn't it possible, and perhaps likely, to have a similar unconscious imitative response seeing a highly modified version of ourselves?

In another section of *Glint*, bodies are filled with sunlight reflected off water, which resulted in several people reporting a feeling of warmth over their entire body, or specifically where the brightest light touched their body (Figure 1). In these examples, proprioception and sensation were both influenced by the video image, with reports of people feeling simultaneously within and outside of their physical body.

The installation is often experienced as quite meditative and calming with a single participant, although some did report feeling uneasy being isolated in a darkened room with only a strange version of themselves for company. (An artist of a different ilk might choose more disturbing images playing inside the body, which could illicit deep fear or revulsion.)

To enhance and literally represent social cohesion, a special effect is activated when there is more than one participant; a fine webbing attaches to the extremities of two or more silhouettes when they get close (within 3 feet), shooting out from one body to connect with and touch another (Figure 2). Sometimes traces of the body are left visible on screen, like a living painting that pulls the viewers more deeply into the virtual world.

With the loss of physical detail that might create a feeling of separation or body self-consciousness, participants notice their similarity and connection with other freely moving, and sensing, virtual bodies. The relationships are complex: people isolated with friends or strangers in a darkened room, a feeling of being in two bodies at once, the location or mislocation of sensation, the intense images of flowing water or light, and the overlap and interaction with real and virtual bodies.

7. Conclusion

Although I make no claims of the scientific accuracy of my musings, it is inspiring to find scientific discoveries that corroborate and shed light on artistic speculation. An expanded definition of the self, physical and emotional transformation, and merging with others – these are timeless themes in art that technology and science promise to extend; from the audience's imagination to an immersive, multisensory experience.

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MOTION IN PLACE PLATFORM: VIRTUAL (RE)PRESENTATIONS OF IRON AGE MOVEMENT

Kirk Woolford & Stuart Dunn

Over centuries, societies have built up a wealth of written knowledge of human behaviour and emotion in response to specific sites. Such narratives are, however, subjective and not necessarily quantifiable. At the same time, the physical study of a site or the cataloguing of material objects falls short of capturing the human experience of a site. MiPP is developing technologies and research strategies to understand a site by moving through it.

Figure 1: Capturing Archeologists working on site in Silchester.
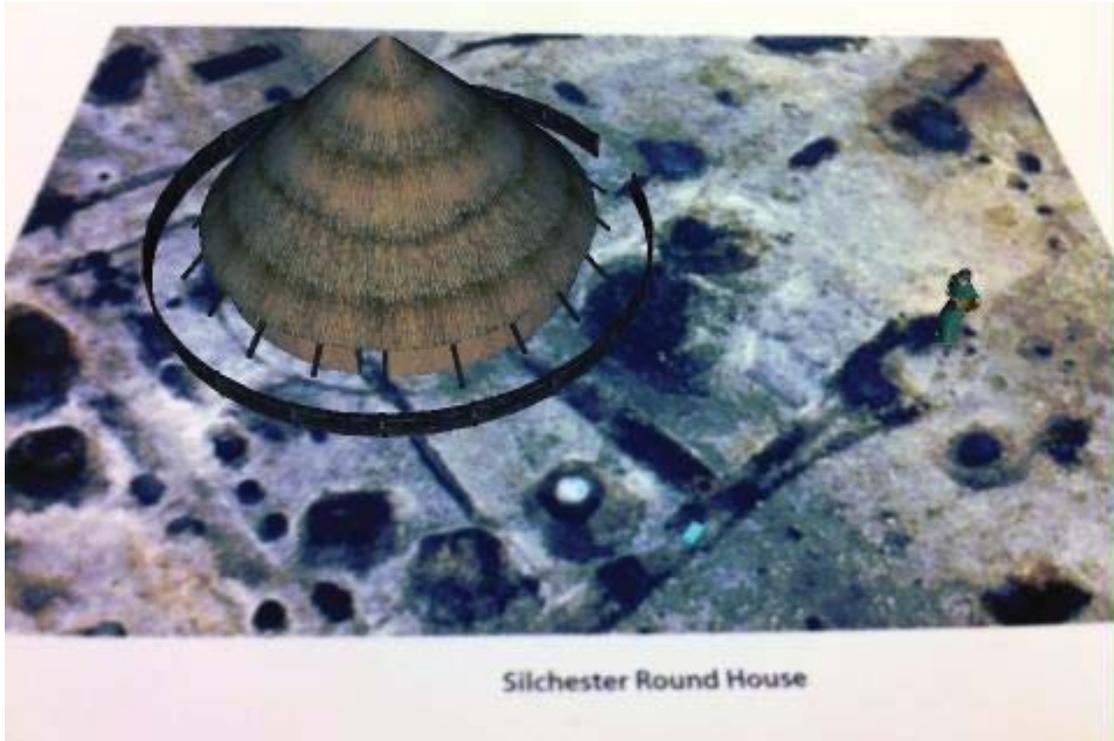
Figure 2: Live, Augmented Reality rendering of Silchester Roundhouse and Iron Age inhabitant.

Figure 3: Live capture in a re-constructed roundhouse at Butser.

Understanding Human Movement

Explorations of relationships between human movement and places, sites, or locations, are frequent components of research in archeology and anthropology. However, as ever more of our culture is digitised, disciplines including architecture, cultural studies, natural and built environment studies, performance, and others, are re-discovering transdisciplinary notions of site and embodied experience of place. They are broadening their research from studies of purely material cultures of roads, paths, and buildings to encompass the experiences and social relationships for which these were constructed. When members of UNESCO developed their definition of Intangible Cultural Heritage they looked at Rangihiroa Panoho's example of the marae, as simultaneously a building and a cultural meeting space for the Maori. It functioned along the lines of what Joseph Roach calls "vortices of behaviour": churches, marketplaces, theatres, schools, and kitchens in which certain kinds of behaviours and values are learned and certain memories are transmitted. [1] These sites are often documented by researchers using traditional research tools including cameras, GPS loggers, etc, but the behaviour, the embodied experience of the place is lost.

Architects long ago realised that it is not possible to get a proper understanding of a location by simply looking at drawings or images; that we need to move around a building in order to understand it. Traditionally, they would build 3D models to allow people to look at places from different viewpoints. Recently, many have turned to digital models and techniques enabling virtual fly-throughs, yet these digital resources cannot replace embodied understanding of place. Architects continue to "walk the site" or, rather, plot out the site on the ground and walk through it with an understanding that movement alone allows them to comprehend scales, orientations, and relationships. Similarly, the importance of an explorer's bodily involvement with the objects of scientific investigation is increasingly, explicitly, acknowledged in current archaeological theory. With the steady growth of interactive virtual environments, architects, geographers, anthropologists, performing and visual artists, and human-computer interface specialists are increasingly dealing with Mashiro Mori's "uncanny valley" where as depictions of motion come closer to human, emotional responses become increasingly positive and empathic, until a point is reached beyond which the response quickly becomes that of strong repulsion. [2]

The interdisciplinary Motion in Place Platform (MiPP) consortium aims to move beyond traditional studio-bound motion capture to ask how capturing humans' movements through sites can lead to new forms of research data to reinforce understandings of how places were/are used rather than focusing primarily on how they are constructed.

Case Study: 3D Movement (Re)Presentation in Iron Age Briton

It is paradoxical that the one thing which most visual 3D representations of the human past lack is humans. The most obvious reason for this is that buildings, features and artefacts can be reconstructed (whether digitally or not) from empirical archaeological remains, whereas there is far less direct evidence for how people would have looked and moved. Clothing, of course, can be reconstructed from historical or art-historical evidence, but such indications are lacking for many periods and cultures. This is surely a limitation on the application of 3D reconstruction, both as a tool for archaeological research and as means of presenting cultural heritage to the public. In a footnote Mark Gillings states: '[I]t is worth noting that one of the most striking things about archaeological Virtual-models is the lack of people in them. As a result, wandering around re-creations such as Virtual-Stonehenge can be a ghostly and unsettling experience.' [3] It should also be noted that such previous research as has been done on this

area has typically focused on what might be termed 'extra-ordinary' activities, such as ritual. [4] There remains a lack of consideration and theory of how day-to-day practices can be visualized and presented as products of human activity.

Archaeological evidence is, and always has been, primarily about material, and about what the process of human existence has left in the ground for us to find and document empirically. Experimental archaeology seeks to evaluate the methods (although not necessarily the tools) used to create features such as buildings and artefacts, such as arrowheads, with the evaluations derived from empirical evidence. [5] Careful observation and recording of the construction and creation processes can lead to new insights in to how buildings and artefacts were created, and in some cases can help explain anomalous or unusual features in the material record.

In its initial development phase of the project, the MiPP researchers worked directly with Michael Fulford's team from the University of Reading during their Summer 2010 excavation of the Silchester Roman Town. [6] The Reading team at Silchester has a strong history of acting as a testbed for digital technologies in the field through it's hosting of the Virtual Environments for Research in Arts (VERA) project. As such, the Silchester team provided infra-structural support for the first on-site motion capture trials. In order to obtain initial test data, the MiPP team captured the movement of the archeologists as they worked on the site (see figure 1), and has made this data available to archeologists at Reading, Southampton and other universities. At this phase of excavation, evidence was emerging of an earlier Iron Age town on the Silchester site including a clear circular impression which hypothesised to have been the wall of a roundhouse. As more evidence of an Iron Age town arose, the MiPP team focused on how their systems could be used to understand the daily life in an Iron Age roundhouse, what were the movements of Iron Age people on the same location and how could an understanding of their motions help to understand the emerging archeological evidence. In collaboration with the Silchester archeological team, a model of the roundhouse and was illustrated, modeled and textured using Autodesk Maya. These models were imported into the Unity3D game engine to allow them to be animated and explored.

Given that round houses were domestic settings, we determined that the actions to be generated to populate this virtual roundhouse should be day-to-day activities, with the actions, themselves, being based as far as possible on available evidence from archeological records. The first step in this process was to develop 3D character models to simulate the activities of human agents. Utilising Zbrush and Maya, characters were modelled and rigged. In order to correctly constrain these activities spatially, an area of floor space in a studio at the University of Bedford was taped out with dimensions equivalent to the Silchester round house. Two dancers and a choreographer were then asked to explore and participate in the type of tasks that might have been performed during the daily activities of inhabitants while wearing Animazoo IGS190 inertial motion capture suits. Motion from the suits was mapped, in real-time, into the virtual 3D round house using Unity3D and a suite of software tools developed as part of the eMove project: a joint research project between Sussex informatics department and Animazoo (http://www.mocapsuit.com, last accessed 29th Aug 2011). The data was simultaneously saved in Biovision Hierarchy (bvh) format, so the resulting motion data could be subsequently analysed and/or attached to a character model for further animation.

The dancers decided to (re)present "household actions" including sweeping, cooking and lifting water from a well. When the handling of water led to numerous discussions about whether water would have been stored in the building, fetched from a well or other source, how it was carried, how it was used, etc., the Mipp team consulted published souces about daily activities in Iron Age Britain, [7] but the Reading archaeologists suggested contacting the experimental archaeology lab of Butser Ancient Farm,

where further capture sessions were conducted with another group of dancers and the Butser archeologists, themselves (see figure 3).

Experimental archaeology seeks to evaluate the methods (although not necessarily the tools) used to create features such as buildings and artefacts, such as arrowheads, with the evaluations derived from empirical evidence. Careful observation and recording of the construction and creation processes can lead to new insights in to how buildings and artefacts were created, and in some cases can help explain anomalous or unusual features in the material record. For, example the presence of curved depressions in the ground near the structure of the round house at Pimperne Down, Dorset, had no apparent function or relationship with the building whatsoever. In the process of reconstructing this round house at the Butser Ancient Farm experimental archaeology site, it was found that such depressions are made when manoeuvring the structure's roof beams in to place. [7]

Motion Assumptions

Alongside the development of technologies and platforms which support the (re)creation of ancient environments in 3D has been a marked increase in the availability, affordability and robustness of 3D motion capture apparatti. Data derived from motion capture can take numerous forms. These can be classified, after Moeslund et al. [8], in to broad categories of surveillance, control and analysis. Surveillance is the observation of the behaviour of individuals and/or crowds; for example for public order at sports grounds. Control is where a human uses a piece of hardware to direct action in a virtual environment (such as a game). Analysis is where motion capture is used to build and/or augment other forms of information, particularly the annotation of video and motion traces. The simulation and documentation of various human activities that were (or may have been) carried out in and around both past and present environments falls chiefly in to the category of analysis.

While this has been investigated previously, many such approaches are purely representational, tending to avoid the pressures that integration of motion capture data with 3D environments places on interpretation. During the capture process, we became aware that we were making numerous assumptions about motion which we needed to record in order to provide a context for our motion data. For example, when capturing in the studio, we became aware of how much the hard floor and dancer's shoes constrained the movement, so we replicated the motions barefoot, outdoors on uneven, grass. We realised how much external factors such as footware, clothing, training, age and gender of the mover impacted the motion data. Many assumptions of this kind are implicitly encoded into virtual 3D models, of which the round house we produced is an example. While we cannot remove such assumptions from the reception and transmission of VR environments, our motion capture trials using the model have allowed us to begin to isolate and critically assess them. It became clear that one key factor missing from our reconstruction of the hypothetical tasks is the ability to annotate and describe the motion data objects. The key difference between the kind of 'human factor' representations and re-enactments that are currently viewed with suspicion by experimental archaeologists is that digital capture should allow particular actions, and particular temporal points in each trace, to be labelled with a) what material evidence relates to each action or trace or, if there is no material evidence, what that action has been represented.

Conclusion

MiPP seeks to replicate, contemporaneously, the actions that the evidence suggest was carried out in a round house, document those using motion capture technologies, and integrate that documentation within the reconstruction. The approach has the potential to bring to life not only the round house, but the hypothesized activities of its inhabitants. The MiPP team is just beginning to explore the use of Augmented Reality techniques for overlaying (re)recreations and dynamic visual interpretations on the exiting site (see figure 2). It is hoped that these techniques will allow close links between site and activities movement by visually combining them. The theoretical questions this raises about how 3D visualization can – and the degree to which it should – impact on our perception of the ancient world are far-reaching. Archaeology is fundamentally about the material record: tracing what has survived in the soil, and building theories top of that. Since the eighteenth century, Britain's museums have operated on, and extended, the same principle: they are polished presentations of the 'final' material record. However, many of our theories concern what people did, and where and how they moved while they were doing. We have reconstructed in a practical and agentive way how certain everyday tasks might have been accomplished by the Iron Age inhabitants, and further development of the project will seek to refine and formalize the evidence framework in which this rests. As far as we are aware, this is the first attempt to link, explicitly, a remediated VR with the 'real world' by human agency, as represented by empirical motion capture data. In this paper, we have attempted to set out the limitations that undoubtedly exist in reconstructing and visualizing human agency but believe that, within those limitations, this approach has a valuable contribution to make to the development of virtual models for Arts and Humaities research and understanding and experiencing locations, sites or "places".

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SKY KNOWLEDGE: THE SQUARE KILOMETRE ARRAY (SKA) AS A FOCUS FOR ART-SCIENCE COLLABORATIONS

Suzette Worden

Radio astronomy is being developed globally through the Square Kilometre Array (SKA) project. The decision for its location, either in Southern Africa or Australia, is expected in 2012 with construction from 2014 to 2024. How will the SKA be understood by broad audiences beyond the scientific community? This paper examines the potential of the SKA as a catalyst for art-science conversations and collaborative projects.

Ilgarijiri: 'Things belonging to the Sky'. Photo © John Goldsmith, ICRAR

ASKAP Fisheye Photography. Photo © Paul Bourne iVEC@UWA with Jonathan Knispel

Introduction

 The Square Kilometre Array (SKA) will be an array of dishes and antennas, which together form an enormous radio telescope. Collecting data from radio waves that can penetrate through cosmic dust, allows astronomers to study the centre of our galaxy. The SKA will extend current capabilities and enable astronomers to look into the past at the history of the Universe. Current developments towards this goal include the building of the Australian SKA Pathfinder (ASKAP) in Western Australia and the MeerKAT in Southern Africa. These telescopes will trial new technologies for the international SKA design.

The project is gaining momentum; it is therefore timely to see how the potential benefits are being communicated and appreciated beyond the scientific community, or how those involved in the development of the SKA are building cultural links with others interested in, or affected by, its development. In this paper I will explore how the SKA is portrayed, especially in art-science conversations and collaborations.

Radio astronomy has been the subject of artworks and a focus for theoretical discussion, as in Astronymous: Leonardo Art and Astrophysics Working Group. Examples of works include 'Radio Astronomy' (2004), a project by Radioqualia, devised by Honor Hagar; 'Deep Space' (2006) by Hellen Sky with Paul Bourke; 'Void Love' (2008-2009), a web-based soap opera by Nicky Forster and Willoh Weiland, with Dr Chris Fluke, Centre for Astrophysics and Supercomputing, Swinburne University, Australia; and 'Beam Me Up,' by the German group, Xcult, an online exhibition with guided tours curated by guest curators as part of the 2009 Year of Astronomy. The International Year of Astronomy in 2009 was a catalyst for work in this area. Examples of activities from Australia included star hunt programmes, commemorative coins, and travelling exhibitions from The World at Night (TWAN) photographers group.

Related areas of astronomy and space travel have been explored through artist in residence schemes, including NASA's residencies which started in 1962 (NASA 2009). Planetariums are important places for visual displays of the night sky. The aesthetics of these displays owe a great deal to the pioneering work of artist Donna Cox. Planetariums have also provided a venue for creative works such as 'Celestial Mechanics' (2005), a planetarium-based artwork installation devised by Gabriel Dunne and Scott Hessels. The 'Space, About a Dream' exhibition (Kunsthalle, Wein, April to August 2011) celebrated Yuri Gagarin's space flight. There is therefore a significant body of art works, in traditional media and electronic formats, demonstrating popular cultural interest in space exploration, through telescopes and by space flight.

Against this background of creative responses to the subject of astronomy, I will consider two examples of the exploration of aesthetics and creativity relating to the SKA that are associated with the physical site for the Australian SKA Pathfinder (ASKAP) in Western Australia. One provides the context for discussing the physical site and engagement with the traditional owners of the land, where a fully functioning SKA could be built in Western Australia. The other concerns how the SKA is being visualised *and* depicted using digital technologies. Images from both of these examples are becoming popular representations of this globally significant scientific and technological development. This commentary will provide the starting-point for suggestions about the characteristics of further art-science collaborations.

The Square Kilometre Array (SKA)

The Square Kilometre Array (SKA) project is going to give scientists unique opportunities to study the formation of the early Universe. The SKA will be the world's largest radio telescope and is the focus of a

project started in 1993 when the International Union of Radio Science (URSI) established a Large Telescope Working Group. After a period of growth and consolidation the project now comprises an international partnership between 67 organisations in 20 countries. In April 2011 the Jodrell Bank Observatory, Manchester, UK, was selected as the host Project Office and a Founding Board established for organising the next phase of development of what is now terms a 'mega-science' project with €1.5 billion funding.

The decision for the final site will be made in 2012. The sites under consideration are in Southern Africa, with extensions to the Indian Ocean Islands, or Australia, with extensions to New Zealand. From the central area an array of antennae will spiral out to cover 3000 kilometres or more. The criteria being used to evaluate these sites include the availability of radio quiet zones, characteristics of the atmosphere, climate, infrastructure, maintenance and operational costs. There will be a pre-construction phase from 2013-2015 and then two phases of construction (2016-2019 and 2018-2023) followed by full science observations from phase one in 2020 and phase two in 2024. When the SKA is operating, sensitivity of telescopes will be 50 times and the survey speed 10,000 times that of current equipment. [1] The data will be used by the scientific community to explore fundamental unanswered questions about the formation of stars and black holes, the evolution of galaxies, and existence of magnetic fields. Researchers will also investigate gravity to ask further questions about the theory of general relativity and seek to detect extra-terrestrial signals, and search for amino acids to detect forms of life or places where life might be supported. These questions are of interest to others beyond the scientific communities and have been investigated by artists, individually or as part of a collaboration with scientists.

Ilgarijiri: 'things belonging to the sky'

A project directly related to the SKA in Western Australia was Ilgarijiri, meaning 'things belonging to the sky' in the Wajarri language. This was a joint project between Professor Steven Tingay and colleagues, from Curtin University and the International Centre for Radio Astronomy Research (ICRAR) and staff and artists of Yamaji Art, Geraldton, Western Australia. The project explored the connections between Aboriginal astronomy and the astronomy associated with the SKA. These artists live in the region of the proposed location of the SKA. Radio astronomers from Curtin University spent time with the Yamaji artists and shared stories, scientific and traditional, about the way they observed nature and the sky. Work by the Yamaji artists, resulting from these conversations and a visit to Mullewa and Boolardy Station, was exhibited in Geraldton Western Australia in June 2009 and then at the University in Perth, Western Australia in October 2009. The work also went to the Australian Institute for Aboriginal and Torres Strait Islander Studies (AIATSIS), in Canberra, and was on view from November 2009 to January 2010. The work was also shown internationally as part of a 'Communicating Astronomy with the Public' conference, held in Cape Town in 2010.

Paintings from the exhibition bring to life stories from indigenous astronomy. [2] For example, a painting by Margaret Whitehurst, 'Emu in the Sky' shows the Emu representing the dark space in the Milky Way that is recognised for its 'emu' shape. The emu's head is near the Southern Cross and its body and legs are dark areas that reach towards the Milky Way in the direction of the constellation of Scorpius, in the southern night sky. The greater visibility of the emu, from May to September, was a sign to hunt for emu eggs, a welcome food for the community. Radio astronomers comment on the relationship between this recognition of the dark spaces in the sky, as opposed to the stars, and their exploration of space through radio waves. As well as recognising the different ways of interpreting the sky, similarities were noted about recognition of visible and invisible parts of the spectrum.

The exhibited paintings gave audiences a view of the richness afforded through observing the night sky and ways of relating the changes in the sky to everyday living patterns and the seasons. The sharing of knowledge was a conversation, with the Yamaji artists embracing ideas from the trip to see the possible location for the new equipment for radio astronomy, as some of the paintings in the exhibition are also a record of that journey to the possible site of the SKA. For the astronomers and the exhibition audience there are opportunities to embrace views of the cosmos with a long and enduring timespan of development. There were also opportunities to work with the local community and collect video documentation of stories about the paintings. Through the project the scientists were able to connect with the traditional owners in the local community where the proposed SKA would be built. The science was therefore contextualised within a social context that embraced the location of the ASKAP. Direct economic benefit also came to the indigenous community through the sale of works from the exhibition and ongoing publicity through a website, TV and press coverage. [3]

The ASKAP project is bringing economic change to the remote area. The Ilgarijiri project is making important educational and cultural links, especially between art and science. It is also providing a context within which to understand our appreciation and reactions to remoteness in an increasingly populated and networked world. For radio astronomers to collect data about the universe radio-quiet locations are needed. Landscapes and environments in a remote location on Earth is being associated with the gathering of information from even more remote locations and across immense distances. In a globally shrinking networked world we are still challenged and excited by the immensity of physical space. As a counterpoint to this demonstration of remoteness and distance, the Ilgarijiri project interestingly demonstrates connections across time. Links are being made between the indigenous knowledge, from a diverse culture with many different groups, to the scientific activities and engagement in a global research project developing new technologies to see back though time and ask questions about the evolution of the Universe.

Scientific Visualisation and the SKA

The SKA is being publicised internationally through a promotional animation that is freely available for viewing along with other images and resources available for downloading for educational purposes. [4] The promotional animation was produced by the 3D Productions Group attached to the Centre for Astrophysics and Supercomputing at Swinburne University of Technology, Melbourne, Australia. The movie takes viewers on a fly-over tour of the site showing the three different kinds of telescope array, followed by a depiction of the scale of the enterprise when it is finished. The animation has to represent a site that has not yet been chosen.

The group has also produced a promotional animation movie for the ASKAP, which takes the viewer through a scene where the telescopes are shown in a visualisation of the Murchison terrain against the backdrop of a rapidly changing sky, from sunrise, through daytime and night time. The smooth movements of the telescopes are shown against the silhouettes of vegetation, depicting a vegetated but otherwise sparse and empty environment. As a viewer we 'fly' over this landscape, as if in a plane, able to see but not touch.

The ASKAP project has provided an interesting subject for experimentation in visualisation. In 2010 Paul Bourke and Jonathan Knispel created visualisations of the Pathfinder on the Boolardy station. [5] As the designs for the SKA telescopes are still being developed, the visualisations, such as these that are in circulation, are integral to the communication process within the project as a whole. In addition the images

are beginning to circulate as part of outreach and public communication side of the project. The images developed by Paul Bourke are also experiments for testing the latest technologies for high resolution gigapixel images, movies, fisheye images, files for Google Earth and Fulldome productions.

In these examples there is reference to 'realism' in so far as the digital technologies being used are associated with collecting accurate data and are photo-realist in style. But the examples comprise highly constructed virtual environments and depict models of the telescope still in evolution.

Roger Malina, a trained astronomer, artist and critic reflecting on dark matter, has commented on the importance of instruments that allow us to access the world beyond our immediate senses, saying that "It is hard to describe the thrill of building a new device and then being the first to be able to see a previously unknown part of the universe."Malina's comments are relevant for considering the relationship between science and technology, which he terms 'techno-science'. He emphasises the importance of instruments, noting: "Certain kinds of knowledge just cannot be obtained until an engineer has invented the right device." [6] Malina adds that for astronomy such instruments are the key to overcoming the limitation of the low range of senses offered by the human body.

The promotional visualisations of the SKA give primacy to the instruments to be used to collect the data. These virtual representations of the physical objects of the SKA are statements suggesting a 'grounding' of the project, which also presents us with iconic statements about the project's technological advancement.

These representations offer an opportunity to reflect on the changing relationship between astronomy considered as a pure science, answering fundamental questions, and the technologies needed to achieve its goals. The historian Paul Forman has reviewed changing attitudes to science and technology and the emergence of an identifiable postmodern reversal of the conception of technology as 'applied science' and as such inferior to science. In a postmodern view technology subsumes science. This is not technological determinism but recognition of 'ordering activities' that constitute culture. [7]

A greater appreciation of the instrumentality of the SKA and the current appreciation of these physical instruments within the development of astronomical knowledge places radio astronomy in the domain of postmodern science, where, in Forman's terms, technology is a set of means to an end or ends and there is less consideration of method. The visualisations account for the current stage of the project, but this may be an indication of the broader ways in which astronomy will be conceptualised as the project is developed. In Forman's terms: "In postmodernity, with technology acquiring primacy, the word 'technology' gradually becomes capable of including science in its denotative compass". [8] As the SKA progresses, artists will have the opportunity to explore the significance of these instruments and how they relate to the changing view of astronomy within postmodernity.

Opportunities

A notable feature of these two related but distinctly different ways of creative and innovative engagement with the development of the ASKAP, as part of the development of the SKA project, is the strong sense of appreciation of a location to communicate ideas that are about exploring distant space. Both projects take us to the Outback in Western Australia and draw attention to the physical remoteness of the possible site for the SKA. This forms a focus for association with cultural attributes that might then become strongly associated with the project.

Choice of location is a predominant feature of the current development of the SKA. The projects described here highlight that preoccupation through the communication of information about interpretation of 'place' associated with one of the possible SKA sites. 'Real world' locations are therefore relevant to the broader narrative and can act as anchor points for future creative work.

There is immense potential for art-science collaborations to explore further aspects of the development of the associated science and technology. What the SKA offers is the potential for artists to consider the implications of the vast volume of data that will be produced that is even a challenge for those developing the SKA. [9] We also need to explore the shifting definitions of pure and applied science. This offers further opportunities beyond those already being demonstrated by the work of the many artists interested in 'applied' areas such as the bio-sciences and nanotechnology.

This interest in the 'applied' is consistent with the observations made above, of a shift to a 'postmodern' science. How will this affect our conceptions of astronomy when associated with the development of the SKA? Additionally, there will be many spin-off technologies. It will be interesting to see how art, associated with radio astronomy, can help us understand this shifting balance between science and technology.

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PLACE IN MIND: TOWARDS A DYNAMIC MEMORY PALACE

Adrianne Wortzel & Damon Loren Baker

This paper will discuss interdisciplinary work on memory between psychologists, biologists, roboticists, neurologists, linguists and discuss archetypical models gleaned from those disciplines. This will include historical memory palaces, neural networks, linguistic structures, and biological systems.

Mnemonic devices: Mental Maps and Memory Lanes
Using the Internet to focus on pinpointing particular nuggets of knowledge, while submerged in an illusion of an infinite amount of data accessible through random access, puts forward the idea of infinite combinations of data and access paths. This combinatory power, along with how a user's choices are informed and filtered, erodes the edges of pre-existing consensus models, laws and identities. Borders between disciplines and paradigms are experienced on the web as increasingly tenuous, arbitrary and dynamic. What kind of model, if any, can serve to supply some constraints of structure on a networked art work.

The Ad Herennium (circa 86-82 B.C.), a textbook on rhetoric, contained a memory section divided into "rules for places, rules for images, memory for things, memory for words." Instructions were to first fix places based on the construction of mental architectural models. The larger and more complex the better because more memories could be housed. Knowledge was broken down into discrete particles and topography constructed as a memory strategy. Bits of information were assigned to objects; objects were placed in specific rooms, in a specific path, which would lead the recaller to data in the correct order. It was imperative that knowledge was fixed - adhered to an object -- so that it could be accessed at any time by virtually beating a path to its door.

Both storage and memory both particularly played a large part in the concerns of medieval scholars, theologians, scientists and artists. In medieval Western Europe the artificial memory structure paradigm shifted from architectural models to theological constructs. The territories of heaven and hell became host to specific memories. Memories were assigned to objects, creatures and topographical landmarks in those territories. Theologically based memory palaces had a large influence on creative forces of their times. It is possible to view Dante's Inferno as a journey through what would have been a pervasive and popular memory palace paradigm. In The Art of Memory, Francis A. Yates describes the Inferno as "based on orders of places Hell, Purgatory and Paradise…. The Divine Comedy would thus become a summa of similitudes and examples, with memory as the converting power, the bridge between the abstraction and the image."

In the 16th century, the memory palace emerged from its virtual state into a physical one existing outside of the mind in the form of an installation. The Memory Theatre of Giulio Camillo Interpolated the Greek memory palace by constructing a wooden structure that became the inspiration for the architecture of Shakespeare's Globe theater. Camillo's theater was a representation of the universe expanding its inception through the stages of creation. Every person who entered this magical portal would come away capable of speaking on any subject with the skill of Cicero. The wooden structure, large enough for two people, was commissioned by the King of France and displayed in Venice and Paris.

A reconstruction of The Memory Theater by Frances Yates

"The work is of wood, marked with many images, and full of little boxes; there are various orders and grades in it. . . . He calls this theatre of his by many names, saying now that it is a built or constructed mind and soul, and now that it is a windowed one. He pretends that all things that the human mind can conceive and which we cannot see with the corporeal eye, after being collected together by diligent meditation may be expressed by certain corporeal signs in such a way that the beholder may at once perceive with his eyes everything that is otherwise hidden in the depths of the human mind."

A-Maze

A 20th century labyrinthine line drawing by Umberto Eco (http://www.intelligentagent.com/archive/ RoadEco.gif) traces the development of a pun created by James Joyce for Finnegan's Wake. The drawing illustrates a decoding of the pun, tracing possible nodes of association which link the words "Nean-derthal," "Meander," and "Tale" from which Joyce formed the transformative word "Meandertale." The newly constructed word "Meandertale" appears to signify the very name of the process that forms it, a meandering quest for associations between words--a quest where these associations simultaneously tell the story of the words' evolution and transform them. In such a well-ventilated world, perhaps one nec-essary constraint might be to assume that no word suffers more than six degrees of separation from any other.

Clues Without Context

How far astray can the routers of imagination take us from what we can consider true? Can we be sure that such a quest on a well-trodden path is revealing good metaphorical expression? Clues without con-text i.e., the nodes without synapses--make the subject of the diagram cease to resonate its potential; it simply becomes a representation of itself where everything is equal or in a simplistic hierarchy (some are upper case, some are lower). The labyrinthine journey defined by the convoluted node line occurring between words is sprinkled with alchemical events: occurrences in language where two words together form another that leads to a whole new expression of association and meaning. Such events stimulate vernacular, slang and new languages.

Mystery Without [E]motion

Then again, selecting the nodes in Eco's drawing without their names or connections offers mystery (go ahead, connect the dots)--but the literary metaphor suffers a loss of its muscular tone, its life-like exu-berance. As the depiction of convoluted connections disappear in the above drawing, the resonance also falls away, dwindling to nothing. If we absent everything but the line, its function as a pointer to possi-bilities suffers. We have uniformly subtracted from this path any of its significant elements.

Order without significance

Networked art presents a process than a product. But the process alone without the narrative, or the significant reason to travel through it, seems barren. Where the relationship of one bit of content to an-other in these works, even at a minimum conjures up additional language in the visitor's mind that makes the leap from one work to another. This invisible text, an emerging hieroglyphic structure in the

reader's mind, is the activity that conjures up a new language of the links and a new mode of presentation. Hypermedia links are pockets, absences, lapses, and synapses, indicating what is inexpressible or interactively assumed by the viewer or reader. The subtext of the work can be embedded, even inconsistently, in the linkages and left to the viewer to decipher.

"Planning is just a way of avoiding figuring out what to do next"

The problems of spatially aware embodied cognition are pervasive. Many disciplines have had to develop strategies to deal with basic questions of 'Where am I?', 'Where is here?' and 'How do I navigate through this place?' in many forms. Some particularly promising techniques have been explored at the intersections between the fields of cognitive science and robotics that may be useful for developing the kinds of advanced spatial navigation of data spaces proposed in this paper. Robots have become advanced enough and cheap enough to be employed in a wide variety of general purposes in relatively uncontrolled environments (for example: using an iRobot Roomba(tm) robot vacuum cleaner to clean the living room floor while you are at work without having to fear for the safety of any household pets that may be roaming about) instead of being restricted to use in controlled industrial environments such as automated factories.

These systems adaptively and efficiently explore their environment using limited contact sensors to determine when they collide with walls or other objects as they follow a semi randomized path through the space. They lack advanced computer vision techniques and have no pre-existing model of what the space is like. They simply know which way they are heading and when they collide with something that would prohibit them moving forward, they go another direction and change the method the pattern they were using to traverse the room (alternating from moving from side to side, spiraling about the room and doing random walks). This may sound simple, because it is.

The robot vacuum doesn't build a high level complex model of the space, it simply reacts to what is immediately happening to it and tries different things when what it was doing did not work. It does not do that because it does not need to. It is able to sense where the boundaries of the area it wishes to explore are and then engages in a controlled and purposeful wandering of that space. The direct feedback that it gets from its environment substitutes for a complex conceptual model. It is a reactive system, with relatively little internal variable state to model the environment. This approach grew out of biological models of how ants and other insects navigate over large areas by following extremely simple rules that rely on responding directly to the environment more than they do on building any complex model of the environment . This subsumption architecture of integrated simple behaviors that respond to a rich environment has been used in a variety of areas of robotics and for tasks such as simulating apparently complex human like behavior in the Sims series of video games. They present a possible method for exploring and designing the sorts of rich data spaces that are proposed in this paper.

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PLAYING IN PLACE NOWHERE: CREATING AN OPEN SOURCE COUNTRY

Andrew Y. Ames & Alexia Mellor (WRMC Collaborative)

Through a combination of performance art and game design, WRMC Collaborative investigates the concept of a digital and conceptually open source country through an analysis of our project, Lokönenie. Lokönenie, meaning "place nowhere," is a portable and mutable nation whose only fixed location is an IP address. With playful interventions, the work is activated in the physical and lives in the digital, connecting disparate locations in web space.

Corporations are the dominant institution of our time and influence everything from the smallest aspect of our daily experience to the most powerful of governments. Today, corporations benefit from greater mobility and rights than do most people. McDonald's, Starbucks and IKEA, for instance, are international brands that shape individual interests. What, then, does nationality mean in a corporatized world?

Corporations and governments actively define physical and virtual borders. Surfing between websites is the contemporary equivalent of moving between states or countries. IDs are checked, information is collected, fees are paid, all to gain or restrict access. Despite virtual space's ability to cross borders and connect people, access is determined by forces in physical space. China's government has banned Facebook; Google Inc. has restricted access to YouTube content based on local copyright laws and the location of an IP address; corporations maintain firewalls that protect their Intranet and limit employee access to the Internet. For better or worse virtual space, physical space, corporations and governments are intertwined, shaping the collective meaning, experience and cultural identity of place.

Using contemporary technologies and drawing upon art movements such as the Situationists and Fluxus, WRMC Collaborative has created Lokönenie, a nation based on open source principles challenging a fixed definition of place. Personal identity is derived less from place of origin, but rather is constructed within a globalized economic, political and cultural climate. Cultures are morphing into a monoculture characterized by urban migration, corporate expansion and technological innovations. Through play strategies, Lokönenie integrates aspects of corporation and government to create the possibility of a culture of one's choosing. With installation, performance and digital art WRMC builds a nation whose citizens are active online and off.

What is Lokönenie?

Lokönenie exists in three formats: public, private and virtual spaces. The milieu from which it springs is one where media are controlled by corporations and social media sites are replacing town hall demonstrations. Although we may not know our neighbors, we do have 447 Facebook friends. WRMC embraces this format of community building by placing the virtual at the center of where citizens can instigate change. Lokönenie citizens, or shareholders, are not asked to relinquish their current national allegiances. The motivation in creating Lokönenie is to dispel the notion that identity is bound by place, and to create a nation-state that takes the dominant governing principles of corporate culture and subverts

them to create a parallel culture; a physical and virtual subculture. Citizens are shareholders in this corporate state, responsible to and for the conditions of the nation. Citizens moderate all aspects of the nation: from how and what is governed, to establishing a framework for political freedoms and civic duties. Lokönenie provides citizens with a space to govern and act as they see fit, provided they follow WRMC's one rule: changes must be for the benefit all citizens. What is deemed "best" is up for interpretation by the group and reflects the community's shifting concerns and ideals in response to current conditions.

Lokönenie seeks to discover whether a country following an open source platform will instigate individual action on behalf of a group. Fascinated by the fact that Facebook has almost twice as many users as the United States has citizens, we question, "does a voice in virtual space hold the same power as a voice in physical space?" Facebook users do not have the right to vote or make changes to the site's format, but they do fervently voice their disgust when the proprietors make updates or alter the rules of use. Many organizations and politicians turn to Facebook to attract voters due to the website's ability to engage tech savvy masses in signing petitions and sharing links with "friends." The corpor-nation of Facebook and other social media sites have expanded their borders and influence beyond simply sharing status updates. Recent uprisings across the globe have turned to Google, Facebook and Twitter to organize protests and broadcast social unrest. "Corporate" is derived from Latin corporatus, and means "united in one body." [1] Lokönenie reclaims the Latin meaning by uniting groups of people through a co-opting of corporate structures and forming an organizational principle by which this new national body can operate in public, private and virtual spaces.

PUBLIC

Public performances take an interventionist role with WRMC, dressed as representative consultants of Lokönenie, entering into public spaces and claiming an area with our tarp and flag. As consultants we act like canvassers, planting our flag in parking lots and public parks, asking passersby to fill out forms for entering the country. The interventions serve to disrupt the normal use of the space and encourage public engagement, whereas the forms serve as a means of collecting data about participants and their responses to questions similarly found on official US government forms. The forms ask participants for information including Social Security Number, address and weight, favorite song, and a minimum wage they would be willing to work for as a non-resident immigrant to Lokönenie. The questions promote the consideration of the underlying agendas of these documents that we are so accustomed to completing. Having filled out the form, visitors are then welcome to enter the demarcated space.

PRIVATE

Private installations take place within the white walls of the gallery. The gallery acts as the temporarily fixed capital or franchise where participants encounter a set of rules that they must follow to enter the work and become the performers. These rules involve taking off shoes for security measures, filling out visa applications, and finally entering the space of the ten foot by ten foot tarp that marks the area Lokönenie inhabits. Lokönenie performs as a sovereign state which citizens may use as they wish, from a space to read War and Peace, to a place to find peace during war. By placing Lokönenie in a gallery setting, we challenge art's role and its potential to actively effect social critique. Further, we challenge the spatial neutrality of the white cube as the gallery sets the stage for the discourse surrounding art as political agent.

VIRTUAL

The URL for the website (http://lokonenie.projectsoya.net) is Lokönenie's virtual and only fixed location; its headquarters or embassy where decisions are made and information is stored. The virtual space of Lokönenie is set up to follow an open source model. Open source is generally a production practice, however in this case it is a philosophy that provides access to end product source materials with the possibility of modifying them to benefit the whole. Utilizing MediaWiki, an open source wiki platform, we create a forum for a democratic, self-policing community of citizens with a common interest in upholding a nation-state based upon equal access. Participating citizens/shareholders can download visa applications and census forms for use in public interventions, patterns for making the flag and tarp, and modify documentation on the wiki. All alterations must follow specific guidelines that adhere to the spirit of Lokönenie and its mission to create an open state.

The name Lokönenie, derived from Esperanto means "place nowhere," and highlights the transitory, dislocated nature of our country and our desire to promote a place without geographic, cultural or language barriers. Based on corporate and government organizational principles of duty to shareholders, popular sovereignty, ability to legislate, and flexibility of operations, Lokönenie fosters a multi-national and multi-platform culture. The work is activated in the real world and lives in the digital where disparate locations become connected in virtual space. The public interventions, website and gallery installations facilitate dialog about perceptions of borders, access and territory, as well as how we identify with place as a fluid idea.

The desire to create a neutral space has been attempted before in the physical world. A historic example is the Esperanto-speaking territory of Neutral Moresnet, later known as Amikejo ('place of great friendship'), which was established as a 3.5 sq km sector in between the Netherlands, Belgium and Prussia in the early nineteenth century. [2] Residents introduced their own form of branding with postage stamps, a flag, currency and a national anthem all to instill a sense of national pride and cohesion. Although Amikejo was not successfully incorporated as an independent state, its ideals of a stateless space have persisted.

Play

The creation of Amikejo exemplifies the Situationist principle of psychogeography, whereby one actively shapes and is shaped by physical spaces, resulting in a relationship to place that is constantly evolving and fluid. As the urban landscape continues to grow and nature is increasingly replaced by technology, psychogeography takes on a particular relevance to the ways we understand spatial strategies. In the vein of the Situationists, Lokönenie uses play and experimentation to alter assumptions about place. Whereas the Situationists focused on altering ways of navigating urban space we take this as a starting point and expand our inquiries to include virtual space. We apply and reboot these approaches to blend with contemporary technologies. Pairing the Situationists' mode of creating "situations" with Fluxus' mode of setting up unconventional playful happenings, we produce actions that bend the rules of corporate engagement and political policy, resulting in conditions that are both familiar and unexpected.

Play serves as a point of entry for participants to interact with the work physically and conceptually. We establish rule sets that imitate and simultaneously subvert existing corporate and government systems, using humor to make transparent the governing systems at hand. These rules define how players move through levels of engagement to gain access to Lokönenie. Informed by Huizinga's theory of the Magic

Circle, [3] our rule systems provide a framework to reflect on the familiar contexts of public, private and virtual space. In the case of Lokönenie, the portable country acts like an embassy or a multi-national corporation, claiming and taking over an area within one of the three realms. The understood rules and codes of conduct in these spaces are temporarily replaced by the rules of Lokönenie, altering the ways participants interact with the physical and social environments. The core of our methodology is based on the principle that understanding comes through action not simply observation. It is this direct participation in the project that we refer to as performativity.

As Judith Butler describes it, performativity takes as its foundation that all social reality is an illusion created from our implicit acceptance of and enactment of codes of conduct and power structures. [4] We perform the various roles society dictates: the role of man or woman, the role of employee, the role of citizen, much like an actor performs the role laid out in a script. Butler describes performativity in regards to gender, but the principle is equally applicable to all facets of social interaction. Once it is understood that everything is in fact performed in relation to pre-determined structures, one can choose to alter either the structure or the behavior in response to said structure. Lokönenie co-opts and manipulates existing and recognizable characteristics of corporations and government to perform something new: a hybrid of corporation and government.

The codes of corporate identity are performed through branding. Just like corporations and governments, WRMC has generated a set of symbols to represent and make recognizable the state of Lokönenie and its open source culture. The branding is carried through all forms of artifacts used in performances, installations and on the web: official documents, the flag and tarp, and our uniforms. These symbols indicate when participants enter into Lokönenie and transcend pre-existing social borders. Ultimately, the branding of Lokönenie is synonymous with an open, accessible and sovereign space.

History

The critique of government has been a thread throughout art history. While the addition of corporate critique to the canon is more recent, it reflects the corporation's position as the dominant institution in our culture. Several predecessors have explored these ideas and it is important to note their differing and influential approaches as we further add to the dialog.

Constant Nieuwenhuys, an artist-architect originally involved in the Situationist International movement of the 1960s, envisioned his own idea of a post-capitalist utopia where play was the underlying structure for society: New Babylon. Through alterations in architecture and the creation of "situations," New Babylon aimed to transform daily life by suggesting that urban space and architecture are both, in fact, amorphous and temporary, responding to and impacting human interactions. [5] In 2011 the artist group Benrik introduced their Situationist iPhone application. The app, termed by the artists as the "first proto-Marxist iPhone app," asks members to act out "situations" in the real world that were selected via the virtual, all with the intention of creating an uncommon everyday. [6] Nieuwenhuys and Benrik take as their medium the various social interactions that occur within public space and use play to modify the context or create "relationships" between people that might not otherwise interact. Similarly to both Nieuwenhuys and Benrik, we enlist play as our primary tool to distort social norms and create situations in which strangers come together to create an exchange.

The artist projects NSK State and Refugee Republic also seek their own forms of utopia to challenge socio-political circumstances. The Slovenian artist group IRWIN created NSK State, "the first global state of

the universe" [7] as an ongoing project through which its founders and citizens produce art, exhibitions and a congress to meet with citizens and further link the political with art. NSK State was initiated amidst the cultural and political turmoil of the former Yugoslavia in the 1990s, and along with its musical wing, Laibach, investigates ideas of denationalization through a blend of political activism and art. Refugee Republic (RR) is another example of a multi-faceted project that links art and politics. Like Lokönenie, RR lives online and engages people in political dialog through corporate practices. The project calls attention to the migratory patterns of refugees and their economic potential in the twenty-first century by registering itself as a corporation in the state of Nevada (USA) and selling stock shares. [8] The aim is to demonstrate the investment potential and economic value of refugees. RR expands the dialog around migration with their downloadable passports, to show that we are all in some way displaced. NSK State, RR and Lokönenie each call upon art as a means to initiate discourse around socio-political critique.

Games offer another method for extending political and institutional critique. NationStates.net allows players to create their own nation based on their political ideals. Originally created by Max Barry as a marketing ploy for his novel, Jennifer Government, the game gained unexpected popularity and has become a powerful tool to experience politics in action. Players debate, moderate and resolve issues as a group through the "World Assembly," akin to the United Nations. There is no way to win the game, but nations are ranked by the "World Assembly" on items such as economic strength and civil liberties. [9] Both NationStates.net and Lokönenie create the terms and conditions as a framework but it is how one plays the game that creates the opportunity to directly experience and consequently critique political policy.

Building upon the dialog of artist as activist, we are developing strategies to expand Lokönenie's impact in private, public and web space. As we continue to develop and increase the technological presence of Lokönenie, there are three directions we are currently pursuing: mobile applications, microblogging, and commodity manufacturing. Our first foray into mobile applications will include the use of QR codes read by mobile devices. The QR Codes left at intervention sites function as ports of entry to find our country online. The codes are miniature territories accessible by passports in the form of key technology. Leaving the QR codes extends the intervention as we attempt to redefine physical, virtual and cultural landscape.

Our second expansion includes a microblog where Lokönenie's citizens are encouraged to document and post images of their own interventions into public space. To facilitate this civic service, we are implementing a Tumblr which shows where Lokönenie has been and becomes a means to connect participants in a united virtual nation. The virtual nation is mapped out based upon users' IP addresses which mark their virtual and physical locations.

Lastly, for citizens who would like to perform interventions but do not wish to make their own flag and tarp, we will have available on our website manufactured packaged country kits, complete with instructions and artifacts for purchase. The packaged country further intertwines the ideas of nation and corporation by turning the symbols and artifacts into commodities.

It is our intention that as the citizen/shareholder base increases, they will take greater ownership over the project and play a crucial role in its trajectory. In creating an open source country, we empower individuals to take an active role in organizing a possible alternative. In doing so, a parallel culture emerges through this empowerment that borrows from the corporatized monoculture dominating today and highlights the socio-political issues at play.

Although with Lokönenie we turn to virtual space as a possible solution to create an alternative global culture, we are keenly aware of its limitations. Accessibility proves to be one of the most prevalent issues regarding technology as a utopian solution with much of the world still without Internet connection. If decisions are exclusively being made by those with access to technology, how do we provide a platform to hear the voices without access? With Lokönenie, we explore how physical and virtual cultures co-exist with the potential of inspiring members to actively contribute to the enrichment of the cultural landscape in both. A culture is created through a shared set of values and goals that are upheld and reflected within the behavior of the group. Cultures accumulate symbols that represent these shared beliefs and serve to reinforce and guide the learned behaviors. Creating a culture in both a corporate setting and a government context is crucial to organizational strategy. Culture, in both cases, is fluid and evolving and dependent upon the individual members to actively participate in its formation. In the digital age, culture is not limited to place.

Extending the ideas of open source we question what a corporate country might look like. Typically, open source is counter to corporate culture where profit is the ultimate driving force. As CEOs and Prime Ministers of Lokönenie, we rewrite corporate and government rules through performativity and play, and create a new objective for corporate culture that makes the greater good of the people, rather than profit at any cost, its primary motivation. Citizens of Lokönenie engage with our rule sets and enter a space in which they are empowered to instate policy change and ultimately cultivate their own culture online and off. Lokönenie as "place nowhere" reflects the globalized culture in which we live and offers an alternative to place-bound identity.

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BENJI: A BRIEF HISTORY OF THE MAN WHO BROUGHT THE INTELLIGENCE OF SEARCH TO OUR DNA

Amy Suo Wu

Benji is a fictitious entity that journeys into the world of bio-information as commodity and envisions the prospects of genetic discrimination and the increasing personalization of marketing. Named after the child of Sergey Brin (Google.com) and Anne Wojcicki, (23andme.com), Benji represents an ideological and economic union seen in royal political marriages and corporate mergers. Benji's mission is to be the world's leading DNA search engine.

Although Prof. Benji Brin is best known for founding Benji™, the world's leading DNA search engine, he cannot be categorised so simply. If nothing else, his life was too varied, his influence too broad. There are tribesmen in Southern Africa, for example, who know nothing of bioinformatics and Benji™, but know Prof. Benji Brin for his philanthropic efforts. Likewise, there are factory workers in Albania who know him only as a pioneer scientist; children in China who know him as the wise author of their code of destiny; and readers, in dozens of languages, who know him only for his many literary achievements. So Prof. Benji Brin is not an easy man to define, and certainly does not fit popular misconceptions of him as some 'guru scientist,' an aloof and contemplative figure. Yet the more one gets to know this man and his achievements, the more one comes to realise that he was precisely the kind of person who could bring to us the unprecedented DNA search engine, an invention that will continue to shape our world for centuries to come.

Born prematurely on the 25th of December 2008 in Los Altos Hills, California, Benji Michael Brin chose to arrive one week earlier. The auspicious birth of this remarkable child, on this holiest of days, anticipated a lifetime of faithful reverence, fortune and wisdom. Nestled in his mother's bosom, the newborn infant was serenely calm, yet a certain cheekiness – which would always remain part of his personality – unmistakably glimmered in his eyes. Baby Benji couldn't wait to embrace the world that he was destined to change. Naturally, one could say that he was born brazenly defiant of nature's ways, an attitude that brought with it the gift to shape his own fate. And so it seems that from the very beginning, Benji was a self-made person, bound to become the celebrated visionary figure now remembered by billions.

His father, Sergey Brin was the renowned co-founder of the internet giant Google.com, while his biotechnology-savvy mother, Anne Wojcicki, was the co-founder of 23andme.com. In the warm sunshine of their hillside estate grounds, young Benji grew up enchanted by the panoramic view of the valley, as well as the intricate patterns he saw in wondrous life forms no bigger than the tip of his rosy little pinky. At the same time, in the safe confines of his parents' estate, in the comfort of the family library and technology facilities, young Benji already showed a rare talent for computer science. His reading habits were also well beyond his years – philosophy, science and the pillars of Western literature – all part of an effort to satisfy a rare and boundless curiosity. Even before he could fully understand the underlying science, young Benji was keenly aware that his father had inherited from his grandmother a mutation of a gene called LRRK2, which seems to predispose carriers to hereditary Parkinson's disease. As a result, he also spent his formative years pondering the consequences of birth, the fragility of life

and the bitter fatality of disease. Eugenia, his grandmother, a Jewish-Russian immigrant and a former computer engineer at NASA, played an important role in young Benji's life. Grandma Gena, as he called her, lovingly nurtured him while his parents were busy with their work, but she also strictly disciplined him when he stepped out of line. She vested in him all the secret knowledge she had acquired during the course of her illustrious career. Stricken with grief, he couldn't bear to think that one day his father and dear grandma Gena would be robbed of their vitality by the mercilessness forces of nature. Young Benji vowed to hunt down and fight what his father euphemistically called 'his personal bug', to demystify once and for all the process of biological breakdown known to humankind as mortality.

In high school, young Benji regularly confounded his examiners, having previously discussed philosophy with his private tutors, engaged in spirited scientific debate with his parents, and auto-didactically cultivated the art of meditation. However, there was one specific event, which was to mark the beginning of the first major branch of his career. Obviously, his parents' work brought them into the very nucleus of the American high-tech elite. Their business enterprises attracted the best and brightest businessmen, politicians and research scientists, from local Silicon Valley to the farthest corners of the earth. Celebrities and luminaries such as Natasha Vita-More, Andrew Hessel, Mark Zuckerberg, Eugene Kleiner, and the Rockefeller family regularly dropped by for coffee visits or friendly chats. However, one particular person was to radically transform young Benji's view on the mechanisms of life. When he was introduced to Ray Kurzweil, during a dinner party, which his family hosted annually, Benji was absolutely enthralled by Kurzweil's theories of Singularity and his admirable quest for transcendence. At last, Benji thought, here was a real chance to provide not only future security for his beloved community, but also to possibility overwrite his family's genetic weakness. Although the encounter left him with many unanswered questions, this was the moment when Benji's enduring interest in unravelling the mysteries of the human DNA code was born.

With his parents' blessings, Benji was admitted, at the tender age of fifteen, to the prestigious Singularity University. This in itself was a startling achievement, as he was the youngest applicant ever to join the Exponential Technologies Executive Program, ordinarily reserved for the ranks of venture capitalists, CEOs, strategists, entrepreneurs and government leaders. Already rising above his exceptionally gifted heritage, Benji now showed an extraordinary aptitude for networks and computing systems, biotechnology and bioinformatics. He was a fervent student, excelled in all his classes, and was already close to making his first groundbreaking discovery. As radical as it may have seemed at the time, he had a hunch that the source of all 'original behaviour' takes place at the most fundamental level – the genetic level. He hypothesised that if psychological mood cycles and physical habits could be conquered within the gene, then it should be possible to not only predict and determine, but also to essentially pre-empt, any actual physical manifestations – thus preventing otherwise inevitable diseases, drug addictions and other factors of biological breakdown. It was here that he first began to work out a rudimentary version of his theory of 'DNA Switch Isolation', which he was to further develop in his seminal doctoral thesis. This was the discovery that soon brought Prof. Benji Brin to found Benji™, and ultimately led him to a series of previously unimaginable technological achievements.

Among other landmark events, Prof. Benji Brin became the first to scientifically isolate and draw accurate prognostications from DNA, while objectively demonstrating technological potentials of human transcendence well in advance of contemporary scientific thought. His vision of Benji™ was to create the ultimate service: controlling our destiny through DNA. Its goal was to empower individuals while developing new ways of accelerating scientific research and the market-driven economy. Benji™ combined genetics with the ubiquity of the Internet to produce a significant and positive global impact. Using state-of-the-art technology, Benji™ carefully analyses our personal genetic information and matches our

data to personalised advertisements, which are guaranteed to enhance our day-to-day life, as well as our long-term health and life expectancy. The company proudly claims that its database contains the most complete health and DNA records of the human race. As the value of genetic information increases, Benji's™ mission has broadened to further improve corporate research of the ways in which genetic data predetermines our lives. This way Benji™ can continue to provide an increasingly refined and superior service. To assure that the technology is available to all humankind, Prof. Benji Brin has personally directed the international spread of Benji™, paving the way for the rapidly approaching global enlightenment. Benji™ is a practical service, applicable to every aspect of human existence. It is a service for the here and now. Yet at its core and within each and every Benji™ lies this enduring invitation from its Founder: "We are extending to you the precious gift of freedom and immortality – factually, honestly."

BASIC INTERACTION DESIGN EDUCATION: CREATIVE SOLUTIONS IN VISUALIZING ACTIONS

Asım Evren Yantac & Oguzhan Ozcan

Now, everyday life gestures are all around us with the advances in ubiquitous technologies. While this will help more intuitively used interfaces, it will also bring more standardization. And one step ahead, wide use of standard gestures will be limiting creativity for case specific creative solutions. This paper shares our experiences on creativity triggering practices on visualizing actions.
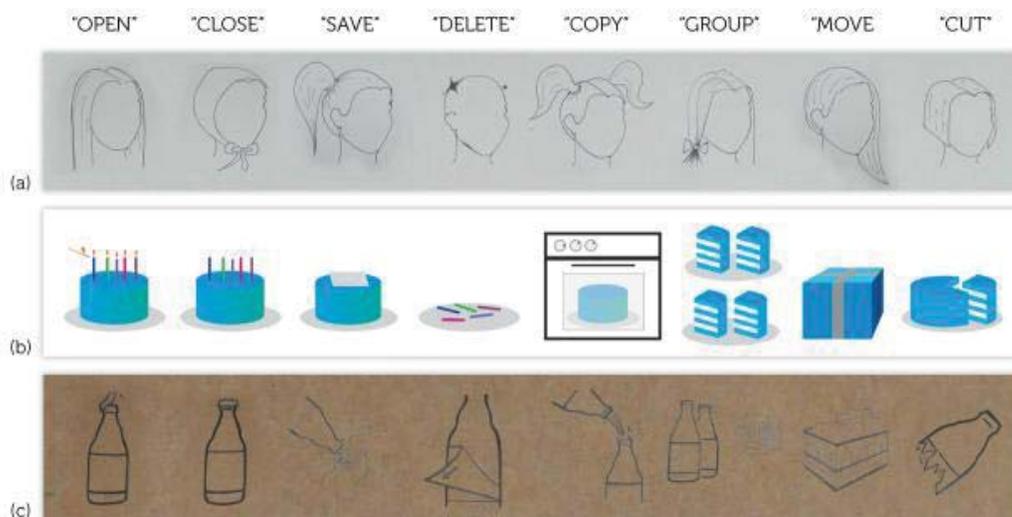

Fig 1. Examples from the "One noun and eight actions visualization" practice. (a)Hande Demir, 2011, (b)Ulas Tayyar, 2011, (c) Hande Demir, 2011.

Fig 2. Examples from the "One noun and eight actions visualization" practice. (a)Nice Uysal, 2009, (b)Nice Uysal, 2009, (c) Gokalp Gonen, 2009
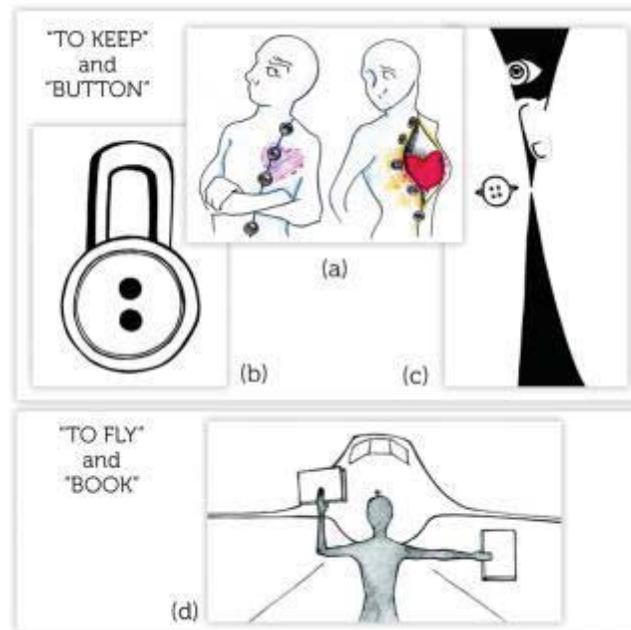
Fig 3. Examples from the "one noun and one action visualization" practice. (a)Nice Uysal, 2009, (b) Doga Corlu, 2009, (c) Sevgi Beyhan, 2009, (d) Ömer Yasar, 2002.

The Need for Authenticity in New Interaction Design

The "desktop metaphor" has been occupying our lives since 80's. Thus we learned to live with mice, icons, menus, button like graphic objects, desktop, alternative navigation paths like mental model abstractions, which all needed to be learned. While we all had to learn this metaphoric digital world, today's children are opening their eyes into a digital world and they easily learn to use these apparatus. We can even say that they do all the things by intuition.

But now, things are changing with the advances in ubiquitous, wearable, tangible technologies. A field called Natural User Interface (NUI) [1] has arisen. We interact with the computers using gestures through devices we wear, cameras, and detectors. Apart from other advantages of the NUI, [2] this means that we can control them with our daily life knowledge and habits. While gestures makes things easier with affordance, predictability, learnability, WYSIWYG, [3] this situation might cause problems in some cases like it might not be that easy to conduct the gesture in several situations.

With all this data in mind, when we look from the designer side, things are not that easy. An up-to-date interaction designer has to know this new gesture library and the standards of it so that he can design functional solutions. Hence, it will be a challenge to find authentic, in a more design oriented term, "creative" solutions regarding case specific needs. For the clarification of creativity in interactive media, we can use the "bringing something into being that is original (new, unusual, novel, and unexpected) and also valuable (useful, good, adaptive, and appropriate)" definition by Osche. [4]

Here, in this paper, we share our experiences of constructing the basic IMD education with action oriented information design. There are several methods [5] we use, one of which concentrates on visualizing actions as described in this paper. The main idea relies on ontological metaphors [6] as mediating artifacts which is a widely used education method for ideation and visualization process. But here, we focus on interaction based issues like action-reaction relations, predictability, WYSIWYG.

Our Basic Interaction Design Education Process

Since 1999, for triggering IMD students' creativity, we have been working on "Breaking the Rules" education methods like;

- Re-reading traditional cultures
- Obstructions (auditory/haptic/visually limited interface design) for Breaking the Rules in Interaction Design [7]
- Participatory Design and Emerging Technology Case Studies [5]
- Random objects' unfamiliar interactions

First three practices are based on complex design problems for the third and fourth year students. In the light of these experiences, we decided to start this visionary practice from the beginning of four years education as the problem seem to be more like a fundamental structure of interaction thinking.

First thing we did is to start this fundamental process from the second years with the "random objects and unfamiliar actions" practice. We urge the students to "re-define" or "re-form" artifacts or objects, with unfamiliar actions applied onto them. The main idea of the practice relies on the idea of ontological metaphors to be used as a mediating artifact. This process shouldn't be named as basic personification but the object is re-designed as a more intelligent whole. The students have to develop a whole interactively working mechanism from a natural object.

While above explained process helped us with focusing on the complex structure of interactive mechanisms without being bound to technological constraints, there was still something missing regarding creative yet working solutions about action-reaction visualization of action messages. It was hard for the students to explain;

- what the message meant,
- how you should use it,
- what is going to happen when you do it,

  in a one frame image.

This time, turning back to our first year students, we restructured our basic interaction design education and looked into the practices of message visualization. We've been giving cases studies of combining one random "noun" and one random "verb" in one still image (Figure 1).The results didn't express the action enough and as a hard case study students couldn't focus on developing alternative solutions to action-reaction relations. Thus we developed the course structure with below explained study of visualizing action oriented image visualization.

Implementation of the Action Oriented Image Visualization for Basic Interaction Design Education

During the years 2008-2011, we studied with 45 first year interaction design students within the basic interaction design course which runs simultaneously with the basic design course and each week we give different ideation practices to the students.

With the above stated knowledge of previous experiences, we added another case study of considering one random noun with eight predefined nouns; to open, to close, to save, to delete, to copy, to group, to move, to cut (Figure 2, 3).

Students develop ideas and sketch as much as alternatives of visualization of these ideas. And the works are evaluated by a jury regarding these criteria:

- To give the right information on what happens if you use the image, how to use,
- Creativity,
- Consistency,
- Alternative amount.

Rather than evaluating the general performance of all the students we examine every single idea and discuss whether it contains any authentic outcome from the action-reaction relation point of view. We conduct the same study for 3 weeks.

Discussion

As a starting point for the evaluation of this experience, we should clarify some facts;

- Instead of considering this practice as an icon design case study, it should be considered as an information visualization sketch for basic interaction. (Fact 1)
- Main idea is to develop the fundamental vision of action-reaction relations for interaction design. (Fact 2)
- This vision will help the students with any kind of further study in information design of interaction. Especially, for the emerging technology case studies in which the students are not familiar with and there is high standardization of interaction (Fact 3)
- By not limiting the students with neither interface, nor technological constraints, we want them to stay out of "cliché" ideas (Fact 4).
- Using one random "noun" with these 8 actions helps them to start thinking of consistency while they are sketching for case specific solutions (Fact 5).

Students participated in this practice so far, have shown us that this is a considerably easy task for them and they can produce many alternatives when they are not bound to technological and interface constraints. They feel free to imagine basic but creative relations between the object and the 8 actions normally assigned to interface interactions.

We accept that these out of standard ideas might not work when applied to interface design, but this is not our focus. What we are trying to formulate is the well thought conceptual ideation of action-reaction relations in interaction design and the ability to visualize these thoughts. Students with this experience, coming to the further steps of our interaction design education structure, are easily adapting to

the case studies of natural objects' unfamiliar interactions and also the interaction for the emerging technologies case studies in the next step. Our studies on gesture based interactions for natural user interface, augmented reality and tangible interaction case studies with these students have been much more effective than our previous experiences.

What we aimed at adding such a practice to our basic interaction design education was to strengthen the first step of "breaking the rules" structure and form the basis of creative ideation process in interaction design. With this point of view, they are moving to the next stages in which we try to prepare them to a harsh design environment of emerging technologies, standards and "cliché" designs. What we should do now is to follow the effects of this study throughout the next years of their education and see what kind of objects and actions are more effective.

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AUGMENTED MOVEMENT VISION: MOVING, SEEING AND SENSING

Tyng Shiuh Yap

The embodied Augmented Reality screen has the potential to alter and augment the dimensionality of our perceptual field through the form and content of the overlaid image. Such augmentation would affect the way our body habitually moves and navigates. This paper explores A.R. expanded spatiality and our body's plasticity or flexibility to refigure and adapt to movement in space with augmented movement vision.
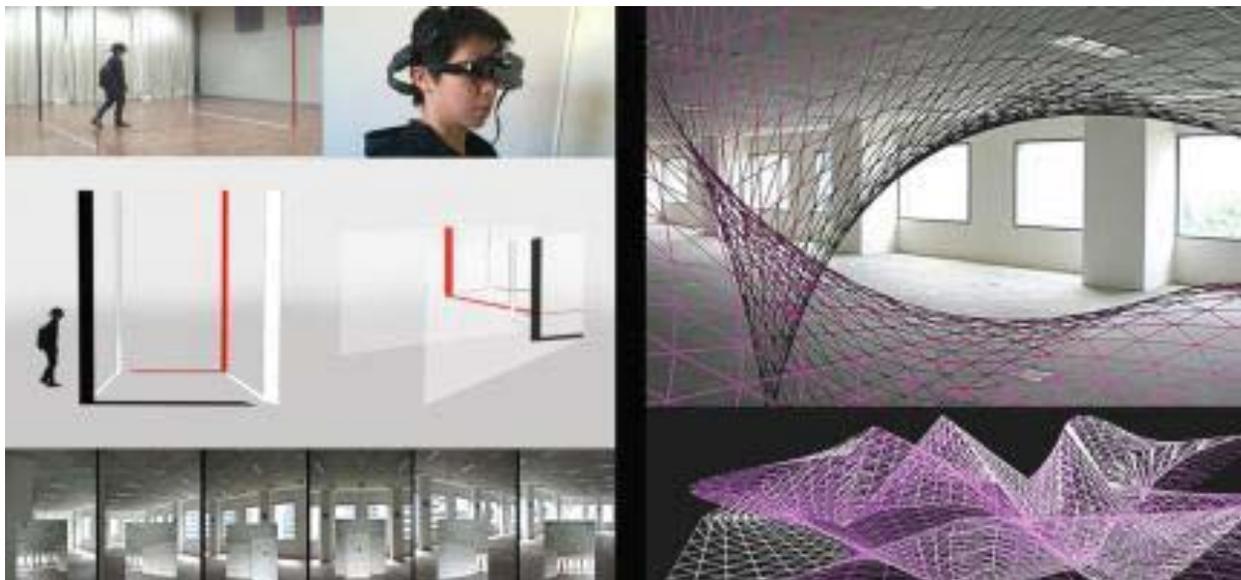
Mpov (Left) – IsoThread (Right), 2010 - ongoing, Tyng Shiuh Yap, Augmented Reality, © Tyng Shiuh Yap. Credits: IsoThread is co-produced in-part with the Banff New Media Institute (BNMI, Canada).

INTRODUCTION

BODY WARES: SCREEN MATERIALITY

The embodiment of the virtual screen presents a situation in which information has to be organized in relation to the moving body. Conventionally, the mobile virtual space is employed as infospace that is structured around egocentric and/or allocentric spatial frameworks in relation to the body, and without the need to be in a continuous field of Cartesian space. [1] The virtual space, in this way, function as a presence or an absence feature that is aligned along with the structures of the physical but is not constrained by location and physical continuity. It is contended here, further, that structures or features in the virtual space need not at all be aligned within the logic of the Cartesian co-ordinate system - that is, the virtual image can serve as a direct extension that transforms or augments the dimensionality of the

actual space. The potentiality of the virtual screen lies, in part, to the fact that it is a null-space without the necessary constriction of physical laws. Its (screen) materiality consists of a medium through which contents and meanings are being projected from. The malleable virtual contents can function as simulation, representation, presence or mirror, and so forth. Therefore, the embodied virtual space could extend not only spatiality but also, more radically, the user's body frame. This implies that there are more potential within such trans-spatiality between the actual and the virtual than the conventional spatial habits and expectations of our body allow. Such spaces do not just present new forms of spatiality but challenges both the body plasticity or flexibility to re-adapt as well as our conventional body-space-time notions of directionality, positioning and orientation in spatial traversing.

TO MOVE, OR NOT

Philosopher Elizabeth Grosz commented that rather than refiguring embodiment, virtual space is often employed in a manner that reaffirm Cartesian mind/body division. [2] There is good reason why (embodied) screen space, in spite of the potentiality of its materiality, is not deployed in more radical ways of interaction to push the capabilities of the body. The kind of augmentation proposed above, challenges deeply ingrained habitual ways of being, and therefore are physically discomforting to the body when implemented. Fracture made to the linearity of the physical space can be made coherent and manageable when the image space is seemingly external to the body, which means that the multiplication of image spaces do not break the singularity of the body's perceptual frame. However, when augmentation starts to encroach onto the embodied space of the moving body and is deployed as a direct re-structuring of spatial dimensionality or as a re-embodiment of the body, they become highly unmanageable to the body. Which is to say there is a disparity of functional requirements between movement vision or vision for movement and locomotion versus vision for more inactive or stationary activities like reading or simply visually scanning the environment.

Enactive theories expound that perceptual representation is derived from actions. However, here, there is the reversed scenario in which perception precedes the possibility for action. Intuitively, one can perceive and analyse the augmented scene more readily, from an external standpoint, than one can learn to re-coordinate one's body to move fluently across the augmented embodied space. Just as, when lost, we stop and refer to our streetmap, to bring actions down to the minimal level, and using our cognitive skills to re-orient ourselves in space. This does not denounce the possibility that higher level off-line perception is inherently rooted in former sensorimotor experience and its memories. [3] It is to be argued in this paper that the challenges of an augmentation of movement vision could be (better) overcome along with the development of both cognitive as well as movement strategies for the body to re-learn, refigure and rehabituate, when the body's usual perceptual relationship with space is augmented either from within or without.

LAYERING: REALITIES

Whilst the embodied screen has the capacity to simulate all kinds of scenarios and configurations, it possesses certain characteristics that are unique to its medium, in its actual relationship to the body and to the extended space. These could be directly translated into the kind of spatio-temporality that it can configure for embodied experience that is not shared by other set-ups. With its integration with the perceptual field of the body, its content, in fact, has no fixed locality within extended space and has no inherent situatedness – other than with its host, the body.

EXPANDED SPATIALITY - TEST SUBJECTS

To explore such hybrid dimensionality, this author is currently developing a series of augmented reality art projects with the working premise of using AR strategies to present ways of perceiving and navigating through space that expands from the circumscription of our physical make-up.

In the "Mpov: xTread" (Fig. 1, Left) series, the user moves around a site with the ability to control concurrently an additional moving point in AR space – which function as an autonomous doubling of her presence and movement in space, such that she is navigating from two positions at once. This project begins with the idea of an expansion of perception from the persistent single, frontedness of the human bipedal body, and investigates the navigation of space with an additional viewpoint. The body (through the multiplied viewpoint) creates a space of active geometry as it moves. In this work the body centredness and directionality is disrupted in that moving forward is not necessarily going forward, but backwards, leftwards etc.

The "IsoThread" (Fig. 1, Right) series work with virtual forms that transcend from the regularity of directionality and orientation that our body experience when it traverses across the stable structures of the flat ground. The user navigates the actual space through the virtual topological reality as augmentation. The IsoThread project presents a situation in which the body is invited to reconcile the translation of its position and orientation between the physical environment and the form of the virtual model. In traversing through the virtual and actual space concurrently, the mapping of the virtual form onto the physical space is devoid of any fixed location and orientation in actuality. By mapping the topological with the flat plane, going forward loops back on a twisted axes. There is no going forward, backward, left or right.

XRELATIONAL : AUGMENTED DIMENSIONALITY : ACTIVE GEOMETRY

The projects above are designed to explore the character of dynamicism that can be brought about with the embodied screen through the layering of realities between the virtual content and the actual space. Volumes of spaces could be nested and juxtaposed, dynamically re-sized and morphed, becoming simulation or doubling the actual as re-presentation, all of these configuring space in a non-Euclidean manner. The situatedness of the body within the extended space becomes extended relational (xRelational) in such trans-spatiality. This is because the state of the moving body described here is not so much being relational to other bodies/structures in space, rather it has to be ready to extend from its embodied situatedness and adopt (or embody) a multiplication of positions, viewpoints and spatial reference frames – in the process rendering space as folded, heterogeneous, multiplied and informatics. Incongruous spaces and views inter-join and split apart, configure and reconfigure. The flipping in and out of viewpoints and perspective forming an inter-crossing of perspective (xPerspectival) creating 'any-spaces-whatever'.

Such configuration produces active geometries, where the experiential space does not have the regularity of flow but consists of interpenetrating volumes which form sub-regularity of orientation, directionality and positioning as the body's perceptual reference frame is decentered. Such virtualization of embodied space, virtualizes the body by making contingent the body's borders, and making dissolute the supposed boundary of its exocentric and the egocentric spatial reference and altering the spatio-temporality logic of its movement in space. Subverting Euclidean linearity, the qualitative and differential takes on space structuring and geometricizing functions; with the body creating and configuring space as it moves.

IN-EXCESS: AUGMENTED MOVEMENT VISION AND TRANS-SPATIAL BODY SPACE

The Augmentation of Movement Vision identified here occurs in two manners. Firstly, in the embodied augmented reality, visually led movement creates a disparity between the perceptual information that is received through the virtual screen and the information that is received through the other modalities of the body. Secondly, the augmented reality vision, in this case, forms a multiplication of spatial references and fracturing of the body's supposed singular egocentric frame. The augmented vision forms an excess that results in the body's needs to re-learn how it can represent and organize new forms of spatial information to facilitate coordination of its collective parts for actions. This is in contrast to what Brian Massumi terms movement-vision, which describes a proprioceptive state, with no division of subject and object. [4] Augmented Movement Vision, here, describes a level of experience which is closer to the state of internal representation, where a lack of singularity or incongruency of movement in space registered in relation to the single-directional vision of the moving body would break down the body's capacity to manage movement.

Unlike phenomenological notion of consciousness as defining experience, Bergson argues that consciousness is derived from the multiplicity of information the body receives; and that our conscious perception is a 'necessary poverty' (or diminution) of our image of matter. [5] For Bergson, conscious representation of the matter suppresses and filters away the information it receives of that which is of no interest for our bodily functions. However, the body is inherently plastic and flexible. Functions of the body are not set in stone, they are open to change brought on by the necessity and demand for new forms of actions in heterogeneous environments. This plasticity of function underlies evolutionary theories of phylogeny and ontogeny (namely, the development found in a species and in an individual over time). Neuroscientist Daphne Bavelier's research on the effects of multi-tasking in Gaming found that gamers who had to content with split-screens action scenarios for extended time starts to adapt and evolve new mental and vision speed and skills that enable the smooth and skillful means of managing the split-screen environment. [6] Bergson's notion of a center of indetermination suggests such openness of the body. Information received is at first unextended in the body, through training they become localized, thus what we experience is memory.

It is inferred here that perhaps the above suggests that the visual information in seeming excess of the body's usual functions can be re-embodied with the whole body through the implementation of interaction between the image and the body movement. That is, to re-figure the body movement to accommodate this excess. The idea for this hypothesis is drawn from the examples of experiments undertaken in the field of neuroscience. It has been shown in experiments that the Body Schema – our representation of our own body – show qualities of plasticity. Neuroscientist Angelo Maravita and his colleagues found that multi-sensory integration of visual, tactile and proprioceptive information in primate brain enables it to construct various body-part-centered representations of space; and that this representation shows

plasticity for change as active tool-use extends the reachable space and modifies the representation of peri-personal space or the space within the arm-length of the body. [7] Separately, it is known that we can dislocate or project our bodily actions onto the video screen and maintain the integrity of our coordination just by following our actions on the screen – as it is commonly performed by surgeons. This follows that our body schema have the same potential to couple with the screen space as part of its own peri-personal space, and that 'virtual tools' could be employed in a similar manner to extend our body space with the virtual space.

COUPLING WITH THE VIRTUAL – A PROPOSAL

In the A.R. project "Mpov" introduced above, the perceptual field in one of the eyes is partly overlaid with the space of the virtual – such that the eyes is looking at the two spaces at once. This may sounds like that the overlaid image would occlude much of the perceptual field. However, in practice, our stereoscopic vision naturally merge the virtual image onto the actual with some degree of transparency.

In order for the body to efficiently move in such trans-spatiality, the body has to be coupled with the virtual space in some manner, such that the body can find new means of co-ordinated movement. When the virtual space stays outside of the movement space of the body, it puts on cognitive load on the brain. Embodying the virtual has the advantages of off-loading mental processes that would be otherwise be needed to make sense of the hybrid space. Through refiguring the body's movement, the new movement patterning derived will off-load this into physical processes. Some neuroscientists would agree that mental and physical processes are not distinct but have integrative roles to play in our thoughts processes.

Further, from the neuroscience concepts of bodily path structure and subspaces, it is inferred that a possible method of implementation is to engage the use of a certain part of the body (one of the arms, for instance) to operate and interact with the virtual space. In this manner, the body space is segmented into two frames of realities, and the user can learn to reconcile the hybrid space through movement and sensing.

Path structure is the geometry rules in which our bodies described spatial structure, they determine the distance and direction trajectories for movement. [8] Each movable part of the body has its own path structure, and there are collectively a hierarchy of different path structures in which some belong in the sub-spaces of others. The rotation of the eyes is a path structure that is considered a subspace of the movement of the head. Subspaces working collectively together produces greater degrees of freedom of movement. The plurality and division of sensorimotor spaces suggest the potential for which the body is open to refiguration for more complex scenarios and to the modification of its internal representation of the extended space it maps. When one arm is tap to control and interact the virtual reality, the body is able to physically sense the virtual, as an extension, within the degrees of freedom of movement the arm allows.

"LEARNING A NEW ACT" – ACTION, CONCEPT AND THE BODY

Cognitive scientist Andy Clark points out that there is a robust finding that mental rehearsal can actually improve sports skills and the part of the brain called the cerebellum commonly known as the motor area. [9] He notes the discrepancies in the amount of time proprioceptive feedback information reaches

to facilitate the action of smooth skilled reaching, which is between 200-500 milliseconds, in contrast to the mere 70 milliseconds the body could actually perform the same action, suggests that neural circuitry that had learnt the pathways involved in the act could trigger the same pathways on cue. [10] This shows that internal representation does play a role in our actions.

If this raises the case that, indeed, language and concepts aid our body movement, then the next question is: are concepts developed from bodily experiences, from our internal representations, or are they independent products. The Deleuzian ontogenetic notion of concepts argues that concepts do not arrive from experiences without creative and productive conditions. Concepts do not merely state the conditions in which identities are formed, rather they produce real knowledge that are creative analysis rather than facts that are representations of the world.

The challenge then is in creating new concept and language that can more adequately assist us to habituate and navigate the increasing complexities of the digital ecology.

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JUST TYPE – A MULTICHANNEL PLATFORM FOR EXPERIMENTAL TYPEFACES

Jesvin Puayhwa Yeo

This paper reports the journey of making interactive art projects that showcases inspirational and experimental typefaces. It uses radio-frequency identification technology, videos and projectors to create a typographic world that reveals the history, inspiration and experimental design of typefaces. The result is a multichannel platform consisting of three interactive art projects.

Fig. 1. Left: Screenshots of the journey of a font. Center: Type Personality. Right:Pangram Art

Fig 2. The console for Type Personality (left), Interactive table (center) and alphabet tags (right).
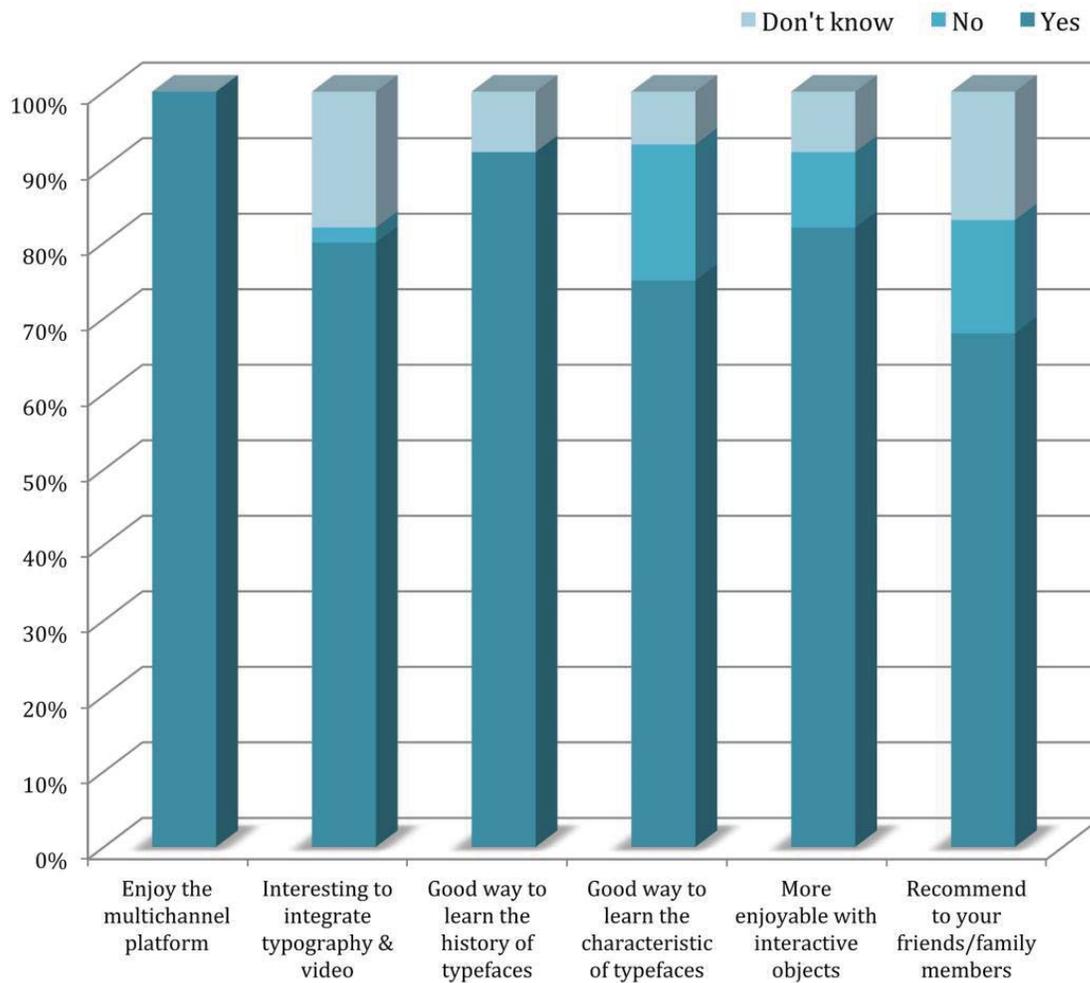
Fig. 3. Survey results

Typography needs to be audible.

Typography needs to be felt.

Typography needs to be experienced.

_Helmut Schmid, designer and typographer

Communication is the main purpose of letters but "there's more to a letter than simply its sound or shape". [1] The different shape and character of a letter affects how we read. For example, a tagline printed in an advertisement evokes a different response in the reader than the same words that appeared on the screen. Given the existence of over 100,000 typefaces, many of which are freely accessible to designers, what are the processes through which one chooses a font? Are our choice of typeface based purely on our aesthetic preferences or influenced by the associations we have of a particular typeface's history and cultural significance? This article aims to explore our experiences with typefaces.

This article reports the journey of making interactive art projects that showcases inspirational and experimental typefaces. It exemplifies how the author selects typefaces and imagines typefaces as people with their own characters and histories. The projects use radio-frequency identification (RFID) technology, interactive videos and projectors to create a typographic world that reveals the history, inspiration and experimental design of typefaces.

The result is a multichannel platform consisting of three interactive art projects – The Journey of a Font, Type Personality and Pangram Arts. The teaching and learning of typography is usually textual, with little or no visual supplements. [2] [3] Therefore, the experience of this multichannel platform is designed to be interactive, fully visual and enjoyable. All videos have an ID and viewers have to use the RFID alphabet tags or the RFID cube to activate it. The multichannel platform is exhibited in a gallery to collect data. The survey results show that the multichannel platform can serve as a useful resource for novice graphic designers, as well as spark the curiosity of anyone with an interest in typography. In addition, the use of typography in video allows us to reclaim the lost art of arranging typefaces in a way that would make an 18th century typesetter's head spin. [4]

The Making of the Art Projects

Art project One, The Journey of a Font, comprised ten typographic motion graphics videos. Inspired by the movement in typography by typographers, Ralph Coburn and John Maeda, [5] [6] the videos explored the concepts of spatial dimension, human/ environmental scale and motion. Each video showed the inspiration of one typeface, introduced its designer and tracked how the font had been used. To begin with the project, desk research was conducted to understand the history and inspiration of twenty-six typefaces. The typefaces selection was based on the alphabet A to Z and the name of the typeface. For example, Avant Garde had been chosen for letter A, Bembo was chosen for letter B and so forth. In the end, ten typefaces were selected for further development. The criteria were based on their interesting background and by the standard of 30 essential typefaces for a lifetime by Joshua Berger. These ten typefaces came into existence between 1845 and 1989, namely, Avant Garde, Bembo, Clarendon, Din, Frutiger, Gill Sans, Helvetica, Trajan, Univers and Vag Rounded. The idea of these typographic motion videos was focused on aesthetic outcome. On the start screen, thousands of letters were flying ubiquitously. When the RFID was activated, the information of a typeface emerged from the flying letters and displayed artistically. The videos were created from Adobe After Effects and original typefaces were used for text display.

Art project Two, Type Personality, comprised ten motion graphics videos. This project was an interactive exploration of typographic form. The idea derived from the personal experience of the author. Being a font fanatic, the author remembers typefaces by visualizing them as people based on the history or popularity of the typeface. She believesone need to be familiar with each typeface to be able to understand their personalities and use them appropriately. In this project, the author anthropomorphized typefaces

and gave them unique human attributions, so that viewers may understand the typeface characteristics through interaction and play.

The formation of the characters of the typefaces used the style of Bembo's Zoo [7] by Roberto De Cumptich de Vicq – a children's ABC book that fashioned letters of the alphabets into animal likeness. Except that it was more complex and refine. The final character designs were formed by hundreds of letters using Macromedia Freehand.Next, Adobe Flash was employed to create the animation of the characters. Each motion graphic video showed how the used of letterform, colour, contrast, scale and layering gave typefaces their distinct personalities. The challenging part of this art project was to upload the vector images to Adobe Flash. The whole image had became raster image in Adobe Flash, therefore individual letters had to be uploaded separately.

Art Three, Pangram Arts, comprised six motion graphics videos that explored the connection between pangram and visual. A pangram was a phrase that used all twenty-six letters of the Roman alphabet at least once. A pangram was invaluable to graphic designers because it aided visualisation of what each letter would look like in a font. The pangrams in this part of the art project gave expression to the colloquial, yet unique, Singlish spoken in Singapore by merging language, illustration and typography. The Singlish pangrams served as the basis for creating the visual images. For example, one of the pangrams was 'Four yellow top black taxies drive up Jalan Bukit Merah on quiet hazy night to liakgao'. In Singlish, Jalan Bukit Merah' is a housing estate in Singapore that frequent by lovers and 'liakgao' mean peeping Tom in Malay language. Therefore, a visual of four taxies and a man with dripping mouth was drawn to represent the pangram. The pangrams were also layout in typographic style to use as part of the video.

When the six images had been sketched, the process of making this art project was almost the same as art project two. Macromedia Freehand was employed to create the vector image of each pangram. Then, Adobe Flash was used to create the animation. This art project was the easier to create as mistakes had been learned from the first two art projects. Three pieces of music were also especially composed for all the videos to prevent copyright issues. Being a first-timer doing projection arts, the author had also learned that it actually take a longer time for a person to read the information of the projection on the wall than on the computer screen.

The Integration of Videos and Radio-frequency Identification Technology

The final phase of the project was to integrate the videos and the Radio-frequency Identification (RFID) technology. The project used two kinds of activation methods. One method was to activate the videos from a distant of 30 cm to create a surprise effect. This method used alphabet tags that were designed especially for this project. Each alphabet tag was made up of two sheets of black acrylic and a passive RFID tag. The RFID tag was to be embedded permanently between the acrylic sheets, therefore, passive RFID tags were chosen because it relied entirely on the reader as their power source and read up to one foot away. Every RFID tag came with a unique ID. [8] [9] Twenty-six alphabet tags of A to Z were created and each tag can activated one movie on both art projects One and Two – The Journey of a Font and Type Personality. The other method was more interactive as the viewer had to throw a cube on a special designed table to activate the videos. Six RFID tags were placed firmly on all six surfaces of the cube and covered with vinyl stickers. This method activates all six movies in art project Three –Pangram Art. All passive RFID tags used in this project were read-write storage tags, in which data can be added to or overwritten.

Being a graphic designer and not a hardcore programmer, the author used the simplest method to program the interaction – Adobe Flash's Action Script. To begin the programming, all twenty-six motion graphics videos of the three art projects had to be converted to swf format. Next, in art project One, The Journey of a Font, all ten motion graphics videos in swf format were uploaded to one flash file. Each motion graphics video was created as an RFID object with the same unique ID as the assigned RFID tag. After the programming, the flash file was exported as exe format. When the assigned RFID tag was read on a RFID reader that was linked to the computer holding the exe file, the video would play automatically. Subsequently, the same programming process was applied to art projects Two and Three.

The Multichannel Platform

The final outcome was a multichannel platform that held the three art projects. Two interactive consoles and an interactive table were custom made to hold the projectors, computers, speakers and RFID readers. The multichannel platform was installed in a gallery as an exhibition for the public to experience it and give feedback. The exhibition was named Just Type. The experience of the multichannel platform was designed to be interactive, enjoyable and informative. Before entering the multichannel platform, viewers had to choose an alphabet tag. If viewers want to view all the videos, they had to use all the twenty-six alphabet tags. The interactivity of the component of the three installations was controlled by the action of the viewers standing in front of the consoles or table. The viewers can either wave the alphabet tag in front of the consoles or by throwing the RFID cube on the interactive table. By doing one of the actions, it activated and played the motion graphics video that had the same unique ID from the tag or the cube.

A questionnaire survey was conducted to capture feedback from viewers. Two trained interviewers were in the gallery for three weeks to carry out the survey. One hundred and twenty questionnaire forms were collected. The interviewees were in the age rangeof fifteen to sixty-four. Sixty-five of them were novice and student designers. The survey results were promising, as it showed that 100% of the interviewees enjoyed the installations and 80% of them think that it was an interesting idea to integrate typography and video. 92% of the respondents stated that it was a good way to learn the history of typefaces and 75% of them agreed that it was a good way to learn the characteristic of typefaces. Sixty-one of the novice and student designers had also commented that it was useful for them to know the inspiration of typefaces. From art project One, they had learned which typeface was used and/or appropriate for certain medium. They also felt that art project Two, Type Personality, was a good way to remember typefaces but they visualized it differently based on their own interpretation. 68% of the interviewees would recommend the exhibition to their friends and family members. For non-designers, they commented that they were surprised that there were so many typefaces in the world. They were even more amazed that graphic designers actually study the anatomy of a typeface and the layout of text. 82% of the respondents agreed that the experience of the exhibition was more enjoyable because of the RFID cube and alphabet tags.

Conclusion

Exploring the interface of art and technology, Just Type is a multichannel exhibition that makes use of radio frequency identification (RFID) technology to explore the world of inspirational and experimental typefaces. The twenty-six videos introduce viewers the histories and personalities of typefaces and pangram art according to the algorithm of the videos' RFID tags, thereby allowing a unique interactive experience. This project has created an enormous palette of possibilities for creating interesting experiences

for exploring typography design. The multichannel platform has combined the experience dimensions of interactivity, intensity, breadth and meaning.

The final outcome has successfully created a platform to experience the physical interaction design with RFID and at the same time learn the history and characteristic of typefaces. The survey results seem to agree, maybe because it is refreshing as this is the first typography cum technology exhibition in Singapore. In addition, there are two popular art and design schools in the area of the gallery. Lecturers have brought their typography class to the gallery. Therefore, the multichannel platform has become a useful resource for novice and student graphic designers to learn how to choose a typeface for design project, how to remember a typeface and how to have fun with typefaces.

The integration of RFID technology and video projection is not new in the world of technology. But it is fresh in the area of typography design and as an exhibition piece. Although RFID technology has been used in our daily life, such as, library books, staff or student's card, etc, it is still able to create wow effects because viewers are unfamiliar with how the RFID technology works. Out of curiosity and too shy to ask, there are viewers who actually open the front of the console in secret to see what trigger the videos. In the area of education, the multichannel platform can be used in other disciplines like Science, Chinese, History, etc. The same RFID technology can also be applied to commercial outlets, such as, the sale of art pieces in tradeshow or gallery. For example, in a tradeshow, gallery owners can track the liking of their customers by recording the unique ID of their customers when they stand in front of an art piece for more than 5-10 minutes.

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ELECTRONIC MUSIC AND TWO COMPOSERS FROM TURKEY

Seyit Yore

Electronic music is one of the first mainstreams of contemporary art music created in both art music and popular music. But it is not known enough on art music, so the aim of this paper is to describe electronic art music with historical process, basic features, the principal composers and two important composers from Turkey as a descriptive study of historical musicology in the qualitative research method.

Introduction

Actually electronic music is a composition and performance of music with electronic devices. These devices are electronic recorders, sound sources and musical instruments. So acoustic sounds can be modified and converted to electronic sounds, also electronic sounds can be produced directly, and electronic and acoustic sounds can be combined with these devices. These processes are used for both electronic art and popular music composition. However, creation of electronic music was based on art music and its all the processes started to be used in popular music after nearly a century. So all information on process of electronic music was examined historically and given systematically together with the Turkish composers in this paper.

Historical and Technical Process, Compositional Methods and Principal Composers

In fact everything on electronic music and music recording begun with the phonograph invented by Edison in 1877. Recorded natural sounds were modified with the phonograph, so that the first studies of electronic music begun with these experiments. Then electromechanic instruments and electronic signals begun to be invented in the early 1900s. Telharmonium (or Dynamophone) was the first electronic musical instrument invented by Thaddeaus Cahill (1867–1934), an inventor, between 1897 and 1902. It was prototype of the synthesizer which produces different pitched hums according to the speed of the Edison dynamos. Also new electronic signals continued to emerge after the Telharmonium. The Triode Vacuum Tube (Oscillator) which was an amplification of electrical signals invented by Lee DeForest (1873–1961), an American inventor, in 1906. Amplification of electrical signals, radio broadcasting and electronic computation, amongst other things were used firstly for electronic music composition, and these still have been used today. While many studies and new sound sources were being made, electronic music begun to be discussed and written during the same years. Firstly, Italian composer Ferruccio Busoni (1866–1924), wrote about electronic music in his book 'Sketch of a New Esthetic of Music' in 1907, and also it was discussed and classified by some Italian futurists like Luigi Russolo (1883–1947), who wrote 'The Art of Noises' for electronic music in his manifesto in 1913. So that they supported electronic music and in fact all the studies called as the mainstream of noise in contemporary music. Other studies also continued in the meantime that the 'Theremin' was the second electronic musical instrument invented by Léon Theremin (1896–1993), a Russian inventor, in 1919–20. Then the first known work, 'First Airphonic Suite for Theremin and Orchestra,' was composed by Joseph Schillinger (1895–1943), a Ukrainian composer, in 1929. So that electronic art music begun to be composed firstly in the world in the first quarter of the twentieth century. Actually before electric bells was used by composer George Antheil (1900–1959), in his 'Ballet Mécanique' (1925) as the first electric instrument. After the 'Ondes-Martenot' was invented by Maurice Martenot (1898–1980), an inventor and a cellist, in 1928 as

a new electronic musical instrument. It was used firstly by composer Dimitri Levidis (1886–1951), in his 'Symphonic Poem for Solo Ondes Musicales and Orchestra' in May 1928. However, it is known composer Olivier Messiaen's (1908–1992) works such as 'Fete des belles eaux' (1937), 'Trois petites liturgies de la Presence Divine' (1944) and 'Turangalila-symphonie' (1946–48). Also Cemal Reşid Rey (1904-1985), Turkish composer, had composed his 'Poem for Ondes-Martenot and String Instruments' in 1934 although it is not known enough. The studies on new musical instruments continued and the 'Trautonium' by Friedrich Trautwein (1888–1956) in 1929, and then the 'Hammond Organ' was invented by Laurens Hammond (1895–1973) in 1934. The Trautonium was used firstly by Richard Strauss, Paul Hindemith and Edgar Varèse in their works. As for the 'Hammond Organ,' in fact it is an electronic organ, has been used in blues, jazz, gospel, and rock musics, but its usage was not seen in art music. While the first musical instruments and amplificators were being improved in approximately thirty-five years, the 'Magnetic Tape Recorder' was invented by engineer Fritz Pfleumer (1881–1945), as the first electronic music recording and composing device in 1928 in Germany, and it was developed in the USA. John Cage (1912–1992), and some composers, begun to use it in their several works. For example, Cage's works, 'Imaginary Landscape no. 1 (1939) and no. 2 (1942)', were the first in the Magnetic Tape Recorder. After the studios begun to be founded for electronic music in 1940s, and so that RTF (Radiodiffusion-Télévision Française) can be considered as the first studio in 1945. Pierre Schaeffer (1910–1995), composed firstly his 'Etude aux Chemin de Fer' in RTF in 1948. These works were the beginning of studio realizations and 'musique concrète' (real music). 'Symphonie pour un homme seul' was composed by Pierre Henry (1927) and Schaeffer in 1950, and it was accepted the first major work of musique concrète. The studio was formally established as the 'Groupe de Musique Concrète' in 1951, and other composers such as Olivier Messiaen, Pierre Boulez (1925), and Karlheinz Stockhausen (1928–2007), composed in there. NWDR (Der Nordwestdeutsche Rundfunk) Studio was founded in Cologne in 1945, and Stockhausen was the most important composer in there. His 'Gesang der Junglinge' was the first major work in NWDR. So electronic music composition method, realized with many electronic equipment, emerged in several studios between 1930 and 1960s years. Also 'The Music for Magnetic Tape Project' was developed as a American Electronic Music in the USA in 1950 after of the Magnetic Tape Recorder. But it did not continue for a long time. [1]

However Columbia-Princeton Electronic Music Center (CMC) was founded by composers and proffesors Vladimir Ussachevsky (1911–1990), Otto Luening (1900–1996), Milton Babbitt (1916–2011), and Roger Sessions (1896–1985), in 1950s as the first center of electronic and computer music in the USA. They were the founders and from the first generation composers of the CMC. Also many famous composers visited, worked, or studied in there, including Edgard Varèse (1883–1965), Bülent Arel (1919–1990), Halim El-Dabh (1921), Luciano Berio (1925–2003), İlhan Mimaroğlu (1926), and Mario Davidovsky (1934). [2]

There were developed the three composition styles based on essentially the same tools and objectives as a result of studio studies. Firstly, Musique Concrète was composed with manipulation of acoustic sound sources in RTF. Secondly, Electronische Musik was composed with electronic sound generators and modifiers in NWDR studio. Magnetic Tape music was a recording of sounds such as spoken voice, singing, musical instrument and sound effects, and re-creation of sound waves. Musique Concrète and Electronische Musik called as the 'Electrophonic Music' in the UK. In fact these are all the same electronic music with their compositon methods and electronic equipments, but called differently according to the countries. Mimaroğlu said that these different names is unnecessary. Because their basic materials were audio tape and studio. So that all of these should be called as the electronic music. [3]

Some new studios continued to be founded in some countries from 1955 in addition to the above: Milan Studio de Fonologia RAI established with as artistic director Italian composer Luciana Berio. Also Japanese composer Toshirō Mayuzumi (1929–1997), founded NHK Electronic Music Studio in Tokyo. Phillips studio was established at Eindhoven, Holland, and then shifted to University of Utrecht Institute of Sonology in 1960. So that many composers composed their electronic works in the studios. [4]

Also electronic sound sources and other technical equipment continued to develop in addition to the studios in the same years. Raymond Scott (1908–1994), a composer and an engineer, designed the first 'sequencer' which converted the elements of music in electronic media from 1950s and after Clavivox synthesizer was invented by Robert Moog (1934–2005), as a portable sound source of several musical instruments in 1956. Then the 'RCA Mark II synthesizer' was developed as the first major voltage-controlled synthesizer in the CMC in 1959, and used by the composers such as Luening, Ussachevsky, Babbitt, Jacob Druckman (1928–1996), Davidovsky, Charles Wuorinen (1938), and Pril Smiley (1943). It has also been used widely in several genres of popular music. There are most well-known 'Switched-on Bach' album made with the synthesizer by Wendy (Walter) Carlos (1939), an American composer and musician. Synthesizers were the beginning of live electronic music performance that 'the Synket,' a live performance instrument was used extensively by composer John Eaton (1935), in his works such as 'Concert Piece for Synket and Orchestra' (1967). In fact the first live performance begun with Theremin, because it had been used with acoustic musical instruments in Schillinger's work. However, synthesizer has produced completely several electronic sounds. So it is used as a stand-alone orchestral. In addition to these, composers Lejaren Hiller (1924–1994) and Leonard Isaacson composed 'Iliac Suite' for string quartet, and it was the first computer-assisted composition (also algorithmic composition) in 1956. So that computer music begun as a method of electronic music. Max Mathews (1926–2011), a composer and an engineer, designed MUSIC at the Bell Labs in the USA as a direct digital synthesis language in 1957. He also continued as a leader in digital audio research, synthesis, and human-computer interaction as it pertains to music performance. He designed many computer programs, and so that computer performance of music begun with an IBM 704 in 1957 in NYC played a 17 second composition on the 'MUSIC I' program. While the studies of computer music were continuing, there were new studies on synthesizers in 1960s. American composer Morton Subotnik (1933), established San Francisco Tape Music Center with Ramon Sender (1934), a Spain composer, in 1961. Donald Buchla (1937), was a new pioneer of the sound synthesizer in there. Charles Dodge (1942) composed 'Speech Songs' (1972) based on early speech synthesis research. Jon Appleton (1939) and his friends invented 'the Dartmouth Digital Synthesizer' later to became 'the New England Digital Corporation's Synclavier' (1976–1993). IRCAM (Institute for Research and Coordination in Acoustics and Music) became by French composer Pierre Boulez a major center for computer music research and realization in 1977 in Paris, and developed 4X computer system, featuring then revolutionary real-time digital signal processing. It was used to transform and route soloists to loudspeaker system firstly for Boulez's 'Repons' (1981) by 24 musicians and 6 soloists. Combined of electro and acoustical art music are IRCAM's importance. [5]

MIDI (Musical Instrument Digital Interface) was designed by Dave Smith's studies as a new tool of electronic computer music from 1981. It is an industry-standard protocol that enables electronic musical instruments (synthesizers, drum machines), computers and other electronic equipment (MIDI controllers, sound cards, samplers) to communicate and synchronize with each other. While it is going on as a popular tool, also interactive computer-assisted performance became popular from 1990s. Tod Machover (1953) composed 'Begin Again Again' for 'hypercello' in an interactive system of sensors measuring physical movements of cellist. It was played firstly by cellist Yo-Yo Ma (1955). [6]

So far, the process of electronic music summarized briefly in a century with the several features. However, it has continued as a mainstream and method of contemporary art music today.

As a result of this information, electronic music can be defined a creation or changing of music by electronic equipment. That is, recorded sounds on the magnetic tape which are passed from oscillator and their combination as a composition. So that there are three compositional methods: The first method is a combination of acoustic and electronic sounds and instruments like Theremin. Second method is usage of electronic musical instruments and other instruments in the studio. In the third method is electronic sounds produced with acoustic instruments. The first and the third methods require musicians to play the compositions. But the second method was composed and recorded only by one composer himself. That is, it does not require any musician, but composer may need a sound engineer for equipment of studio if composer does not know to use enough them. Also composers use altered and tranformed sounds with electronic equipment. Sounds are changed specially by them for their works. So that the first section of this study was completed. The following second section is two composers of electronic art music from Turkey.

Two Composers from Turkey: Bülent Arel and İlhan Mimaroğlu

While electronic art music is being composed in the World, it is composed in Turkey, too. So that there are even two important composer from Turkey, and they composed their works in the USA. Firstly, Bülent Arel was born in 1919 in İstanbul, trained as a classical composer in Ankara State Conservatory from 1939 to 1947. Then he worked as a pianist, sound engineer and teacher in the conservatory and the Ankara Radio from 1950, and founded the Helicon Society in Ankara and held on the concerts from Baroque to contemporary music until 1959 in there. He composed his first electronic music work, called 'Music for String Quartet and Audio Tape', in 1957. It is also the first electronic music work of Turkey. The Rockefeller Foundation invited him to work at the Columbia-Princeton Electronic Music Center in 1959. He studied, worked, composed and taught at the CMC from 1959 to 1962. Also he had more advantages than the other composers about the practice of studio equipment. So that he worked firstly with Edgard Varèse on the electronic sections of Varèse's 'Déserts' at the CMC in 1962. Then he came back to Turkey for electronic music studies and aimed to establish studio in Middle East Technical University in 1962. But he did not realize his aims, so he went back to the USA, and also founded the electronic music laboratory at Yale University, where he taught from 1963 to 1970. Also he established the electronic music program at the State University of New York at Stony Brook, where he taught from 1971 until his retirement in 1989. He died in New York. He is one of the CMC's first and Turkey's second-generation composers. Also he is directly the first composer of electronic music in Turkey. Besides electronic works, he composed chamber music, vocal works, and symphonic pieces. Briefly, he has been accepted one of the pioneers of electronic music in the USA and in Turkey. Daria Semegen, Conrad Cummings, and Jing Jing Luo are from his notable students. [7]

Secondly, İlhan Mimaroğlu was born in 1926 in İstanbul. He graduated from Galatasaray High School and Faculty of Law, Ankara University between 1945 and 1949. He worked as a critic, journalist and radio programmer, and learned clarinet under Hayrettin Duygu until 1955 in Ankara. Then he went to New York to study on music with the support of the Rockefeller Scholarship for two-year, where studied musicology at Columbia University under Paul Henry Lang (1901–1991) and composition under Douglas Moore (1893–1969). He was completely settled in New York from 1959 and worked at the Record Hunter as a specialist of repertoire and an art critic at the 'Voice of America Radio'. At the same time he continued his program, called the 'Composers of Our Age', at the Ankara and the İstanbul Radios in New

York. In 1963 he begun to studied on electronic music in the CMC under Vladimir Ussachevsky and on occasions worked with Edgard Varèse and Stefan Wolpe (1902–1972). He taught at Columbia University on electronic music, then he was invited by French Radio and continued his works at Studio of Music Research Center in 1968. Besides being a composer, Mimaroğlu, has also worked as a producer for Atlantic Records, and collaborated with trumpeter Freddie Hubbard on a moving anti-war statement, 'Sing Me a Song of Songmy' in the same year. So that he was awarded the Guggenheim Fellowship in music composition in 1971. He is one of the second generation composers of the CMC and Turkey. He wrote articles and 12 books on music in addition to his compositions from 1960s, currently continues his works in New York. [8]

Arel's and Mimaroğlu's compositions classified in three methods: Firstly, music for acoustic sound and instruments according to certain forms of music. Secondly, music with combination of acoustic and electronic sounds and instruments, and thirdly, completely electronic music. In fact the three methods are valid for majority of the composers of electronic art music.

Conclusion

We can see that electronic art music is one of the first mainstreams and methods of contemporary art music since 1920s. Although it has several methods in several countries, called completely electronic music in the World. This study includes many composers, the works and development on electronic music. However there is need to evaluate some of the information. These can be distinguished such as popular music and art music, sound source and musical instrument, and composer and sound engineer in electronic music. Firstly, electronic music begun primarily in art music, after it has been used in some genres of popular music. While electronic equipment provide a musical background and timbre for popular music, composition's direct tools for art music. Because composer tries to create particularly different sounds in art music. Although some devices, such as the synthesizer and the studio equipment, are common in both music, their aims and creation techniques are different from each other. Secondly, sound source and musical instrument are different, because the Hammond Organ is an electronic musical instrument, but the synthesizer is mostly an electronic sound source. However, these can also be seen as an evolution of the electronic organ from the Telharmonium to the synthesizer. Thirdly, composer and sound engineer are considered differently in electronic music. In fact a composer should used directly the electronic equipment for his works. But a composer cannot use them, a sound engineer applies a composer's musical wishes. So that composer is a creator, as for sound engineer is a practitioner. Some composers worked both as a composer and sound engineer such as Arel and Mathews. So that they had more advantages than the other composers. In this context, many composers of electronic music composed directly their works with the equipment. The other evaluation is about listeners of electronic music that Stockhausen evaluated "In 1967, just following the world premiere of 'Hymnen,' [...] Many listeners have projected that strange new music which they experienced into extraterrestrial space. Even though they are not familiar with it through human experience, they identify it with the fantastic dream world. Several have commented that my electronic music sounds 'like on a different star' or 'like in outer space." [9] In second section, although Arel and Mimaroğlu are the pioneers of electronic art music from Turkey, there is no other composer of electronic art music in their period. Because the other composers of Turkey were not interested enough. But some young composers studied on electronic music from Turkey.

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SOLAR ARTWORKS

Nacho Zamora

Solar artworks combines art, architecture, design, science, and a common objective: how to make our cities more sustainable through public art. In this conference we will see some of the most interesting examples of solar artworks studied in the frame of The Solar Artworks Project to date, in particular how different the projects can be, and why they have been created.

The Solar Artworks Project. http://www.solarartworks.com

Introduction

The Solar Artworks Project arises as an answer to this question: What can public art do to give something back to public in the context of the XXI Century urban landscape.

Solar artworks are an illustrative example of how far could go the relationship between art, architecture and the new technologies related to renewable energies, in this particular case, solar power.

These artworks provide an aesthetic attraction to the place where are constructed and, at the same time, they use their capability to produce solar power and employ it.

Almost all solar artworks designers have a common objective: how to make our cities more sustainable through public art. We can find designers from different parts of the world, and they are generally multi-disciplinary groups of specialists.

In this conference, I would like to talk about several examples of solar artworks that I have studied within this research project. We are going to see how different the projects can be, and the opinion of their designers about key aspects of these artworks.

Solar Sail, by The Solarsail Society**,** created in 1998 in Müsingen (Switzerland), was the first solar artwork that I found, when I was searching for information about these projects.

I was very impressed, because this kind of work was completely different from the public artworks that I had studied before in my career.

Solar Sail improved the aesthetic conditions of its location and, at the same time, this work provides clean energy for a building.

Stephan Kormann, from The Solar Sail Society, describes the advantages of this artwork:

"The elegant shape of the sail is a metaphor for movement and lightness. It stands as a symbol for the sympathetic treatment of the fundamentals of our lives." [1]

Since then, I have been collecting information about these works and their designers, shaping the Solar Artworks Project.

I'm going to talk about several examples of solar artworks, classified according to, in my opinion, their most relevant contribution to the public spaces where they have been built.

New aesthetic proposals

We can see physical characteristics which make them different from "traditional" public art.

I consider these qualities as a new aesthetic kind of proposal.

The temporary project *The Verdant Walk* by the Canadian The North Design Office, created in the United States, offered another point of view on a city place at night.

This work reminds us of the industrial origins of the city of Cleveland, and the strong promotion of renewable energies by the local government.

In addition to the sculptures, The Verdant Walk restored a large space, called Mall B, recuperating native grasses from different parts of local landscapes in the area.

Alissa North, one of the designers, say about the reaction of the people with this work:

"Visitors were attracted to the forms, children and adults, wanting to come up to them and touch them. People were intrigued by the solar aspect, and were interested to understand this component of the project." [2]

Interaction

Perhaps the interactive factor is the next step to explore within public art. Solar artworks offer a great opportunity to research and develop participative ideas, involving citizens within the creative process.

Solar Collector, by Gorbet Design, is completely interactive with the public.

Located in a traffic island in Cambridge, Ontario, Canada, this work provides citizens with the possibility to interact with the sculpture, giving them the opportunity to change the look of the lights and create their own performance each night, by using simple computer commands at the sculpture's website.

Matt Gorbet, one of the creators of *Solar Collector* said:

"By collecting the creative output of people during the day along with the sun's energy, and combining them into a graceful nightly performance, the piece connects people to the power and beauty of nature."[3]

Educational intention

One other objective that almost all these works have is an educational intention. In this sense, solar artworks invite us to learn, to be curious, and concerned about the environment.

Rein Triefeldt has been developing solar artworks for more than a decade. Triefeldt's work is an example of how art can be a good way to impart knowledge about the qualities of the renewable energies for new generations. This artist has provided workshops for students regarding art and sustainability projects.

He thinks that:

"Solar artworks can generate public dialogue*, addressing and even resolving community problems."* [4]

Triefeldt is founder of the *Solar Tree Project*, an educational proposal in which they:

"seek to give participating students primary knowledge in the field of solar energy and practical experience in design and creation of fine art and sculpture." [5]

Hybrid projects

Solar Artworks are, first of all, an extensive field where their designers are looking to innovate with new materials and their applications. Architecture and art find new ways of collaboration with hybrid projects that combine the best of each other.

The New York studio SMIT**,** has developed the project *Solar Ivy.*

Inspired by the Ivy leaf, this work can be adapted to almost any kind of vertical structure. Each leaf is an independent solar power sensor, and the total energy produced depends on the quantity of leaves in

the installation. This work offers many possibilities of configuration, design, functionality and adaptability, mixed into a product that is currently available today.

Samuel Cochran, one of the founders of SMIT, says about their work:

"Solar Ivy is functional in its purpose and artistic in its drive to change the connotation of what a solar panel can be." [6]

Message of Solidarity

As we have already seen, solar artworks can be used in many different applications. We have also recognized the objective of solar artworks' designers, to spread a sustainable message.

The work of Alexandre Dang, maybe is an exception within this group of artworks, closer to a temporary installation than a piece of public art. Dang has created many different versions of *The Dang'cing Flowers* around the world.

In common with all the particular characteristics of his installations, this work presents a whimsical vision of the necessity to incorporate renewables energies within our lives.

However, *The Dang'cing Flowers* have a strong power of attraction for everyone who sees them in motion, having an hypnotic effect on the public.

The meaning of Dang's work, and the initiative that he represents, *Solar Solidarity International,* are looking for a better future in which the use of new green technologies, are synonymous with sustainable development.

Organizations

We can find several interesting organizations that are dedicated to research, promotion and some even produce projects which could be considered solar artworks. However, it's difficult to find an initiative more committed to this issue than *The Land Art Generator.*

The Land Art Generator Initiative is, today, the perfect example of the public art research centre of the future. This project, created by Elizabeth Monoian and Robert Ferry, has become a reference for all those who want to learn about the possibilities of combining public art, architecture and renewable energies.

This organization is also a platform for artists, architects and designers who want to innovate with their work, by providing them with an exclusive space on the Internet.

The competition which *The Land Art Generator* organizes, held in 2010 in Dubai and to be held next January 2011 in New York City, is an opportunity, not only because of the innovative projects that we can expect to find, but also because the events take place in large public spaces, aiming to transform them into:

"a symbol of renewal and an expression of how our society can restore balance to its landscape." [7]

Some Conclusions

With these examples of solar artworks, we have seen that, although these works are in an early stages of their existence, we can anticipate spectacular projects in the coming years.

The evolution of solar artworks will be determined by the artistic vision of their designers as well as by the advances that we expect in the field of solar power technology.

In addition, we can extract some final conclusions:

Solar artworks are a completely new artistic product. Far removed from the public art that we have seen before.

There is an international artistic movement of artists, architects and designers, whose artworks are being planned for some of the most emblematic places of modern architecture.

Solar artworks are an excellent means for governments to increase public awareness about the value of renewable energies.

These works are functional, original and technologically advanced models of self-sufficiency within the urban landscape.

Solar artworks remind the observer of the compromise with and respect for our environment.

Although we can say that solar artworks remain great unknowns, It is certain that, step by step, these works will become part of the urban landscape in our cities.

Solar artworks offer a wide range of possibilities and attractions that should be taken into account by governments when they invest in the public art of the XXI century.

You can find all the most interesting information about this research project on the project's web-site: www.solarartworks.com

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REMIX CULTURES AND THE IMAGINING OF ALTERNATIVE INTELLECTUAL PROPERTY POLICIES

Martin Zeilinger

In theory, legal taxonomies acknowledge how creative, productive, and beneficial remixing practices can be. This does not reflect the realities of how such law is enforced, however. This paper is concerned with how creative practitioners and users deal with this problem. I argue that it is in the lived praxis of remixing communities that 'para-legal' contexts which challenge traditional intellectual property policies are established.

In this era of easily copyable and flawlessly reproducible digital information, a never-ending profusion of news items, online postings, and academic writing focuses on the complications and quandaries that arise whenever remixing activities interface with the legal apparatuses currently in place to safeguard the materials to be remixed. These accounts, whether they cover legal complaints, artistic practices, or tech news, may touch on everything from audio mashups, fan fiction and machinima to web-apps combining the functionality of multiple online services, modded video game consoles and hacked games, art projects drawing on scientific data visualization methods, and business ventures that remix traditional production processes. True to the beautifully open-ended idea of recombinant creativity, there is no limit to the possibilities of what can be remixed, and of the forms that remixes may take. However, the consequences of all these remixing practices tend to be much less broadly envisioned. In more or less detail and with ranging measures of precision, discussions of remixing practices invariably invoke various aspects of intellectual property (IP) law, most commonly the spectre of copyright infringement. Often, this is done to the effect of stating that the remixes in question either 'have been,' 'should be,' or 'could easily be' prosecuted for IP violations.

The haziness and inaccuracies of such discussions, which may condemn legitimate users as thieves, or, conversely, praise thieves as open access advocates, often reflect the fact that most national and international IP regimes currently have no truly fair methods for sanctioning certain types of remixes while properly classifying others as wrongful. In theory, legal systems acknowledge how creative, productive, and beneficial remixing practices can be – after all, most IP law is explicitly understood to encourage learning and the arts. But this does not at all reflect the realities of how such laws are enforced. This paper is concerned with how practitioners and users deal with this problem.

In many creative remix practices, we can observe a general unwillingness to acknowledge the relevance of IP law for interpreting certain creative activities and expressions. Consequently, I argue, such practices often seek to establish extra-juridical or 'para-legal' contexts which challenge traditional IP policies by creating alternatives that foreground the common and the collective rather than the concept of property. It is in the lived praxis of these alternatives that some of the most elaborate critiques of the shortcomings of existing IP law may be found.

In part because of dated Copyright Acts featuring vague and unrefined 'fair use' and 'fair dealing' doctrines, remixing is often improperly linked with property violations. As a result, there is much confusion

concerning what does or should constitute a permissible remixing practice. This is certainly complicated by the fact that today, virtually all digital activities heavily rely on a core feature of remixing, namely the copying and reusing of bits of information. Add to this the effortlessness with which everyday users have adopted all manners of cut-and-paste techniques, and it comes as little surprise that in the popular imagination expressed in news media and online, there often remains little difference between relatively distinct practices. Take, for example, the reshuffling of digital code practiced by sampling artist Gregg Gillis (aka Girl Talk), legendary for cramming 322 individual, copyrighted samples into 14 radio-length mashups on his 2008 album Feed the Animals without securing licenses, and the reshuffling of digital code practiced by hacker George Hotz (aka geohot), who opened up Sony's PS3 gaming console to home-brew software in 2010. A variety of perspectives on this comparison are conceivable: 1) Both practitioners could be criticized for interfering with the integrity of IP-protected, authored content. 2) Hotz's hacking and Gillis's sampling might be seen as unrelated, the former willfully damaging the value of IP, the latter constituting a creative compositional act. 3) The same distinction could hold if we were to switch the roles of geohot and Girl Talk in this last argument. 4) Finally, the activities of both practitioners could be justified by arguing that their recodings are conducted in the spirit of openness and sharing, and for public benefit rather than for commercial purposes (the expressions of both remixers encourage active, creative use of otherwise restricted cultural commodities).

While none of these perspectives have been legally tested (Girl Talk has yet to be sued for copyright infringement; geohot has settled with Sony out of court), there is some validity to all the opinions they express. Indeed, both geohot and Girl Talk have been typecast as both copyright villains and fair use activists. More and more, legal systems are pushed to acknowledge such uncertainty and their inability to adequately respond to it. Meanwhile, creative communities around the globe move on to explore their own solutions to the problem of how go regulate which remixes are permissible and which aren't. Much can be learned from the ways in which remix practitioners and activists are beginning to respond to the inadequacies of current IP law. Rather than seeking to frame creative practices of remixing in existing IP regimes, I propose we must acknowledge that the communities forming around such unfairly marginalized activities already produce principles and ethical codes of collaborative, appropriation-based creativity and sharing.

Beyond gaining due legitimacy, these activities and the ethics they produce have also yet to be recognized as a valuable component of cultural policy reform initiatives. In the complexities which arise when current IP discourse collides with new creative practices fundamentally based on the appropriation and reuse of IP-protected materials, we can find long lists of the ambivalences and confusion around the legality of remixing culture. Part of the intrinsic value of appropriation-based creative practices conducted in the spirit of open access and the circulation of cultural expressions and knowledge, I believe, is that they produce this confusion and thus demonstrate the inability of traditional IP law to deal with it. One tactic of creative communities, in other words, is to show how tragically out of step current IP law is with the tendencies, desires, and, quite simply, realities of present-day remix culture.

Discussions of remixing culture frequently foreground the potential legal repercussions remixing can entail. Yet, notwithstanding threats of litigation or fines, remixing is ubiquitous to a degree that might be astonishing if it weren't for the fact that digital media environments are inherently designed to facilitate the copying, sharing and reusing practices on which remixes rely. In light of this, national and international IP regimes have generally proven unable to properly address questions of the permissibility of remixing. A growing body of scholarships is highly critical of the direction IP law is taking, and challenges the rationale that IP laws stimulate and incentivizes cultural creativity, showing, instead, that they limit it. Similar arguments have been made in more mainstream venues, such as in Brett Gaylor's 2008 open

source documentary RIP! A Remix Manifesto. Such critiques, and the creative practices of appropriation and remixing they commend, indicate that regimes of IP law are facing crises of legitimacy and relevance. Official responses to these crises are in short supply, and often inadequate. To give one example, last June the Canadian Parliament tabled an amendment (Bill C-32) to its Copyright Act that would adopt a number of positive changes to its fair dealing provision, while at the same time including new provisions that would criminalize the circumvention of digital rights management (DRM) software – a move that essentially reverses the proposed expansion of permissible copying and remixing.

Developments of this kind have long driven creative practitioners and their advocates both into the underground and to activist fronts. Groups such as the Canadian Appropriation Art Coalition work to raise awareness concerning the impracticality of current IP laws, and highlight recommendations of changes to existing laws based on the experiments of artists and activists. But the fact remains that to creative practitioners and everyday users, to the remixers of the world, lobbying for meaningful legal reform has proven tedious and ineffective. Often, establishing more radical, independent alternatives which operate in the shadow of existing IP regimes appears as the more practical direction to take. Common to most such alternatives – whether they take the shape of individual artists' projects or organized groups – is the assumption that the remixes in question must be permissible as a matter of principle, i.e., that alternative models for fairly regulating copying and circulation of protected cultural matter must be pursued primarily because existing fair use and fair dealing exemptions fail to do so.

While efforts of practitioners and activists to establish fair copying and remixing cultures 'outside' of IP law have drawn the attention of academic communities, comprehensive investigations of alternative systems governing creative exchange and remixes have not been conducted. Studies on the successes of developments such as Creative Commons can be bracketed here, considering that this movement has been criticized of simply promoting a continuation of copyright by other means; see, e.g., Berry and Moss 2005. In this sense, the Creative Commons licensing system's resistance to the limitations imposed by conventional IP law on remix culture may be described as a defeatist approach which advances by layering an already restrictive system with further rules.

In comparison, much of the resistance emerging in creative communities of mashup artists, fan fiction writers, coders, or machinima artists operates, rather, through what we might call 'para-legal' sites and channels that allow for the more immediate, vernacular negotiation of moral codes and new ethics of the permissibility of copying and remixing practices (see Zeilinger, forthcoming).

An example of this approach is the practice of media artist and activist Kenneth Goldsmith, founder of Ubuweb (www.ubu.com), perhaps the most popular free digital repository of experimental art. Goldsmith tends to ignore the possibility that some of his reusing practices are illegal, and generally insists that his 'dealings' are always 'fair' even when they don't conform to the rules outlined in copyright laws, i.e., that there is no reason why his activities of making copyrighted works freely available should be considered as infringement. If contacted by content owners, Goldsmith proceeds by entering into personal correspondences with them, during which, by arguing that he broadens their audiences and does not interfere with their commercial interests, he is usually able to win them over to the ethics of his activities (Goldsmith, forthcoming).

Many communities of remixing practitioners follow similar tactics of 'copy first, ask later,' but often add into the mix what amounts to complex, if informal, codes of conduct governing matters of the access to and reuse of remixed works. The vibrant chipmusic community, for example, many of whose members repurpose obsolete but patented video game hardware to synthesize and sample recognizable sounds,

generally follows a series of informally agreed-upon rules established on popular online fora. Transgression of these rules and misappropriation of material produced by members of the community are dealt with in the online exchange of comments and opinions, involving creators, offenders and audiences. Conventional IP law is hardly ever invoked, and these informal negotiations are surprisingly effective in establishing a fair system of access and exchange among creators (Zeilinger, op. cit.). Similar practices have emerged in communities of machinima artists (Horwatt 2010), or also in the exploding mashup scene (McGranaham 2010). Rather than choosing the path of litigation, members of these communities frequently prefer to discuss their concerns with offenders, or denounce or ridicule breaches of the various codes of conduct to which they subscribe. For example, when punk pioneer Malcom McLaren sought to co-opt the burgeoning chipmusic scene as 'his' discovery, members of the chipmusic community voiced their grievances in a widely publicized open letter that helped to solidify the community's sense of identity and the artform as such (gwEm 2004). Creative communities also tend to foreground links to ideals of collaboration, sharing and exchange as known from open source programming culture, hacking culture, and the now defunct 'demoscene' of the 1970s and 1980, which, too, functioned according to unwritten codes of conduct that in turn strongly influenced open source programming.

As noted, remix practitioners often display unwillingness to acknowledge the relevance of IP law for their activities as a matter of principle. A good example for this unwillingness is Richard Stallman's work, where it is linked to the issue of genetics and bio-engineering. As Stallman, well known as the founder of the GNU project and the Free Software Foundation, notes, admitting broad applicability of IP law can substantially complicate any resistance to misconceptualizations of copying processes. To make his point Stallman cites the appropriation of traditional knowledge and its 'remixing' as patentable procedures or medical agents. While such activities must be condemned for effectively shifting collective cultural practices and knowledge from the public domain into the domain of IP law, it should, argues Stallman, never be defined as theft or piracy: "The 'biopiracy' concept presupposes that natural plant and animal varieties, and human genes, have an owner as a matter of natural right. Once that assumption is granted, it is hard to question the idea that an artificial variety, gene, or drug is property of the biotech company by natural right" (Stallman 2005: 170).

In the same vein, many creative practitioners are concerned that there lies danger in allowing their remixing practices to be co-opted by conventional property-based IP discourse, because once that happens, all their actions will have to accept as a relevant context the restrictions and limitations imposed by existing copyright regimes. It is easy to see, then, why creative practitioners and everyday users who seek to acknowledge copying, sharing, remixing as a quasi-universal human tendency (discussed, for example, in Boon 2010) are often unwilling to adopt rules which supplement, rather than supersede IP law. Instead of simply shifting the enclosures which IP law represents, qualitatively different approaches are needed.

With the exception of fan fiction communities, comprehensive studies on viable alternatives in creative communities are few and far between. Some work has been done on the contemporary mashup scene, on relevant aspects of chipmusic communities, as well as on machinima communities. But these examples of critical inquiries have not begun to adequately address larger questions of how the different practices they consider fit into a broad discourse regarding the general permissibility of remixing in our contemporary cultural landscapes. Some foreground discussion of remix aesthetics over legal and sociopolitical aspects, some interpret resistance to limiting legal systems as a negation of copyright, and some simply test how existing remix forms would fare in hypothetical confrontation with current IP laws. I contend that more useful perspectives can be found by considering the critical commentary of

remix practitioners itself, and to treat their practices, tactics and techniques as a performance of new remix theories.

Many contemporary remix communities are well organized and have established extensive platforms where works, ideas, and methodologies are shared, discussed and exchanged. It is to these platforms of creative production, collaboration and exchange that we have to look in order to understand what remixing means today, which ethics and moral values are attached to it, and how remixing is already systematically validated and legitimized outside the law. Here, the reproductive qualities of digital media – i.e., their inherent copyability, the fundamentals of remixing – are properly explored as a de-mocratization of culture, rather than as an economic threat to fenced-off property systems. This insis-tence on the inherent positive value of copying and sharing always resists the enclosure of creativity by IP policies that are based on profit-driven models of private property, and it is here that we can find dis-cursive frameworks which can provide real alternatives to conventional IP and copyright law.

However, remix communities appear hesitant to conceptualize and provide such frameworks. It may be up to researchers and activists to demonstrate that cultural practices which insist on the merits of shar-ing and copying should be framed in a new positive rhetoric, for example of civil liberties, human rights, or moral economy. Only then will it be possible to conceptualize creative resistance to existing IP law not as indirectly confirming the validity of profit-oriented IP regimes (i.e., theft as a challenge to prop-erty), but to link such resistance to fundamental rights which property-based legal regimes can't easily acknowledge, including the freedom of expression, the freedom of access to information, or the free-dom to receive and impart information and ideas (as outlined, e.g., in the Universal Declaration of Human Rights). As such, the actual practices of and discussions among present-day remixers suggest that a moral economy or a human rights framework may be most suitable for negotiating how to bal-ance new digital-environment abilities to copy, collaborate and share with universal desires for rights to creatively participate in cultural life, for open access to informational goods, and for rights to cross-cul-tural exchange and cultural diversity. Taking existing remixing practices seriously, in other words, will inevitably push existing national and transnational doctrines of fair use and fair dealing to their limits, and will demonstrate the urgent need for policies that honor inherent values of sharing and collabora-tion over the monetary worth of culture-as-property.

It appears that revised and updated permutations of existing IP law can only recast, rather than remove, the restrictions which property-based legal discourse imposes on universal creative drives. Thus we must insist that emergent forms of digital cultural appropriation are not merely seen to create new forms of legal offence and injury, but rather new, experimental ethics of digital practice and new forms of respectful dialogue. My focus in this short paper has been on how crucial it is to accept domains of collaborative creativity and cultural exchange as evolving extra-juridical systems that are based upon norms, mores and conventions operating outside the logic of intellectual property. Rather than explor-ing how to 'fairly' embed remixing communities in existing IP schemes, we need to show how creative practitioners are able – and have always been able – to withstand assimilation by expansive ideologies pushing property-based legal regimes and to forge alternative practices in their shadow. We may be a far way off from proposing coherent alternatives to existing, flawed intellectual property regimes. For now, it is a good start to acknowledge that already existing sites of resistant, fluid remixing practices represent the true laboratories of legal reform.

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USERS BECOME RE-CREATORS: ENHANCING EXPERIENCES THROUGH MAPPING

Anja Zeising & Dennis Krannich

In this paper, we present a new understanding of interactive installations that goes beyond action-reaction communication between actor and installation. The goal is to enhance the user's experience and engagement as well as the reflection about the creator's initial intention. We employ "Mapping" as method to redefine the user's role from consumer to"re-creator" within a specified scope, set by the creator.
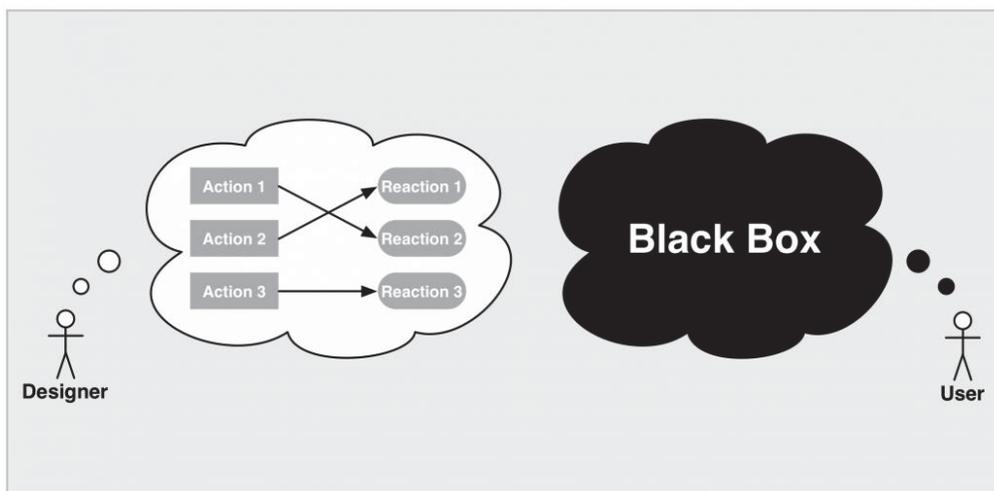
Fig. 1: The designer's and active user's role in traditional interactive media art work.
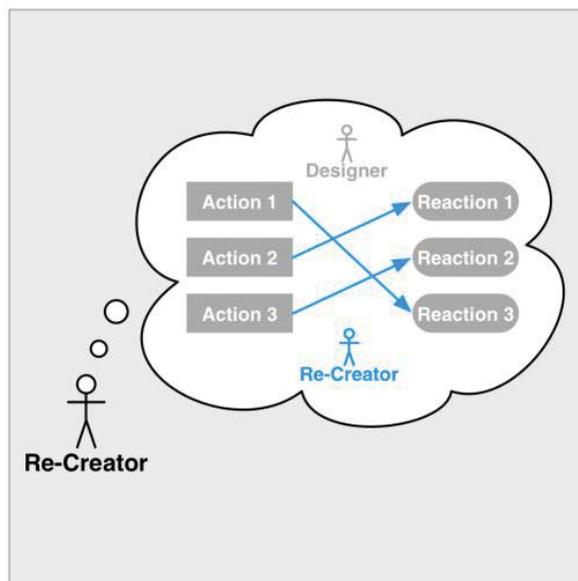

Fig. 2: Dynamic mapping concept - the user become a re-creator.

Introduction

On the crossroads of technology and arts, we consider User Experience Design as a promising approach to empower the design process of media art pieces and ensure the actors' engagement and reflection. We focus on interactive installations as media art pieces; the actor provokes a system's reaction by his actions (e.g. full body movement).

Since most installations only provide a closed action-reaction framework – some employ programmed randomness to include surprising moments – we argue towards a new understanding of the actor's role. The goal is to enhance the user's experience by creating a deeper engagement and immersion on the one side and a reflection process on the other side.

Digital Experience Design

In context of HCI, works like "User Experience with the CYBER graphics terminal" (1974) from Edwards & Kasik have constituted the term user experience for the first time. [1] During the 80s the term was rarely used. In the 90s its popularity started again with the movement of Don Norman ("User Experience Architect"). Since the new millennium, the term user experience is spread through various disciplines in the field of HCI. Hence, the quality of a digital product does not rely on usability only, but also on aspects like aesthetics and emotional bonding. In the near future previously separated disciplines will merge due to the shift from performance- and task-oriented systems to experiences with and through digital products. [2]

Hassenzahl says: „[...] experience emerges from the intertwined works of perception, action, motivation, emotion, and cognition in dialogue with the world (place, time, people, and objects). It is crucial to view experience as the consequence of the interplay of many different systems. [...] While many processes together produce experience, emotion is at its heart and has an accentuated position. One may go as far as saying that emotion is the very language of experience." [3]

According to this, our understanding of experience is a stream of thinking, acting, feeling, rating and reflecting of external and internal influences. It is an inner self-reflection. An experience is a composition of this stream into a closed and personally meaningful entity. Experiences give our actions meaning, they are remembered, communicated and act as a motivator or de-motivator. It can be named precisely and has a start and end point. As a matter of this, an experience changes over time.

Besides taking a look at experiences on a meta-level, it is also important to take a look at the particular factors that are directly related to our interaction with digital products, because user experience design does not only involve the product, but also the user, their activities and the context in which the interaction takes place. We understand user experience as a symbiosis of these four basic elements. As a matter of this, we extend the term experience design by the word *digital* to *Digital Experience Design* to accentuate the interaction with a digital product. The use of a digital product in contrary to analog products is essential for the general framework of interaction. Therefore we stress on this particular aspect.

The *Digital User Experience* is based on four key aspects: the characteristics of the product, the user, the activities and the context of use. The digital product is characterized by its tangible (pragmatic) and intangible (hedonic) qualities. The appraisal of functionality, performance and usability takes place on an

objective level, whereas beauty, emotion and meaning take place on a subjective level. The user is driven in particular by his intentions (goals), perception, (pre-) knowledge and culture. In this process, self-reflection and perception/cognition takes place. The user evaluates and rates the own acting and the experience as well as compares the current experience with previous ones. Before the user interacts with a product he has expectations of the product (expected experience). This experience will change over time. The user starts with some expectations before the first contact with the product, which he might have gotten from product description, photos/videos or review. During the use, these expectations can be met or not. Based on these experiences new expectations evolve. After the use a first opinion is created and new expectations for future interaction/use arise. Places and spaces, their objects and people (subjects), events and environmental influences (e. g. light and weather) characterize the context of use. An essential factor is the time, because all characteristics of the context and activities depend on it; they can change during the day and over months and years. This does also include the requirements and needs of the user; they also change over time. Consequently, it is only possible to measure the user experience at a given point in time.

In conclusion we can say, that user experience is a dynamic phenomenon, which changes over time and influences or future experiences. The context of use influences the user, the activity and the digital product. Thus, the experience can be influenced for example by poor lighting conditions, that result in reflections on the screen, the activity by tight and crowded places and spaces, and the user can be distracted by high traffic, pedestrians or other objects (e.g. vehicles in road traffic). An activity provides the connection between the digital product, the user and the usage context.

Mapping to enhance experiences and reflexion

to map: to assign (as a set or element) in a mathematical or exact correspondence <map picture elements to video memory> (Source: Merriam-Webster.com) [4]

With the term mapping we refer to the process of assigning a set of controls to a given functionality of an installation to modify the action-reaction principle of an installation. This gives the creator the possibility to enhance the interaction and user experience.

"Interactions are reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another."[5] Thus, the user can influence a process and change the systems' behavior. However, the interaction is limited to a set of rules, defined by the creator. Mapping on the other side modifies or enhances these fixed rules of interaction. It makes decisions about if, when, and how to respond to incoming inputs or which channel to use for the response. Additionally mapping is always connected to a certain topic (e.g. movement, sound). It builds in itself a closed entity.

More in general, a distinction can be made between installations in which a continuous mapping of action (input) onto reaction (outputs) is used and installations in which a sort of dialog takes place. These two conditions can be thought as boundaries of a continuum of possible interactions. According to this, we can distinguish two different types of mapping: 1. direct mapping implies some kind of directness in the action-reaction process without any dynamics; 2. indirect mapping includes some kind of logical model or reasoning that selects a reaction-algorithm in correspondence to the current context. Hence the reaction is selected from a collection of possible reactions. Due to this static concept the user experience decreases when the user fully understood the underlying mapping rules.

Therefore we propose to change the role of the actor from an active user to an active re-creator. A re-creator is empowered to manipulate the mapping rules, which allows her/him to reflect on technology, aesthetics and experience. Technology becomes a visible artifact of the installation. Performing the mapping process motivates the re-creator to explore the action-reaction framework and underlying rules. Adding personal meaning enhances the experience even more.

In traditional interactive media art works the designer defines a set of actions and reactions and maps them according to the designer's mental concept (see fig. 1). The user on the other side perceives the installation as a black box. He/she has to figure out how the installation works (action → reaction) and how the designer applied the mapping. With the lack of modifying the mapping, his/her experience of interacting with the installation is decreased. This can lead to one of the following three states: The user gets bored: He/she has figured out the installation's underlying concept and mapping; any further interaction is boring; the interaction time is too limited/short. The user gets unexcited: He/she understands the static installation concept, but its static behavior makes the interaction unexciting. The user gets frustrated: He/she cannot find out or understand the installation's underlying concept and mapping.

By applying an dynamic mapping concepts to the interactive media art work, the designer's and user's role are changed (see fig. 2):

The designer still creates a set of actions and reactions, as well as a mapping (as shown in figure 1), but in addition he/she defines certain rules and boundaries. The designer defines the different perspectives of the installation in order to reflect upon its being and purpose. He/she can adjust this experience by defining the boundaries of the mapping. The re-creator exploits the installation and modifies the mapping within the given scope through an additional interface.

However it is always a tightrope walk between level of freedom and level of art. The more mapping is applied, the more the designer divulges the installation to the user. On the other side, the less mapping is applied, the more the installation can focus on a certain aspect.

An Example: Der Schwarm

Some examples of mapping are presented in the installation Der Schwarm. [6] A flock of swarming light spots projected on the floor reacts to free body movements. The response of the swarm intelligence to the movement of the interacting user is represented through behavioral patterns. A pattern defines a set of swarm parameters such as movement direction, velocity and graphical representation. Free body movements are tracked and its velocity and position are mapped to the flock's behavioral patterns and position. Quick movements by the user evoke a fleeing or aggressive flock of light spots, while slow movements make the light spots react calm and friendly.

An enhancement of the installation Der Schwarm is an auditory display [7] that creates sound, every swarm particle creates a sound. The mapping is realized through the employment of Albert Mehrabian's three-dimensional emotion model (PAD), which has advantageous properties for digital systems and is already been applied to link properties of sound and emotions. [8] [9] Mehrabian's representation oriented system is defined through the axes valence (pleasure vs. displeasure), arousal (arousal vs. non-arousal) and control (dominance vs. submissiveness). [10] At first we mapped three major swarm behavior parameters to the axes of the PAD model. Then we assigned three sound parameters to the axes. The result is one possible mapping of swarm behavior parameters to sound parameters. An interface

enables the user to modify the mapping, so any combination of the three swarm behavior and sound parameters is manually adjustable.

In this example the user becomes a re-creator. S/he is enabled to change the mapping within a defined scope and explore its effects by full body interaction. The re-creator on the one hand can modify the underlying mapping rules and understand the installation's basic idea. The re-creator's empowerment to configure certain functions and manipulate the action-reaction framework of the installation can foster hers/his experience. On the other hand, the designer is enabled to provide restricted insights into his media art pieces. This allows her/him to draw the re-creator's attention to certain parts of the installation to deliver her/his intending message.

Conclusion

In this paper we have proposed a new concept for enhancing the user experience with interactive installations. With the installation Der Schwarm we have a proof-of-concept. Applying this approach allows an enhanced experience for the actor and provides new possibilities for the creator to reach the actor. The actor becomes a part of the whole process (not the product). Thus we are not only able to enhance the experience, but also to strengthen the engagement of the user with the installation as well as the immersion and reflection.

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EYE GAZE AS A VEHICLE FOR AESTHETIC INTERACTION: AFFECTIVE VISUALISATION FOR IMMERSIVE USER EXPERIENCE

Brigitta Zics

The paper explores the aesthetic potential of affective visualisation technology that responds to the affective changes of the user through reading their eye gaze. Through a critical investigation of current practices this research is exemplified with a practical application of affective visualisation that explores the interconnectivity of visualisations of swarm intelligence and dynamic affective changes of the user's immersive experience.

The Philosophy of Eye: The Eye-Mind Problem

Throughout the study of eye movement researchers have attempted to provide comprehensive models of how eye gaze can serve as a display of the mind, however, most research outcomes have failed to provide inclusive explanations. Early research has conveyed two significant but very different claims that have remained relevant, particularly in their accounts of the relationship between attention and eye movement. Both challenge an importance of the eye in processing information and give significance to the underlying voluntary processes of the mind as the control mechanism of attention or imagination.

Hermann von Helmholtz was one of the first scholars who attempted to explain how the mind is instrumental to the patterns of eye movements. He states that the eye's optical characteristics and information gathering is rather poor. Therefore, vision is only possible with some form of unconscious inference that makes sense of the information based on prior experiences of the world. [1] Studying the relationship between eye movements and visual attention, Von Helmholtz discovered the phenomena of 'covert attention,' which explained that visual attention is not always where eye 'fixation' (holding eye gaze on a single location) is directed to; he points out that one can attend to a stimuli without shifting visual focus. Observing letters on a screen that was too large to view at once; he noticed that without moving his eyes could 'covertly' attend any location of the screen. Although von Helmholtz's observation on visual attention introduces significant questions about the relationship between eye movements and cognitive processing, it can be stated that eye movements most commonly reflect a will to attend to objects in detail ('overt attention').

William James, reflecting on von Helmholtz account, provides an explanation of a very different aspect of visual experience in his discussion of the 'embodied eye'. James suggested that attention "is the taking possession of the mind, in clear and vivid form, of one out of what may seem several simultaneously possible objects or trains of thoughts…It implies withdrawal from some things in order to deal effectively with others." [2] He claims that attention and imagination are directly related; when attention does not regulate one's sense organs it is imagining things or actions that one is attending to, or looking for. James states that paying attention to what one is doing often consist of a similar kind of anticipatory imaginative engagement. As with Von Helmholtz's covert attention, James' 'imaginary' attention give prominence to the complexity of the eye-mind relationship, acknowledging that although the quality of motion and fixations might be measurable, their cause is not fully determinable.

The Physiology of the Dynamic Eye

In order to better understand the physiological capacities of the eye in reference to aesthetic experience, this section elaborates on the eye's basic functionalities and characteristics. It is well known that the size of the visual field is limited and can be divided into: 'fovea vision' (encompassing 2 degrees at the centre of the visual field) responsible for the sharp detailed sight, and 'parafoveal vision' (2-10 degrees off centre) responsible for low resolution compressed information next to the 'peripheral field' (>10 degrees off centre). Since the visual field cannot be processed from one single fixation (lasting between 180 and 275 ms), as a result of the limited acuity of the retina, rapid eye movements are necessary to bring the retinal image of an object of interest to lie on the fovea (saccades; lasting between 10ms and 100ms). Attention initially assigns a target before saccade eye movements happen. During saccades, vision is dormant and new information is acquired only during fixation.

For eye movement analysis there are three types of movements that might be modelled to understand the overt localisation of visual attention (when attention and eye location are matched). Fixation, 'smooth pursuits' and saccades are all under 'voluntary' control as such they are a result of intentional decision making (whilst 'involuntary' movements, such as micro-saccades, are unconscious). Whilst saccades are rapid jumps of the eye to shift gaze to the object of interest, fixations and smooth pursuits occur during the intermission between saccades. In smooth pursuits the eye tracks a moving object and compensates the velocity of the moving on the retina. Some of these voluntary eye movements can be practiced and improved with control, however a saccade cannot be disrupted. Involuntary eyelid movements, such as blinking of the eye, are recurrently applied for the measurement of affective states of the user.

Aesthetic Experience and Eye Movement Research: A Critical Revisit

Since eye movement research and its methods of recording often lends itself to reducing aesthetic experience to characteristics of behaviour, psychological accounts have subsequently been popular. An early example is Alfred L. Yarbus who used a 'scanpath' (a graph of saccades and fixations) and the visual recording of eye movements (fixations and saccades) to study complex scenes to identify mainly task-dependent patterns of fixations. Yarbus' well-known study of 'An Unexpected Visitor' proposes that the interpretation of a composition can be based merely on where the viewer looked on the image. [3] Similarly to Donald W Graham, who described the composition that guides the viewer's eye on a pleasing path of visual elements of the scene, he implies that compositions facilitate the artist's decision in the viewers' experience of looking. Yarbus explained the viewing process more as a task to be solved, and showed that the viewer reinvestigates elements of the painting that promise to explain the image. He acknowledged that: "these elements show that they give information allowing the meaning of the picture to be obtained. Eye-movements reflect the human thought processes." [3] Yarbus' approach neglected the multidimensionality of aesthetic quality of the image resulting in a limited account of aesthetic experience that only focused on the visual attention in the viewing experience.

An often-used concept in the study of eye movement research is Daniel Berlyne's description of 'diversive-specific' behavioural patterns of the viewer. [4] Berlyne's approach has been largely disregarded in contemporary psychology, yet topical eye movement research still applies his method. [5] According to these studies 'diverse exploratory behaviour' is when the viewer seeks out stimulation that has appealing collative properties (such as complexity, novelty, surprise and uncertainty that can trigger hedonic effects of arousal [4]) regardless the content or source; 'specific exploratory behaviour' is when viewer's

curiosity arouses through the uncertainty or lack of perception of particular information in the image. [5] The two types of accounts exhibit diverse patterns of eye fixations; the earlier shows diffuse clusters of fixations, the later contains high density of fixations. The initial use of Berlyne's work by Francois Molnar suggested that whilst knowledge based exploration is slow and purposeful therefore specific, pleasure based exploration is diverse. He furthermore proposed that good and bad composition can be shown by the number of transitions on the scanpath of the image before the exploration comes to equilibrium; he concluded that aesthetic engagement happens at early engagement and good composition needs fewer transitions.

Following these foundational studies, there have been many valuable contributions investigating aesthetic experience based upon discrete characteristics of viewing experience. For example, evaluating aesthetic appreciation between art-trained and untrained viewers, or understanding artist's perception in drawing or developing multidimensional methods inclusive of verbal recordings, task-directed recording and recordings of hand movements. [5] However, the major methodological problems of such research remained the same, which is the limited capacity of scanpath applications that are forced to evaluate dynamic experience of the viewer based on the analysis of static values. As a consequence, the application of reductionist conceptions of human experience has generated a fragmented account of aesthetics that broadly influenced the understanding of eye movements in aesthetic experiences and limited in its future applications.

Towards an Affective Eye: Eye Movement as Aesthetic Interaction

Mark Johnson declared that: "aesthetics must not be narrowly constructed as the study of art and so-called aesthetic experience. Instead, aesthetics becomes the study of everything that goes into human capacity to make and experience meaning." [6] Following the words of Johnson, this research also attempts to explain aesthetic experience (and aesthetic interaction) as the creation of meaning of an embodied mind. Applying Johnson's approach, human capacity in experience is explained here as affection when "meaning grows from our visceral connections to life and the bodily conditions of life… the bodily sources of meaning." [6] In a similar manner Brian Massumi referring to Deleuze and Guattari, describes affection as: "an ability to affect and be affected. It is a prepersonal intensity corresponding to the passage from one experiential state of the body to another and implying an augmentation or diminution in that body's capacity to act." [7] As such the aim of an aesthetic experience is to understand the meaning of one's everyday 'affections' in order facilitate effective engagement of the user with novel meaning creation. John Dewey explains this following: "to understand the meaning of artistic products, we have to forget them for a time, to return aside from them and have recourse to the ordinary forces and conditions of experience." [8] He goes on to state: "that experience becomes conscious, a matter of perception, only when meanings enter it that are derived from prior experiences." [8]

Following up on these arguments, in order to understand eye movements it is crucial to comprehend them as an enactive capacity that produces embodied meaning through its actions. The dynamicity of an eye, in this sense, is crucial for understanding aesthetic experience; any kind of attempt to represent this dynamic action can lead to a reduction in its characteristics. Therefore, in the framework of this research it is suggested that eye gaze in aesthetic interaction should be applied as a real-time property rather than a static value. As such, this investigation disregards the scanpath based methods of eye movement analysis and introduces 'aesthetic interaction' for aesthetic meaning creation.

Aesthetic interaction moves away from common conceptions of human-computer interfaces that focus on the 'invisibility' of the interface as most imperative facet of the human and computer relationship. Rather, aesthetic interaction requires a view where the system is a framework to facilitate user's expression and interpretation, promoting serendipity, provocation, surprise or how Umberto Eco referred to it, wonderment. In this sense aesthetic interaction acknowledges the ability of the user to appropriate technology and instead of immediate invisibility it offers an intellectual reflection process where the user's interpretations are instrumental to the system. As Graves Petersen et al. explains, aesthetic interaction "promotes improvising to be the key modality in how the user explores the worlds around her and learn new aspects." [9] Similar to the approach presented in this paper, they take Dewey's pragmatic approach further and explain bodily experience as a significant aspect of the interaction adding that: "we have to move beyond ideals of meeting human sensor motor skills and somatic sensing, to include among others human intellectual capacity to grasp and make sense of complex, contradictory and even ambiguous systems and situations." [9]

In summary, it is argued that real-time dynamic processes allow a meaningful exploitation of eye movement for particular aesthetic production. As a result, an open system is established where meaning is enacted through an indirect response mechanism where user's curiosity and imagination drives the interaction towards immersive states. The aim of such interaction is not to gain full control or full invisibility of the technology but to engage the viewer in a self-explanatory process of interaction through the movement of their eyes. As a result aesthetic interactive system is designed to respond to 'augmentations and diminutions' of the body [7] (in this case the eye) and produce responses to the anticipated affective state; meaning emerges through the continuous cognitive loop between the eye and the system.

Eye Gaze Driven Affective Visualisation and Swarm Behaviour

Having explored the aesthetic meaning of eye movement, this section introduces the concept of affective visualisation; a visual display that facilitates aesthetic experience through eye gaze. Data visualisation is generally described as "computer-supported, interactive, visual representations of abstract data used to amplify cognition." [10] An affective visualisation is an interactive system where real-time data of the users is collected and feed back to them after an evaluation of their affective state. The feedback mechanism is crucial to the interaction as the real-time flow of data is visualised to provoke an aesthetic experience for the user. In this sense the visualisation is not specifically aimed to represent data but reflect on the dynamic qualities of the data flow.

An affective modelling of the user in affective visualisation is an aesthetic exploitation of the feedback mechanism between technological effect and affective human response. Coupling the dynamic flow of visual elements (effect) with the eye movements as passage of experimental states of the body (affect) here will be explained as a 'cognitive feedback loop.' Such couplings entail an augmentation in the body's capacity to act which promotes user's involvement toward unexplored states of immersion. In application, a cognitive feedback loop is an open system where instead of discrete values for affective states the system allocates meaning to the changes in affective qualities of the user. This approach is similar to the so-called 'affective loop' concept introduced in HCI research as both concepts emphasise an affective input and output modality in order to facilitate unique and individual experiences of the user. However, cognitive feedback loop specifically builds upon the real-time dynamicity of interaction where aesthetic qualities do not represent affective states but trigger affection in real-time; this is a significant distinction as meaning here is linked to dynamic events rather than passive qualities.

An example application of the model described above is that developed for the 'Mind Cupola' biofeedback installation work. The main aesthetic concept of the display is to generate an open system that organises information along the user's eye movements in a way that it reflects their behaviour. The underlying mechanism of the visualisation is to guide the user towards a state of equilibrium, where the user's interaction is balanced between control and aesthetic satisfaction. There is no particular goal in the system other than to explore whether this process of interaction might activate imaginary capacities in the user experience by the engagement of meaning creation.

The affective modelling of the user is based on three characteristics: aesthetic engagement with the screen (level of engagement), task driven interaction (as level of attention, engagement, performance) and measurement of involuntary responses as eyelid movements (blink rate, blink closure duration). The system incorporates all voluntary eye movements such as saccades, smooth pursuit and fixations; involuntary eyelid measurements also captures user's affective responses over time.

The visual display consists of a particle system (collection of independent objects) that respond to the user's eye movement in a way that they represent three different intelligent behaviours according to the user's responses. This intelligent behaviour can be described as a form of 'swarm intelligence,' designed to visualise the natural phenomena of fish shoals, bird flocks and swarms of insects. The particular patterns (from ellipsoids to vortex arrangements) with emergent qualities such as speed, density and colour, are dynamically appointed to the changes in the user's evaluated affective states. For example fish shoal patterns is appointed to low engagement level, bird flocks to optimal performance and insect swarm behaviour to erratic engagement level. The particle system not only produces swarm behaviours but also forms simple messages as affective texts or recognisable shapes with affective meaning. They serve as a feedback mechanism for the participant, informing them of their performance over time enhancing their experience. As a result, aesthetic experiences are encouraged through the dynamic and affective quality of patterns and their responsive characteristic to eye movement.

A significant aspect of the aesthetic experience is the relationship between these emergent patterns and eye saccades. The swarm might follow or avoid the focus of the eye, which can be described as 'predator' or 'guider' behaviours. This is further used as a feedback mechanism for the user; in such a situation the system starts to distribute the swarm in such a way that it is shifted to the parafoveal vision and the peripheral field. This returns to Von Helmholtz's concept of covert attention, which implies that the user is asked to distribute or move their attention to the outside of their fovea vision. Task-driven aspects of interaction are when the user is asked to guide a swarm. Smooth pursuit eye movements are applied here to follow a particular path, or fixation when users are asked to focus to keep the swarm in a particular spot of the display to avoid, for example, objects with predator behaviour. In equilibrium the patterns become more harmonic with no predators, the aim is a pleasurable interaction based on the aesthetic engagement of movements.

The aim of this paper has been to discuss a non-reductive model of aesthetic experience that produces an affective engagement of the user based on information of the eye gaze. The semantics of this affective visualisation based voluntary movement of the eye whilst both, voluntary and involuntary responses, were evaluated in order to generate a cognitive feedback loop. It has been proposed that the collective behaviour of swarms might well simulate affective states or consciousness. As Johnson explained before, aesthetic qualities aim to trigger new meaning through the body; by the use of the relative quality of visual information and affective intelligence the users re-evaluates their everyday experiences of viewing and attaches new meanings to their actions. The critical evaluation of this research

hopes to stimulate further ways of applying theories of aesthetic experience and affective visualisation that aims to generate an open system for unique immersive experience.

An extended version of this paper with full references can be accessed at cognitiveloop.org.

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"IN THE REAR": ARTISTIC CONCEPT AND DIFFERENT SPATIALISATION METHODS

Lidia Zielinska & Rafal Zapala

The inside of the piano gets resized to the volume of a concert hall, with acoustic properties of the piano's interior being preserved and intensified. The composition deals with sounds generated inside the instrument, sounds of the instrument's mechanics, inaudible outside. In order to carry out the concept of sound space in full, a system of virtual devices had to be created. Their functions combine a number of spatialisation methods.
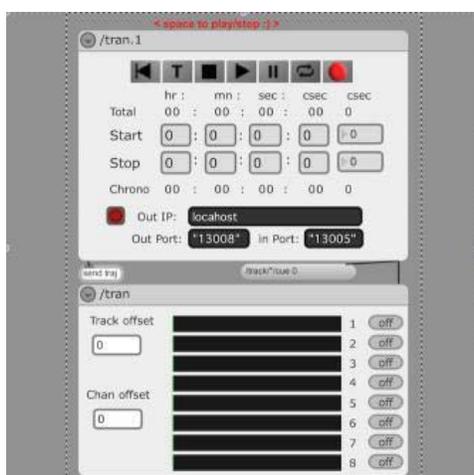

Figure 1. Patch 1_bp_holoinput.
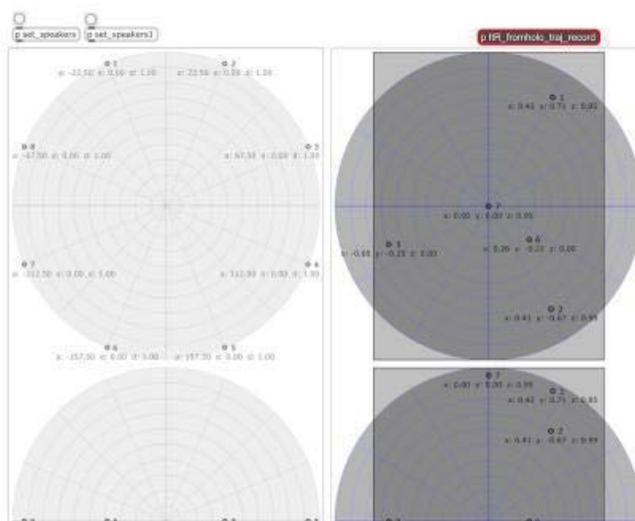

Figure 2. Patch 2_bp_ambisonics.
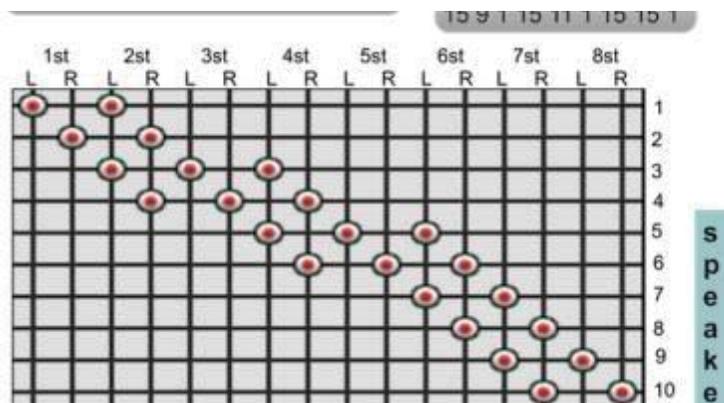
Figure 3. Patch 3_bp_player

1. INTRODUCTION

Composed simultaneously in ambisonic (live) and multichannel (fixed) versions, Lidia Zielińska's composition "In the Rear" (2010) is an acousmatic piece. The integrated system of different spatialisation methods was made by Rafal Zapała.

2. THE IDEOLOGY

In "In the Rear", piano keyboard becomes the interface between the inside of the instrument and accumulated experience of the listener's life. The acoustic world inside the piano looks different to what we experience at a concert: it resembles the experience of a child sitting under the piano. The acoustic world outside the instrument is not only its real sound at concert, i.e. in specific acoustic spaces of different reverberation, but also – or perhaps, above all – its sound in our long-term memory, in the tradition of piano literature, in various cultural codes and emotional reactions remembered.

The composition deals with sounds generated inside the instrument, at the back of the keyboard, so to speak: with sounds of the instrument's mechanics which are inaudible outside, as well as with specific reverberation inside the sound box. Symbolically, it also refers to what the instrument has experienced under numerous pianists' fingers. The inside of the piano gets resized to the volume of a large concert hall, with all acoustic properties of the piano's interior being maintained and intensified. Listeners experience resized timbres, as if they found themselves inside the instrument. Due to the scale shift, the aesthetic experience is accompanied by a more distinct physiological sensation (increased changes of acoustic pressure). One also hears idioms of great historical piano literature reverberate; this, in turn, is the support structure on which musical memory of each individual listener rests.

Motifs of 19th-century piano literature appear throughout the piece. The keys of these fragments have been adjusted; they employ a similar piano idiom. They have been edited as one sequence which preserves the musical logic and character of the erstwhile idiom even in the monophonic version. However, the motifs, which come flying to their meeting place from three spatial zones, establish a thoroughly different musical quality.

I also took the liberty of carrying out an experiment concerning our mental base. The piece originated in 2010, i.e. in F. Chopin's Year, and had its ambisonic première performance at the "Warsaw Autumn" International Festival of Contemporary Music. Listeners expected references to Chopin, and – even though there were none at the time – heard citations from Chopin's works, instead of Brahms', Rachmaninoff's and Gershwin's musical gestures quoted.

These were practical, both composing and performance/concert-related considerations that prompted simultaneous writing of two (multichannel and ambisonic) versions of "In the Rear".

In a home studio, one could control the results of a preliminary composition of the sound material solely in stereophonic and binaural way. It was only a trial at the 8-channel SMEAMuz studio that made it possible to compare the results with the imaginary spatial vision. A few days before the opening performance, a provisional system of 12 loudspeakers was assembled, which let us initially verify the ambisonic effectiveness of movement trajectories originally charted for sound objects in imagination.

From the technical point of view, performance of the multichannel (i.e. fixed) version, is relatively simple, and its acoustic adaptation is carried out by the composer or sound diffusion director as it develops. The ambisonic version, however, is performed by at least two persons: the sound director and the composer, or another competent person who computer-activates subsequent modules of the system and oversees their reliable operation. Furthermore, the ambisonic version requires an extra rehearsal to adapt the virtual system to the existing acoustic and technical conditions.

Unlike the ambisonic system, multichannel projection makes sounds move only along the circumference of the auditorium, and excludes their sufficiently precise travel along diagonals of the room. As it takes the dramatic edge off certain phases of the piece, duration of these fragments should be shortened. Thus, in terms of composition, it constitutes a different version of the piece with slightly modified contents and objectives.

At the composition stage, simultaneous development of both versions made one realise the consequences of particular solutions faster than usual. It also required permanent and full control over the whole of the sound material, as well as over its spatial distribution potential. It also led to quicker conclusions concerning perception of musical time in the all-important relation to the type of spatial distribution of the sound material. These experiences would be an ample source of material for a separate study; above all, however, they have already contributed to one's composing skills.

As far as the choice of technology is concerned, the most important assumption of the composition are three sonic layers related to their spatial disposition: a group of static stereophonic timbres, a group of monophonic sound objects dynamically exploring space, and a group of reverberation timbres.

The static group mixes different acoustic orders taken from the real world. A conventional multichannel system and 8 speakers would be sufficient for its projection.

The dynamic group – motifs "floating" in the space of the concert hall – required creating a special tool to precisely design movement trajectory, and to play it in the ambisonic system. The greater the number of speakers, the greater the precision of movement trajectories. With an arrangement of 48 speakers, the listener feels as if he or she were directly touched by sound objects floating in space.

The reverberation group required highest sampling frequency and employment of the ambisonic system to create an illusion of a concrete concert space significantly increased in size.

Each sonic group is the foundation for one phase of the composition. Thus, a need arose for each of them to build appropriate tools for concert projection.

For a composer witnessing a performance of her composition, these were observations of how different kinds of spatialisation affect the perception of time, the piece's dramatic quality, and listeners' comfort that were of great significance. Particularly important is the middle episode of the piece, in which spatial dimension and increased distance play a key role. Drastic reduction of the episode to a stereophonic version would require significantly shorter time proportions than the original ambisonic version. Similarly, an insufficient number of speakers would require recomposing the piece's time proportions. A small venue, causes considerable discomfort to listeners due to high acoustic pressure felt simultaneously from several different directions.

3. THE TECHNOLOGY

The multichannel version of "In the Rear" was intended for performance using the traditional multichannel system. Each audio track of DAW program has a fixed place in the surrounding space; it has a dedicated speaker. In order to satisfactorily present the complex spatial structure of the piece, 16 or more speakers (12 on the auditorium level, and 4 above) should be available.

It is the ambisonic technology that optimises execution of the composer's assumptions and visions related to spatial phenomena in the composition. In particular, this concerns organisation of object movement in space.

Ambisonics is a technology of work with the surrounding sound whose origins go back to the 1970s and the pioneering work of Michael Gerzon at the Mathematical Institute of Oxford University. It is particularly useful for a composer who finds the limitations of commercially available systems (5.1–10.2) unacceptable. These were the characteristic features of the ambisonic system that prompted the decision to use it in "In the Rear".

For the composer, the key requirement was full periphony, i.e. ability to freely compose in three dimensions. It concerns horizontal space, in which natural and flexible design of movement around the audience, as well as along diagonal axes of the system is possible. It also concerns unrestrained upward and downward movement of sound objects along the vertical axis. It was the efficiency of ambisonic technology that made fuller and more subtle design of one of the layers of the composition possible.

Ambisonics does not treat speakers as separate sources of sound. They are not borderlines between which the composer is forced to stretch his or her soundscape. Here, the idea is an opportunity to independently create a three-dimensional sound space developed virtually in the studio, or captured by means of relevant techniques of recording the surrounding sound. Such composition exists almost independently of the number and arrangement of speakers, as each time it can be adjusted to the size and type of the space, in which the piece is presented. It can be one of both regular, and unusual, experimental configurations. As I have already said, in Lidia Zielińska's composition the optimum arrangement is an axially symmetrical set of 16 speakers on two horizontal planes (12+4).

An additional advantage of the system which prompted the choice of this technology, is equivalent treatment of sounds coming from all directions – equivalent treatment of speakers, which only constitute a medium intended to carry a B-Format-coded composition in a manner closest to the natural. In traditional systems, particular speakers play highly specialised roles, which limits their functionality.

In line with the composer's assumptions, and – as a result – with the multi-layered structure of the piece, "In the Rear" combines different approaches to work with spatial sound.

The full spatial structure of the composition consists in the following layers:

- dynamic layer – monophonic objects moving in periphonic space,
- static layer – stereophonic sounds of defined location in the surrounding space,
- reverberation sound layer.

3.1. THE DYNAMIC LAYER

The dynamic layer is a set of monophonic sounds of precisely designed movement in space. Adequate precision and comfort of designing the trajectory was achieved with Holo-Edit software module, part of Holophon project systematically developed at GMEM Institute in Marseilles. [1]

Holo-Edit is a graphic editor of sound trajectory, which makes simultaneous animation of as many as eight tracks in three-dimensional space possible. It was selected for its high precision and method of operation known from DAW programs. The program automatically converts spatial trajectories drawn by the user into tonal changes of the moving sound, such as stratification of the spectrum, the Doppler effect, structure of reflection and reverberation, air absorption, etc.

It has to be noted that despite a similar working method, the program is not an audio sequencer. It is a tool intended only and exclusively for drawing and recreating trajectories. We do not process or edit sound; we only organize its movement in three-dimensional space. The program has no audio output to make hearing sound possible. There is no B-Format coding, either. To make it possible, data from Holo-Edit had to be sent to relevant tools created in Max/MSP.

3.1.1. Patch 1_bp_holoinput

Constructed for "In the Rear", the first patch (see Figure 1.) acquires data from the Holo-Edit program. Its main elements are two modules from Jamoma, an extensive set of tools created for the Max/MSP environment.[2] Open Sound Control data transmission technology is used at the crucial moment of communication between programs (Holo-Edit and Max).[3]

The first module of the patch is responsible for the so-called "transport" functions, i.e. transmission of data concerning time synchronisation, as well as for receiving key data about sound trajectory. The other module receives sounds, monophonic audio signals from the Holo-Edit. The dynamic layer of "In the Rear" consists in seven tracks.

3.1.2. Patch 2_bp_ambisonics

The task of the second patch (see Figure 2.) is ambisonic operation proper: coding to B-Format and decoding to multichannel form, which makes feeding sound to speakers possible. These functions are performed by a set of objects (ambiencode~, ambidecode~) written for the Max/MSP environment at the Institute for Computer Music and Sound Technology in Zurich.[4]

By coding a moving sound object to B-Format, we place it in a virtual, three-dimensional space. Two GUI type objects (ambimonitor) enable the user to monitor this space: control the objects' movement, and define location of speakers by means of which the piece shall be presented.

3.1.3. Patch 4_bp_output

Upon decoding, the signal is sent to 4_bp_output patch, which is responsible for audio interface outputs. This patch closes the audio network on the computer. Made up of typical elements of Max/MSP environment, as well as of objects which constitute the SPAT set developed at IRCAM in Paris, it enables the composer to add the final reverberation to correspond with the acoustics of the performance venue. [5]

3.2. THE STATIC LAYER

Stereo audio tracks transmitted in the periphonic space in a distinct way constitute the second layer of "In the Rear". Together with the designed movement inside its stereophonic space, each timbre has been assigned to a pair of speakers around the audience, and duplicated with speakers over the listeners' heads. This has created a static (though "live") space based on eight independent stereophonic systems expanded with sound coming from above.
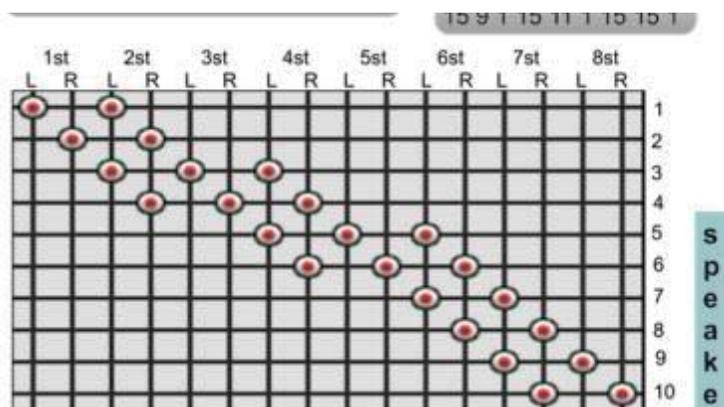

Fig. 3. Patch 3_bp_player

Patch 3_bp_player is responsible for playing these tracks. This patch works as a multichannel player of tracks created by the composer during her work at SMEAMuz studio in Poznan. Consisting in a set of multichannel players of stereo sounds, it is synchronised in time with Holo-Edit program and other elements of the system. To perform live in different spaces, the composer had to be able to freely assign particular tracks to specific pairs of speakers. This function has been incorporated into the patch in the form of matrix (see Figure 3.)

3.3. THE REVERBERATION LAYER

The material used to produce this layer mainly originated in a recording of real timbres inside the piano. It was also here that ambisonic technology was used, although it was employed in a different way.

Using the tools built to meet the requirements of the composition's dynamic layer, the composer was able to create virtual space in the studio, practically speaking, from scratch. The goal of the reverberation layer, in turn, was to render the acoustic reality of the inside of the piano, and to expand it to the size of the concert hall. Thus, a technology of recording the material directly in the 4-channel structure of the B-Format was employed. SoundField ST350 microphone was used. An extensive collection of piano timbres was built: whole phrases, individual timbres, sounds of the instrument's mechanics, as well as specific reverberations inside the body. The character of the recorded timbres is both static and dynamic: they move in space. In her work, the composer used Lexicon 960LD to select and transform the material, as well as to elaborate its reverberation.

Sounds of this group are played by the other multichannel player in patch 3_bp_player. Similarly to static sounds, it boasts the ability to configure speakers through the matrix.

Sounds from all sources, effects of all spatialisation methods, "meet" in the previously discussed patch 4_bp_output. Objects employed on it enable its quick adaptation to specific performance conditions: the number of sound card outputs (which is related to the number of speakers used), and acoustics of the hall (through the ability to finally correct the reverberation of the entire piece).

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COLLABORATION MODELS IN BIG SOUTH LAB

Andreas Zingerle, Tyler Freeman, Lars Kynde & Anne Nigten

This paper highlights the co-creation processes of two electronic art and design works in the Big South Lab; the VJacket coordinated by Andreas Zingerle and Tyler Freeman and The Big South Orchestra, coordinated by Lars Kynde and Maartje van den Hurk in collaboration with 12 youngsters. We'll examine the design models and the co-relation between the deployed collaboration models and the projects' qualitative outcomes or co-ownership.
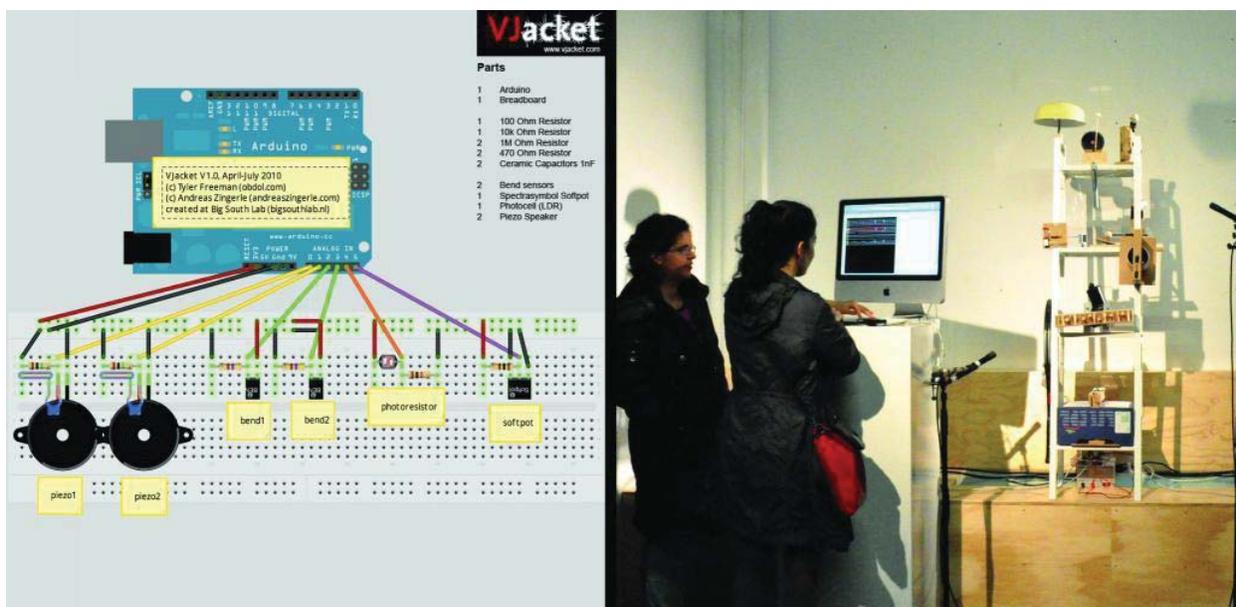
Design document VJacket (L),presentation Big South Orchestra (R). CC some rights reserved The Patching Zone (Zingerle, Tyler, Kynde, Nigten).

The context: Big South Lab

Big South Lab was the second project that The Patching Zone realized in Rotterdam South, in the borough of Feijenoord. The Patching Zone developed the Big South Lab project for young people between the ages of 15 and 27. The Big South Lab is modeled around training, through workshops and co-creation projects, in the creative media field. Big South Lab, executed and initiated by The Patching Zone and its partners, distinguishes itself from competitors and other initiatives through its way of working: above-average students and young professionals addressed a socially relevant project as a team. The team combines some principles of participatory design, co-creation and interactive art. This means that stakeholders (young people/residents) play an important role in the design, realisation and distribution process. Their roles vary from designers, usability testers, interns, scouts, trend watchers, co-owners of projects. **[Nigten]** Negotiation and collaboration are central in The Patching Zone approach; in this paper we'll investigate the consequences of the chosen collaboration models in Big South Lab.

The VJacket is a piece of wearable technology that enables the wearer to interact wirelessly with audio-visual processing software. Implemented in the jacket is a sensor network consisting of bend, touch and hit sensors that you can trigger and control your preferred audiovisual effects in realtime, all from the comfort of your own jacket [VJacket] The jacket invites you to move your body to trigger these effects, show your rhythmic expression or just dance to your favourite music and create visuals at the same time.

 Our objective was to create, with the VJacket, an alternative way to access and manipulate audiovisual content. Inspired by research projects like "the Djammer" [slyaden],"Go Dance" by [negrillo] or the "sensorsuit" that was used by the Dutch performer 'Eboman' [eboman] we wanted to free the DJ/VJ from the 'behind the screen' posture you can normally find them at parties or in nightclubs. This objective was combined with the interest of the project's focus group. In general a lot of teenagers try to express themselves through fashion, dance and music and want to show this at social events and parties. The designers' initial concept, originating from media art, was suggested to be interesting for the focus group as a starting point, while details for the design were developed with the two representatives of the focus group.

 Following the objectives, we split the development process of the VJacket in different design phases, each covering a specific field within the making process. This resulted in modular workshops where we gave introductions into 'Vjing and software', "Wearable technology', 'Arduino and sensors', 'Alternative controllers used in VJ performances' and 'Making of the jacket' [bsl]. Tyler Freeman [odbol] and Andreas Zingerle [az] both work in the media art field and realized various projects as VJs, interface designers, musicians or experimental film directors. Teaming up at the Big South Lab [bsl] we did several workshops for teenagers and young adults in the Rotterdam-Zuid area, examining a creative (mis)use of technology. The two bsl interns Geoffrey Frimpong and Kevin Brito were our scouts into the subculture of the neighbourhood. Considering several design choices like comfort, style, sensor placement and content creation we were planning, designing and prototyping, in several 'peer2peer sessions', a second version of the VJacket with them.

 A more detailed overview on the design challenges and technicalities can be read in our paper "Enabling the VJ as Performer with Rhythmic Wearable Interfaces" [az, tf].

THE VJACKET DESIGN CYCLE

The VJacket was developed in an iterative way, we describe the major steps of the design and development process that we took. The design cycle was based on a pragmatic approach that showed a parallel with the combined approach for user centered and user driven design Eric Reiss gives. **[Reiss]** 'Firstly, we organized a series of user centered workshops based on the information we received from our scouts, we prepared a series of workshops that generated feedback on the design decisions and informed the next steps for the design process. For example; we hosted the 'Vjing and software' workshop. The students were very fast learners and by the end of the two hour workshop they had already created a VJ set to play for a hip-hop concert that they were performing the next day. Now it was time to show them how to use alternative controllers and OSC to affect the visuals. We started with the WiiJ Video program, an application that allows you to VJ using gestures and motion tracking using the Nintendo Wii remote. [http://wiijvideo.com] This workshop was held at the Go-for-IT! Relaunch Festival, and there

were even young kids trying the controller who excelled at controlling the visuals with little or no training.

In one of the final workshops, we worked with the students to develop their own VJacket, here we shifted from a user centered approach towards a user driven and finally for the last parts towards a participatory approach within the given boundaries of the VJacket design framework. The VJacket hardware was designed in a modular way, with the ability to choose exactly which kinds of sensors you wanted to use. The circuits and software were designed as to allow any combination of sensors, which can be swapped with other sensors by attaching them with velcro. The variable sensor position allows for comfortable attachment and finer sensor control customized to the wearer [gemperle, 4].

This modular design was tailored, according to principles from participatory design, for particular users such as for step dancer Geoffrey Frimpong. This version allowed us to use all percussive piezo sensors, so he could slap different parts of his jacket during the dance for a dominantly rhythmic, staccato audio-visual performance. In contrast, the other custom made version for Kevin Brito, reflect his dance style and is more smooth and flowing, so he made a lot of use of the bend sensors and slide sensors during dancing. In this way, each sensor in a person's VJacket is an extension of that person's style: just as an expensive suit is tailored to follow the contours and movements of an individual's body, the VJacket's sensors are placed to capture and accentuate the performer's natural style, creating a highly personalized instrument.

VJACKET'S STATE OF AFFAIRS

The VJacket was presented to the public in several smaller events and presentations and also shown in a big event that took place in November 2010 at the Creative Factory [cf] in Rotterdam. The development process was documented and resulted in 'Do-It-Yourself' explanations that can be found on popular community sites [make] [instructables], and the source code for the Arduino2OSC software is available for download and collaboration on the VJacket website [VJacket]. The VJacket is a work-in-progress by the designers Freeman and Zingerle.

Kynde reports on the design process of the Broad Band Band, Big South Orchestra

The following part of this paper is an analyzes of the co-design and development process of the interactive musical installation, the Broad Band Band [BBB], that was presented at the Big South Event, on the 19th of November 2010. The installation consisted of a variety of small mechanical instruments activated by motors and solenoids, controlled from multiple computers via a network based graphical interface.

BIG SOUTH ORCHESTRA: FIRST PHASE OF THE DESIGN CYCLE

During the first phase we, the designers, Lars Kynde [LK] and Maartje van den Hurk, created the overall concept, the framework and interface of the installation.

In contrast to the two later design phases, we (the designers) took part as participants. We were working creatively within the overall structure of The Patching Zone.

The Big South Lab priorities to be incorporated were: "Elements of music, interactivity and technology, implemented via the Processpatching-approach [PP] (meaning transdisciplinary collaboration as found in electronic art) and The Patching Zone-approach (meaning participatory design, bottom-up approach, and involvement of the stakeholders)"

BIG SOUTH ORCHESTRA: THE SECOND PHASE OF THE DESIGN CYCLE

The self-playing mechanical instruments used in the installation were created during a workshop with 12 participants (18-26 years old). The workshop participants were invited to create an electro mechanic musical instrument each. To do this they were provided motors, solenoids, materials for building and sound production and the necessary tools. The participants were free to experiment and build on the basis of their individual ideas. On the other hand they were restricted to use the material available, and though we had tried to find as big a variety of components as possible with the emphasis on letting the materials be as non-specific as possible, it was impossible not to influence the creative process through these pre-choices. The participants were encouraged to work independently on each their instrument, so that everyone would go through all the steps of the creative process. On the other hand they were also allowed to help each other and to interchange ideas. We, the workshop leaders, changed gradually our behavior during the day of the workshop, allowing gradually bigger freedom and independency to the participants. We, the designers, started as masters and by the end of the workshop days we worked as peers with the participants. Even though the changes happened gradually, I could sum it up to three different roles that we took during the workshop-day: Initially, we started as initiators (masters) presenting the idea and giving the assignment. We moved from the previous 'user centered' working model towards 'user driven' model as we passed the authority on to the participants and with that came also our trust in their self-responsibility of finding the right solution. Still we walked around the table to overview the process and assisted them when this was needed.
Thirdly we put ourselves completely on the same level as the participants, sitting around the same table building our selves more instruments, and at the same time sporadically giving advises to the projects in process. Since they were also increasingly helping each other, the distance between workshop leader and participant became smaller towards the end of the workshop. The results became a broad variety of instruments all with very distinct personalities reflecting the different personalities of their creators.

BIG SOUTH ORCHESTRA: THIRD PHASE OF THE DESIGN CYCLE

The installation let the public take the role as composers. The interface functioned as an empty musical score rolling over the screen from right to left. The score was ready for notes to be drawn by the visitor. During the presentation two computers were connected and synchronized via a local network. That made it possible for two composers (visitors) to work together on the same musical score simultaneously.

BIG SOUTH ORCHESTRA: FEEDBACK FROM THE FOCUS GROUP

During the day of presentation, the interest of the visitors was mostly centered on the creative interaction. They were trying to find the most cool rhythm or building up an ideal sequence of sounds to be executed, enjoying the compositions as they took shape.
At the same time, the visitors did not express any need for saving or recording their compositions, or otherwise keeping or using the results after the creation, even though they put a lot of time into building up the compositions and exploring the interface and the instruments, they did express great joy interacting with the instruments and each other, creating a piece of collaborative music.

Concluding thoughts on both projects

The VJacket's development cycle showed how much the makers and the focus group share interests in Interaction Design, photography, music, street culture etc. Sharing these interests made it a fun time to plan the VJacket, work on different workshop proposals and create special content for it. It needs mentioning that the cycle of engagement for the content workshops was much shorter than the required engagement time span for the development of the entire VJacket project. The short concentrated workshop cycles were focused on direct outcomes, after several afternoons the participants finished their own movie, in some hours they made a rap, mixed sound or participated in a VJ session. Workshops with direct results and short cycles that focused on topics or media expressions that were somehow familiar to the focus group worked well and also generated relevant material. The quality of the workshop's outcomes varied a lot from aesthetically convincing to more well done and amateurish.

Working over a longer term with the youth from the neighborhood on the VJacket turned out to be problematic due to the lack of many continuity aspects that made it impossible to create a presence with the VJacket team within the neighborhood society or creatively-influence the youngsters' minds. The creators Freeman and Zingerle created the first prototype within 2 months in a user-driven way. After the lack of qualitative input from the focus group the designers decided to develop the second prototype more according to a user centered design. Although the two focus group collaborators kept on being interested to work together they did not seem to feel any ownership and it was difficult to plan a performance with the jacket and to motivate the interns to create their own film clips to VJ with.

Compared to the initial objective of the VJacket, the user-centered design process was a good attempt to start from, whereas the user-driven process was more problematic. The quality of the project's outcome therefore can only be measured according to the makers' design and media art standards and we feel that we did not succeed in creating co-ownership. The cycle that is suggested by Eric Reiss that includes the option to jump between user centered and user driven could not be established. The VJacket is still a work in progress but seems to meet the designers desired artistic qualities.

Kynde states on the results of the Big South Orchestra:

'If I personally should say what I took with me from the Big South Orchestra project, then I would put the emphasis on the experience the project gave me. I would mention the knowledge and skills gained from my own research and the help from my colleagues and the experts, and I would certainly mention the experience gained by leading the workshop.' Kynde continues: 'the final outcome of the process, was of course part of the process itself, and those two can therefore be difficult to separate. Yet I would state that the value of the final work, meaning the physical outcome, seems infinitely small compared with the value of the experience. I agree thus with the general reactions that I got from the other frameworks during this project, namely that the process was experienced as more valuable than the final result'. […] 'The success criterion for the Big South Orchestra was mainly mutual inspiration and learning during the creative process, secondarily the artistic quality of the installation produced.' We therefore can state the process was successful, if we take the enthusiasm of the participants as our main indicator. Although, the participants did enjoy the making process, they did not engage with the final results.'

OVERALL CONCLUSION

As an overall conclusion one can state that we can determine a co-relation between qualitative outcomes and the co-creation process in the Big South Band project. In this project the quality of the collaboration among the youngsters and the designers can be considered as being of high quality, if we take the participants enthusiasm and their presence as a reference. For the presentation of the Big South Orchestra, the makers mention the interaction as another qualitative parameter though here a new audience came in. One therefore can state that high quality input and engagement in the workshops did, in this case, not generate a need for workshop participants to showcase the work. A similar pattern can be observed with the short workshops in the VJacket design cycle. The content workshops (short time span) were well attended and generated qualitative outcome. The longer term collaboration was more difficult to establish in the VJacket development process, here the designers decided to leave the planned user driven approach and to continue according to a user centered approach. The quality of the VJacket's final outcome will therefore be measured from a designer's viewpoint only.

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NEUROBODYGAME: THE DESIGN OF A WEARABLE COMPUTER FOR PLAYING GAMES THROUGH BRAIN SIGNALS

Rachel Zuanon & Geraldo Lima

This paper has as a main objective to present the design aspects involved in the development of the NeuroBodyGame that consists of a wearable computer that allows the user to play games using their brain signs. It is a wireless interface for brain interaction with games loaded into the system. Both games and wearable computer react to the emotion of the user at the moment of interaction.

Fig1 NeuroBodyGame – Neuro Action, 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa

Fig2.*NeuroBodyGame – Interaction with Game by brain wave activity and neurophysical signs from user. 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa*

Fig. 3. *NeuroBodyGame – BCI interface, 2010, Rachel Zuanon & Geraldo Lima, wearable computer and interactive installation, © Rodrigo Pessoa*

The advances achieved in recent years through ubiquitous computing, "as the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user," [1] are responsible for transforming significantly how men and machines interact. This way, the body presence of the interactor, distended by its gestures, is sufficient to establish the communication flows between these systems, until then only mediated by the physicality of tangible interfaces.

Mouses, keyboards and joysticks make room for the user's body, free to move about in the digital space miming his actions in the three-dimensional physical environment. Loose or limited movements, gestures and voices construct the expression of the visible body, in a continuous dialogue mediated by the invisibility of intangible interfaces. The configured mobility thus announces another condition for interactive existence in which games stand out as universe of hybrid reality – physical and digital.

This context gains even more dimensions with the addition of concepts from affective computing, in which the machines presenting affective abilities focused in recognition, expression, modeling, communication and in response to user's emotion [2] and bio-interfaces, by providing a differentiated condition

for interaction, governed by the user's biology. [3] In other words, the interactor's emotion literally comes into play so an interactivity of another nature can present itself.

Within this scope, NeuroBodyGame is a wearable computer that incorporates the concepts of wearable affective computing and of the bio-interfaces (functional biometric interfaces and the brain-computer interface) to provide an organic interaction between humans and games and thus lead these systems to a co-evolutionary relationship in which the games and the wearable computer are changing according to the thoughts and emotions of the users at the moment of interaction. Thus, this paper has as a main objective to present and to discuss the principal design aspects involved in the development of this wearable computer focused on allowing the users to play games using their own organism.

Art, Science, Technology, Fashion and Games: a transdisciplinary design

Initially, it is important to underscore that the creation and development of the entire NeuroBodyGame (NBG) system involves a transdisciplinary team comprised of artists, designers, doctors and engineers, which provides the encounter and unique exchange of knowledge between specific areas of training that present themselves fully articulated and integrated to the product's final result.

NBG integrates wireless interfaces for brain and biometric interactions with games loaded into the system, which allows the users to play games using their neurological and physiological signals. Thus, the functional biometric interfaces are responsible for checking the player's ANS (autonomous nervous system) variability and for providing information about his physical status or behavior, gathering the physiological data in a continuous manner, that is, without having to interrupt user activity, in this case, his playability with the game. In this system, two biosensors are used as input channels for the interactor's physiological data: the galvanic skin response sensor (GSR); and the blood volume pulse sensor (BVPS). The brain-computer interface employed transforms the electrophysiological signals of reflexes from the player's central nervous system activity into messages to be sent to the game being played. In other words, in NBG, the player's physiological information acts as data to configure an interaction that corresponds to his organism's status, specifically at that given moment of his relationship with the game in question.

In order to achieve all ages, two games that are being used with the NBG: NeuroBodyGame Dragon which aims at a light user and has a less complex playability and NeuroBodyGame Car which aims at a more experienced user and presents a complex playability. Both games are open source – a fundamental characteristic for providing full remodeling of the programming and integration with the games' controls and the interactor's brain and physiological commands.

Like the frequencies of the brain waves, acquired from the brain-computer interface, the player's following physiological parameters are also read during playability, by the functional biometric interfaces: emotional variability; anxiety control; emotional response; sympathetic and parasympathetic nervous system; functional oxygen; and cardiac frequency. The mapping of these brain waves and these parameters are done and associated in real time to game features, which begin to react in accordance with the player's physiological state. In other words, the feedback obtained by the interactor from the game as well as from the wearable computer results from his emotional state during the interaction with the entire digital system.

Thus, the playability can get easier or more difficult according to the brain wave frequency and the physiological state of the user at that very moment. The wearable computer interprets the brain activity and the emotional state of the user and reacts to it by changing the colors (back and front) and by applying vibrations (back). A really calm user, extremely careful and focused will have his playability enhanced and the NBG will mostly react by showing the color blue. If the user is just calm and focused, the color displayed is green. A tense user, if a bit unfocused or even nervous, will have his playability worsen and the NBG will react to it by turning into yellow and applying a soft vibration in the area of the back. And a really tense and unfocused user will have his playability worsen and the NBG will react by changing its color to red and by vibrating really intensively.

In relation to the piece of clothing that carries the wearable computer, the starting point for its investigation and creation follows the same principles that govern the conception of pieces for a fashion collection, in which for defining its formal elements, the following aspects must be considered through experimental research: fabrics, textures, silhouette, finishing, processing, color, comfort and adaptation of these to the design for each piece. In this sense, the project procedure for the NBG proves to be identical. However, differently from a piece for a collection, in NBG, the project does not focus all its efforts in external appearance of the clothing, but rather in the structuring of its interior. In other words, it focuses on the incorporation of a series of necessary devices for operation of the wearable computer, which requires specific and appropriate adjustments for their implementation and consequently for obtaining satisfactory results.

The objectives desired by NBG, as previously described, require it to have a series of cables and electrical wires; LED tapes, rechargeable batteries, vibrators/massagers; keyboard; sensors and electrodes, for acquiring vital signals; as well as a controller system for all information acquired and interpreted in real time, which enables user-computer interaction. For such, as a first step, the guiding concept for distribution of all items in the NBG lies in considering that its internal structure reproduces the interior of the human body, taking the brain as the main point from where the nerve stimuli responsible for body functioning depart and arrive. That is why, the electrodes and sensors responsible for measuring the user's neural and physiological signals are located in the front view of the wearable computer.

Thus, with the human body as a reference, along the spine and medulla, the NBG reproduces the chain of electrical conductors which allow sending information to other areas of the wearable device. In a second instance, the distribution of other devices and circuits is carried out, allowing the operation of all wearable computer items. In the third step, support points are created for each of the internal components while the final design of the piece of clothing is established. The fourth step, in turn, focuses on the choice of fabrics, which have basic divisions and classificatory subdivisions that refer to the types of each in the set. There are two main divisions: texture – which influences the look of the cloth, the cut and the modeling – and the framework, which establishes the foundation on which the yarns are supported and indicate the sequence the loom will work, providing them with different aspects and uses. [4]

In order to build the NBG, different textile structures can be considered for receiving all the components mentioned above. At the same time, the user's comfort must be taken into account during the entire process for installing this wearable computer since poor adjustment of the piece to the player's body can hamper playability. Furthermore, NBG's design aims at uniting comfort, sensations and emotions of the user, also related to the tactile experience with the wearable item, because "although touch is not exactly an emotion, its sensory elements induce neuronal, glandular, muscular and mental alterations that together we call emotion." [5]

Thus, the design of the wearable item considers the application of three raw materials that, together with modeling, unite the intrinsic aspects of its making, comfort and esthetics. Thus, the first fabric, besides defining the inside of the piece of clothing, also constitutes the structure on which all circuits and devices are supported. Also, considering the need to carry out their maintenance, a second fabric is used to accommodate and provide stability to the applied components, preventing them from slipping during use of the NBG. And the last fabric, while granting the appearance of the wearable computer, also provides for the light emitted by the LEDs installed inside to be revealed without exhibiting the devices and circuits that comprise the interior of the piece.

For the process of choosing the raw materials, which meets the needs of the wearable computer, it is necessary to observe that the weight, fitting, elasticity, movement, adherence and texture are qualities of the fabrics as are the color, print, weave, structure, shine, opacity or transparency, flexibility and malleability. [6] Thus, these textile characteristics or qualities, which also deal with the behavior of fabrics in relation to touch, guide the definition of materials and respective colors used while also adding quality and providing the desired results for the operation of NBG, such as: (1) allow transparency and noninterference in the projection of colored light hues emitted inside the clothing; (2) in its external appearance, translate visual comfort and shine as key needs; (3) the notions used in making the clothing must also be in chromatic harmony. From these definitions, the design of clothing considers the use of materials in their compositions that alternate the use of yarns and fibers like cotton, polyamide, polyester and synthetic foam - the latter responsible for the piece's structural base.

Associated with that, a concept of significant importance and which also permeates the making of the piece as a whole is found in the possibility of it being used by bodies of diverse biotypes. For such, the shape of NBG was defined based on a vest, since it permits adjustments to different bodies by extending or reducing the piece using adapters and Velcro applied to the internal face. It means that the wearable computer can be expanded or contracted in order to fit the user's body. Its main challenge lies in the fact that it tries to preserve the user's comfort. Once each and every possibility of discomfort may alter the neurophysiologic signs and by doing so, it would compromise the organic information acquired. The same criteria was used in the composition of the strap that is attached to the head – for acquiring the player's brain signals – and also considered for designing the wrist, where the keyboard used for the game is installed.

Another important moment to emphasize, considering its impact on the design of the wearable computer, guiding the making of needed adjustments, involves the usability tests conducted with NBG users throughout the entire process. These tests include the analysis of aspects related to comfort, mobility, and adaptability of the user to the functional biometric and brain-computer interfaces and the integration of physiological functions of the player's organism to the functionalities of the game in question.

Also, the player/NBG relations observed during interaction of a significant number of users – more than 5,000 – during exhibit of the wearable computer at FILE (International Festival of Electronic Art) 2010, leads to the conclusion that the use of biological information from the interactor to configure organic playability with the games constitutes a fertile field of research, considering the immersion potential the brain-computer and functional biometric interfaces provide when associated with affective computing concepts and applied to interactive digital systems, such as computer games.

Game Training and Neuro Action Stations

NeuroBodyGame's design also extends to physical space, taking into account greater immersion of users with the proposed games. Conceived as two different environments, also called Game Training and Neuro Action stations, respectively, its interactive space configures an installation.

In a first moment, and still without use of the wearable computer, the interactor learns about the two games. This occurs in the first station, Game Training, which consists of a space dedicated to necessary training for the user to become familiar with the games indicated before interacting with the wearable computer. This training occurs directly on a desktop computer.

Neuro Action, in turn, consists specifically of user interaction with the games through their brain and physiological signals, based on use of the wearable computer. In this instance, the games are designed on an 80-inch screen that integrates game visualization to neural activities and other physiological parameters of the player that are being acquired by NeuroBodyGame during playability. The projection is made at a comfortable height for game visualization by people of different heights, meeting the ergonomic parameters and also keeping a minimum distance between the screen and the interactor.

Thus, from all these aspects presented and discussed above, in our future studies we consider the design of wearable computers that provide increasingly complex levels of interaction between the user's organism and the elements that constitute a game - characters, scenarios, feedback and playability - in order to configure effectively co-evolutionary communication between both systems: biological and technological.

References and Notes:

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